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Department of Defense
Fiscal Year (FY) 2019 Budget Estimates

February 2018

Air Force

Justification Book Volume 2 of 3

Research, Development, Test & Evaluation, Air Force

Vol−II

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Department of Defense
FY 2019 President's Budget
Exhibit R-1 FY 2019 President's Budget
Total Obligational Authority
(Dollars in Thousands)

01 Feb 2018

Appropriation	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO
Research, Development, Test & Eval, AF	28,381,681	27,577,477	27,577,477	365,205	365,205
Total Research, Development, Test & Evaluation	28,381,681	27,577,477	27,577,477	365,205	365,205

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Department of Defense
FY 2019 President's Budget
Exhibit R-1 FY 2019 President's Budget
Total Obligational Authority
(Dollars in Thousands)

01 Feb 2018

Appropriation	FY 2018 Emergency Requests** Emergency	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency
Research, Development, Test & Eval, AF	255,744	-255,744		28,198,426	-255,744	27,942,682
Total Research, Development, Test & Evaluation	255,744	-255,744		28,198,426	-255,744	27,942,682

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Department of Defense
FY 2019 President's Budget
Exhibit R-1 FY 2019 President's Budget
Total Obligational Authority
(Dollars in Thousands)

01 Feb 2018

Appropriation	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Research, Development, Test & Eval, AF	39,892,149	600,465	40,492,614
Total Research, Development, Test & Evaluation	39,892,149	600,465	40,492,614

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Department of Defense
FY 2019 President's Budget
Exhibit R-1 FY 2019 President's Budget
Total Obligational Authority
(Dollars in Thousands)

01 Feb 2018

Summary Recap of Budget Activities	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO
Basic Research	521,594	505,259	505,259		
Applied Research	1,314,271	1,284,114	1,284,114		
Advanced Technology Development	792,497	794,017	794,017		
Advanced Component Development & Prototypes	2,822,781	4,605,030	4,605,030	13,200	13,200
System Development & Demonstration	3,983,019	4,476,762	4,476,762		
Management Support	1,690,840	2,663,875	2,663,875		
Operational Systems Development	17,256,679	20,585,302	20,585,302	122,158	122,158
Undistributed		-7,336,882	-7,336,882	229,847	229,847
Total Research, Development, Test & Evaluation	28,381,681	27,577,477	27,577,477	365,205	365,205

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01 Feb 2018

Summary Recap of Budget Activities	FY 2018 Emergency Requests** Emergency	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency
Basic Research				505,259		505,259
Applied Research				1,284,114		1,284,114
Advanced Technology Development				794,017		794,017
Advanced Component Development & Prototypes	90,500	-90,500		4,708,730	-90,500	4,618,230
System Development & Demonstration				4,476,762		4,476,762
Management Support				2,663,875		2,663,875
Operational Systems Development	165,244	-165,244		20,872,704	-165,244	20,707,460
Undistributed				-7,107,035		-7,107,035
Total Research, Development, Test & Evaluation	255,744	-255,744		28,198,426	-255,744	27,942,682

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Department of Defense
FY 2019 President's Budget
Exhibit R-1 FY 2019 President's Budget
Total Obligational Authority
(Dollars in Thousands)

01 Feb 2018

Summary Recap of Budget Activities	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Basic Research	517,819		517,819
Applied Research	1,312,342		1,312,342
Advanced Technology Development	814,797		814,797
Advanced Component Development & Prototypes	6,529,943	13,495	6,543,438
System Development & Demonstration	5,272,191		5,272,191
Management Support	2,839,511		2,839,511
Operational Systems Development	22,605,546	586,970	23,192,516
Undistributed			
Total Research, Development, Test & Evaluation	39,892,149	600,465	40,492,614

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FY 2019 President's Budget
Exhibit R-1 FY 2019 President's Budget
Total Obligational Authority
(Dollars in Thousands)

01 Feb 2018

	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO
Summary Recap of FYDP Programs					
Strategic Forces	658,404	825,038	825,038		
General Purpose Forces	2,060,061	2,962,365	2,962,365	9,750	9,750
Intelligence and Communications	2,048,032	1,466,925	1,466,925	5,400	5,400
Mobility Forces	476,577	602,629	602,629		
Research and Development	10,034,179	10,713,989	10,713,989	7,800	7,800
Central Supply and Maintenance	93,625	109,419	109,419		
Training Medical and Other	3,251	3,615	3,615		
Administration and Associated Activities	31,237	-7,214,983	-7,214,983	229,847	229,847
Support of Other Nations	4,626	4,569	4,569		
Space		3,165,909	3,165,909		
Classified Programs	12,971,689	14,938,002	14,938,002	112,408	112,408
Total Research, Development, Test & Evaluation	28,381,681	27,577,477	27,577,477	365,205	365,205

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01 Feb 2018

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Summary Recap of FYDP Programs						
Strategic Forces				825,038		825,038
General Purpose Forces				2,972,115		2,972,115
Intelligence and Communications	90,500	-90,500		1,562,825	-90,500	1,472,325
Mobility Forces				602,629		602,629
Research and Development				10,721,789		10,721,789
Central Supply and Maintenance				109,419		109,419
Training Medical and Other				3,615		3,615
Administration and Associated Activities				-6,985,136		-6,985,136
Support of Other Nations				4,569		4,569
Space				3,165,909		3,165,909
Classified Programs	165,244	-165,244		15,215,654	-165,244	15,050,410
Total Research, Development, Test & Evaluation	255,744	-255,744		28,198,426	-255,744	27,942,682

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Summary Recap of FYDP Programs	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Strategic Forces	1,064,875		1,064,875
General Purpose Forces	3,287,655	53,049	3,340,704
Intelligence and Communications	1,394,674	54,600	1,449,274
Mobility Forces	916,041		916,041
Research and Development	12,027,571		12,027,571
Central Supply and Maintenance	97,134		97,134
Training Medical and Other	3,578		3,578
Administration and Associated Activities	130,882		130,882
Support of Other Nations	3,998		3,998
Space	4,717,811	18,495	4,736,306
Classified Programs	16,247,930	474,321	16,722,251
Total Research, Development, Test & Evaluation	39,892,149	600,465	40,492,614

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Undistributed				-7,107,035		-7,107,035
Total Research, Development, Test & Evaluation	255,744	-255,744		28,198,426	-255,744	27,942,682

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Undistributed			
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Central Supply and Maintenance	93,625	109,419	109,419		
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Space		3,165,909	3,165,909		
Classified Programs	12,971,689	14,938,002	14,938,002	112,408	112,408
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Research and Development				10,721,789		10,721,789
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Training Medical and Other				3,615		3,615
Administration and Associated Activities				-6,985,136		-6,985,136
Support of Other Nations				4,569		4,569
Space				3,165,909		3,165,909
Classified Programs	165,244	-165,244		15,215,654	-165,244	15,050,410
Total Research, Development, Test & Evaluation	255,744	-255,744		28,198,426	-255,744	27,942,682

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01 Feb 2018

Summary Recap of Budget Activities	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Summary Recap of FYDP Programs			
Strategic Forces	1,064,875		1,064,875
General Purpose Forces	3,287,655	53,049	3,340,704
Intelligence and Communications	1,394,674	54,600	1,449,274
Mobility Forces	916,041		916,041
Research and Development	12,027,571		12,027,571
Central Supply and Maintenance	97,134		97,134
Training Medical and Other	3,578		3,578
Administration and Associated Activities	130,882		130,882
Support of Other Nations	3,998		3,998
Space	4,717,811	18,495	4,736,306
Classified Programs	16,247,930	474,321	16,722,251
Total Research, Development, Test & Evaluation	39,892,149	600,465	40,492,614

Department of the Air Force
FY 2019 President's Budget
Exhibit R-1 FY 2019 President's Budget
Total Obligational Authority
(Dollars in Thousands)

01 Feb 2018

Appropriation: 3600F Research, Development, Test & Eval, AF

Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	Sec
1	0601102F	Defense Research Sciences	01	370,595	342,919	342,919			U
2	0601103F	University Research Initiatives	01	137,775	147,923	147,923			U
3	0601108F	High Energy Laser Research Initiatives	01	13,224	14,417	14,417			U
	Basic Research			521,594	505,259	505,259			
4	0602102F	Materials	02	158,243	124,264	124,264			U
5	0602201F	Aerospace Vehicle Technologies	02	130,923	124,678	124,678			U
6	0602202F	Human Effectiveness Applied Research	02	110,012	108,784	108,784			U
7	0602203F	Aerospace Propulsion	02	192,583	192,695	192,695			U
8	0602204F	Aerospace Sensors	02	160,339	152,782	152,782			U
9	0602298F	Science and Technology Management - Major Headquarters Activities	02		8,353	8,353			U
10	0602601F	Space Technology	02	119,670	116,503	116,503			U
11	0602602F	Conventional Munitions	02	110,074	112,195	112,195			U
12	0602605F	Directed Energy Technology	02	127,365	132,993	132,993			U
13	0602788F	Dominant Information Sciences and Methods	02	165,517	167,818	167,818			U
14	0602890F	High Energy Laser Research	02	39,545	43,049	43,049			U
15	1206601F	Space Technology	02						U
	Applied Research			1,314,271	1,284,114	1,284,114			

16 0603112F	Advanced Materials for Weapon Systems	03	54,095	37,856	37,856		U

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(Dollars in Thousands)

01 Feb 2018

Appropriation: 3600F Research, Development, Test & Eval, AF

Line No	Program Element Number	Item	Act	FY 2018 Emergency Requests** Emergency	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency	Sec
1	0601102F	Defense Research Sciences	01				342,919		342,919	U
2	0601103F	University Research Initiatives	01				147,923		147,923	U
3	0601108F	High Energy Laser Research Initiatives	01				14,417		14,417	U
	Basic Research						505,259		505,259	
4	0602102F	Materials	02				124,264		124,264	U
5	0602201F	Aerospace Vehicle Technologies	02				124,678		124,678	U
6	0602202F	Human Effectiveness Applied Research	02				108,784		108,784	U
7	0602203F	Aerospace Propulsion	02				192,695		192,695	U
8	0602204F	Aerospace Sensors	02				152,782		152,782	U
9	0602298F	Science and Technology Management - Major Headquarters Activities	02				8,353		8,353	U
10	0602601F	Space Technology	02				116,503		116,503	U
11	0602602F	Conventional Munitions	02				112,195		112,195	U
12	0602605F	Directed Energy Technology	02				132,993		132,993	U
13	0602788F	Dominant Information Sciences and Methods	02				167,818		167,818	U
14	0602890F	High Energy Laser Research	02				43,049		43,049	U
15	1206601F	Space Technology	02							U
	Applied Research						1,284,114		1,284,114	

16 0603112F	Advanced Materials for Weapon Systems	03	37,856	37,856	U

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(Dollars in Thousands)

01 Feb 2018

Appropriation: 3600F Research, Development, Test & Eval, AF

Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Sec
1	0601102F	Defense Research Sciences	01	348,322		348,322	U
2	0601103F	University Research Initiatives	01	154,991		154,991	U
3	0601108F	High Energy Laser Research Initiatives	01	14,506		14,506	U
		Basic Research		517,819		517,819	
4	0602102F	Materials	02	125,373		125,373	U
5	0602201F	Aerospace Vehicle Technologies	02	130,547		130,547	U
6	0602202F	Human Effectiveness Applied Research	02	112,518		112,518	U
7	0602203F	Aerospace Propulsion	02	190,919		190,919	U
8	0602204F	Aerospace Sensors	02	166,534		166,534	U
9	0602298F	Science and Technology Management - Major Headquarters Activities	02	8,288		8,288	U
10	0602601F	Space Technology	02				U
11	0602602F	Conventional Munitions	02	112,841		112,841	U
12	0602605F	Directed Energy Technology	02	141,898		141,898	U
13	0602788F	Dominant Information Sciences and Methods	02	162,420		162,420	U
14	0602890F	High Energy Laser Research	02	43,359		43,359	U
15	1206601F	Space Technology	02	117,645		117,645	U
		Applied Research		1,312,342		1,312,342	

16 0603112F	Advanced Materials for Weapon Systems	03	34,426		34,426	U

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Appropriation: 3600F Research, Development, Test & Eval, AF

Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	Sec
17	0603199F	Sustainment Science and Technology (S&T)	03	19,994	22,811	22,811			U
18	0603203F	Advanced Aerospace Sensors	03	39,854	40,978	40,978			U
19	0603211F	Aerospace Technology Dev/Demo	03	128,358	115,966	115,966			U
20	0603216F	Aerospace Propulsion and Power Technology	03	104,695	104,499	104,499			U
21	0603270F	Electronic Combat Technology	03	64,591	60,551	60,551			U
22	0603401F	Advanced Spacecraft Technology	03	69,338	58,910	58,910			U
23	0603444F	Maui Space Surveillance System (MSSS)	03	11,493	10,433	10,433			U
24	0603456F	Human Effectiveness Advanced Technology Development	03	25,784	33,635	33,635			U
25	0603601F	Conventional Weapons Technology	03	105,487	167,415	167,415			U
26	0603605F	Advanced Weapons Technology	03	47,358	45,502	45,502			U
27	0603680F	Manufacturing Technology Program	03	62,272	46,450	46,450			U
28	0603788F	Battlespace Knowledge Development and Demonstration	03	52,274	49,011	49,011			U
29	0303467F	SENSR Spectrum Pipeline SRF	03	6,904					U
		Advanced Technology Development		792,497	794,017	794,017			
30	0603260F	Intelligence Advanced Development	04	5,598	5,652	5,652			U
31	0603438F	Space Control Technology	04	8,506			7,800	7,800	U

32	0603742F	Combat Identification Technology	04	23,551	24,397	24,397	U

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17	0603199F	Sustainment Science and Technology (S&T)	03				22,811		22,811	U
18	0603203F	Advanced Aerospace Sensors	03				40,978		40,978	U
19	0603211F	Aerospace Technology Dev/Demo	03				115,966		115,966	U
20	0603216F	Aerospace Propulsion and Power Technology	03				104,499		104,499	U
21	0603270F	Electronic Combat Technology	03				60,551		60,551	U
22	0603401F	Advanced Spacecraft Technology	03				58,910		58,910	U
23	0603444F	Maui Space Surveillance System (MSSS)	03				10,433		10,433	U
24	0603456F	Human Effectiveness Advanced Technology Development	03				33,635		33,635	U
25	0603601F	Conventional Weapons Technology	03				167,415		167,415	U
26	0603605F	Advanced Weapons Technology	03				45,502		45,502	U
27	0603680F	Manufacturing Technology Program	03				46,450		46,450	U
28	0603788F	Battlespace Knowledge Development and Demonstration	03				49,011		49,011	U
29	0303467F	SENSR Spectrum Pipeline SRF	03							U
		Advanced Technology Development					794,017		794,017	
30	0603260F	Intelligence Advanced Development	04				5,652		5,652	U
31	0603438F	Space Control Technology	04				7,800		7,800	U

32 0603742F	Combat Identification Technology	04	24,397		24,397	U

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17	0603199F	Sustainment Science and Technology (S&T)	03	15,150		15,150	U
18	0603203F	Advanced Aerospace Sensors	03	39,968		39,968	U
19	0603211F	Aerospace Technology Dev/Demo	03	121,002		121,002	U
20	0603216F	Aerospace Propulsion and Power Technology	03	115,462		115,462	U
21	0603270F	Electronic Combat Technology	03	55,319		55,319	U
22	0603401F	Advanced Spacecraft Technology	03	54,895		54,895	U
23	0603444F	Maui Space Surveillance System (MSSS)	03	10,674		10,674	U
24	0603456F	Human Effectiveness Advanced Technology Development	03	36,463		36,463	U
25	0603601F	Conventional Weapons Technology	03	194,981		194,981	U
26	0603605F	Advanced Weapons Technology	03	43,368		43,368	U
27	0603680F	Manufacturing Technology Program	03	42,025		42,025	U
28	0603788F	Battlespace Knowledge Development and Demonstration	03	51,064		51,064	U
29	0303467F	SENSR Spectrum Pipeline SRF	03				U
		Advanced Technology Development		814,797		814,797	
30	0603260F	Intelligence Advanced Development	04	5,568		5,568	U
31	0603438F	Space Control Technology	04				U

32	0603742F	Combat Identification Technology	04	18,194	18,194	U

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33	0603790F	NATO Research and Development	04	4,174	3,851	3,851			U
34	0603830F	Space Security and Defense Program	04	32,399					U
35	0603851F	Intercontinental Ballistic Missile - Dem/Val	04	99,949	10,736	10,736			U
36	0603859F	Pollution Prevention - Dem/Val	04	3,500	2	2			U
37	0604015F	Long Range Strike - Bomber	04	1,290,307	2,003,580	2,003,580			U
38	0604201F	Integrated Avionics Planning and Development	04		65,458	65,458			U
39	0604257F	Advanced Technology and Sensors	04	34,818	68,719	68,719			U
40	0604288F	National Airborne Ops Center (NAOC) Recap	04		7,850	7,850			U
41	0604317F	Technology Transfer	04	8,080	3,295	3,295			U
42	0604327F	Hard and Deeply Buried Target Defeat System (HDBTDS) Program	04	52,706	17,365	17,365			U
43	0604414F	Cyber Resiliency of Weapon Systems-ACS	04		32,253	32,253			U
44	0604422F	Weather System Follow-on	04	82,506					U
45	0604425F	Space Situation Awareness Systems	04	9,901					U
46	0604776F	Deployment & Distribution Enterprise R&D	04	25,890	26,222	26,222			U
47	0604857F	Operationally Responsive Space	04	17,976					U

48	0604858F	Tech Transition Program	04	378,126	840,650	840,650	U
49	0605230F	Ground Based Strategic Deterrent	04	109,260	215,721	215,721	U

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33	0603790F	NATO Research and Development	04				3,851		3,851	U
34	0603830F	Space Security and Defense Program	04							U
35	0603851F	Intercontinental Ballistic Missile - Dem/Val	04				10,736		10,736	U
36	0603859F	Pollution Prevention - Dem/Val	04				2		2	U
37	0604015F	Long Range Strike - Bomber	04				2,003,580		2,003,580	U
38	0604201F	Integrated Avionics Planning and Development	04				65,458		65,458	U
39	0604257F	Advanced Technology and Sensors	04				68,719		68,719	U
40	0604288F	National Airborne Ops Center (NAOC) Recap	04				7,850		7,850	U
41	0604317F	Technology Transfer	04				3,295		3,295	U
42	0604327F	Hard and Deeply Buried Target Defeat System (HDBTDS) Program	04				17,365		17,365	U
43	0604414F	Cyber Resiliency of Weapon Systems-ACS	04				32,253		32,253	U
44	0604422F	Weather System Follow-on	04							U
45	0604425F	Space Situation Awareness Systems	04							U
46	0604776F	Deployment & Distribution Enterprise R&D	04				26,222		26,222	U
47	0604857F	Operationally Responsive Space	04							U

48	0604858F	Tech Transition Program	04	840,650	840,650 U
49	0605230F	Ground Based Strategic Deterrent	04	215,721	215,721 U

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33	0603790F	NATO Research and Development	04	2,305		2,305	U
34	0603830F	Space Security and Defense Program	04				U
35	0603851F	Intercontinental Ballistic Missile - Dem/Val	04	41,856		41,856	U
36	0603859F	Pollution Prevention - Dem/Val	04				U
37	0604015F	Long Range Strike - Bomber	04	2,314,196		2,314,196	U
38	0604201F	Integrated Avionics Planning and Development	04	14,894		14,894	U
39	0604257F	Advanced Technology and Sensors	04	34,585		34,585	U
40	0604288F	National Airborne Ops Center (NAOC) Recap	04	9,740		9,740	U
41	0604317F	Technology Transfer	04	12,960		12,960	U
42	0604327F	Hard and Deeply Buried Target Defeat System (HDBTDS) Program	04	71,501		71,501	U
43	0604414F	Cyber Resiliency of Weapon Systems-ACS	04	62,618		62,618	U
44	0604422F	Weather System Follow-on	04				U
45	0604425F	Space Situation Awareness Systems	04				U
46	0604776F	Deployment & Distribution Enterprise R&D	04	28,350		28,350	U
47	0604857F	Operationally Responsive Space	04				U

48	0604858F	Tech Transition Program	04	1,186,075	1,186,075	U
49	0605230F	Ground Based Strategic Deterrent	04	345,041	345,041	U

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50	0207110F	Next Generation Air Dominance	04	22,272	294,746	294,746			U
51	0207455F	Three Dimensional Long-Range Radar (3DELRR)	04	47,166	10,645	10,645			U
52	0208099F	Unified Platform (UP)	04						U
53	0305164F	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04	297,975					U
54	0305236F	Common Data Link Executive Agent (CDL EA)	04	40,293	41,509	41,509			U
55	0305601F	Mission Partner Environments	04						U
56	0306250F	Cyber Operations Technology Development	04	205,048	226,287	226,287	5,400	5,400	U
57	0306415F	Enabled Cyber Activities	04	15,842	16,687	16,687			U
58	0408011F	Special Tactics / Combat Control	04		4,500	4,500			U
59	0901410F	Contracting Information Technology System	04	6,938	15,867	15,867			U
60	1203164F	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04		253,939	253,939			U
61	1203710F	EO/IR Weather Systems	04		10,000	10,000			U
62	1206422F	Weather System Follow-on	04		112,088	112,088			U
63	1206425F	Space Situation Awareness Systems	04		34,764	34,764			U
64	1206434F	Midterm Polar MILSATCOM System	04		63,092	63,092			U

65 1206438F	Space Control Technology	04	7,842	7,842	U
66 1206730F	Space Security and Defense Program	04	41,385	41,385	U

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50	0207110F	Next Generation Air Dominance	04				294,746		294,746	U
51	0207455F	Three Dimensional Long-Range Radar (3DELRR)	04				10,645		10,645	U
52	0208099F	Unified Platform (UP)	04							U
53	0305164F	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04							U
54	0305236F	Common Data Link Executive Agent (CDL EA)	04				41,509		41,509	U
55	0305601F	Mission Partner Environments	04							U
56	0306250F	Cyber Operations Technology Development	04	90,500	-90,500		322,187	-90,500	231,687	U
57	0306415F	Enabled Cyber Activities	04				16,687		16,687	U
58	0408011F	Special Tactics / Combat Control	04				4,500		4,500	U
59	0901410F	Contracting Information Technology System	04				15,867		15,867	U
60	1203164F	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04				253,939		253,939	U
61	1203710F	EO/IR Weather Systems	04				10,000		10,000	U
62	1206422F	Weather System Follow-on	04				112,088		112,088	U
63	1206425F	Space Situation Awareness Systems	04				34,764		34,764	U
64	1206434F	Midterm Polar MILSATCOM System	04				63,092		63,092	U

65 1206438F	Space Control Technology	04	7,842	7,842	U
66 1206730F	Space Security and Defense Program	04	41,385	41,385	U

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50	0207110F	Next Generation Air Dominance	04	503,997		503,997	U
51	0207455F	Three Dimensional Long-Range Radar (3DELRR)	04	40,326		40,326	U
52	0208099F	Unified Platform (UP)	04	29,800		29,800	U
53	0305164F	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04				U
54	0305236F	Common Data Link Executive Agent (CDL EA)	04	41,880		41,880	U
55	0305601F	Mission Partner Environments	04	10,074		10,074	U
56	0306250F	Cyber Operations Technology Development	04	253,825		253,825	U
57	0306415F	Enabled Cyber Activities	04	16,325		16,325	U
58	0408011F	Special Tactics / Combat Control	04				U
59	0901410F	Contracting Information Technology System	04	17,577		17,577	U
60	1203164F	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04	286,629		286,629	U
61	1203710F	EO/IR Weather Systems	04	7,940		7,940	U
62	1206422F	Weather System Follow-on	04	138,052		138,052	U
63	1206425F	Space Situation Awareness Systems	04	39,338		39,338	U
64	1206434F	Midterm Polar MILSATCOM System	04	383,113		383,113	U

65	1206438F	Space Control Technology	04	91,018	1,100	92,118	U
66	1206730F	Space Security and Defense Program	04	45,542		45,542	U

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67	1206760F	Protected Tactical Enterprise Service (PTES)	04		18,150	18,150			U
68	1206761F	Protected Tactical Service (PTS)	04		24,201	24,201			U
69	1206855F	Protected SATCOM Services (PSCS) - Aggregated	04		16,000	16,000			U
70	1206857F	Operationally Responsive Space	04		87,577	87,577			U
		Advanced Component Development & Prototypes		2,822,781	4,605,030	4,605,030	13,200	13,200	
71	0604200F	Future Advanced Weapon Analysis & Programs	05		5,100	5,100			U
72	0604201F	Integrated Avionics Planning and Development	05		101,203	101,203			U
73	0604222F	Nuclear Weapons Support	05		3,009	3,009			U
74	0604270F	Electronic Warfare Development	05	4,986	2,241	2,241			U
75	0604281F	Tactical Data Networks Enterprise	05	78,167	38,250	38,250			U
76	0604287F	Physical Security Equipment	05	63,101	19,739	19,739			U
77	0604329F	Small Diameter Bomb (SDB) - EMD	05	37,603	38,979	38,979			U
78	0604421F	Counterspace Systems	05	32,618					U
79	0604425F	Space Situation Awareness Systems	05	25,540					U
80	0604426F	Space Fence	05	162,510					U
81	0604429F	Airborne Electronic Attack	05	8,589	7,091	7,091			U

82	0604441F	Space Based Infrared System (SBIRS) High EMD	05	161,966	U

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67	1206760F	Protected Tactical Enterprise Service (PTES)	04				18,150		18,150	U
68	1206761F	Protected Tactical Service (PTS)	04				24,201		24,201	U
69	1206855F	Protected SATCOM Services (PSCS) - Aggregated	04				16,000		16,000	U
70	1206857F	Operationally Responsive Space	04				87,577		87,577	U
		Advanced Component Development & Prototypes		90,500	-90,500		4,708,730	-90,500	4,618,230	
71	0604200F	Future Advanced Weapon Analysis & Programs	05				5,100		5,100	U
72	0604201F	Integrated Avionics Planning and Development	05				101,203		101,203	U
73	0604222F	Nuclear Weapons Support	05				3,009		3,009	U
74	0604270F	Electronic Warfare Development	05				2,241		2,241	U
75	0604281F	Tactical Data Networks Enterprise	05				38,250		38,250	U
76	0604287F	Physical Security Equipment	05				19,739		19,739	U
77	0604329F	Small Diameter Bomb (SDB) - EMD	05				38,979		38,979	U
78	0604421F	Counterspace Systems	05							U
79	0604425F	Space Situation Awareness Systems	05							U
80	0604426F	Space Fence	05							U
81	0604429F	Airborne Electronic Attack	05				7,091		7,091	U

82 0604441F Space Based Infrared System (SBIRS) 05 U
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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Sec
67	1206760F	Protected Tactical Enterprise Service (PTES)	04	51,419		51,419	U
68	1206761F	Protected Tactical Service (PTS)	04	29,776		29,776	U
69	1206855F	Protected SATCOM Services (PSCS) - Aggregated	04	29,379		29,379	U
70	1206857F	Operationally Responsive Space	04	366,050	12,395	378,445	U
		Advanced Component Development & Prototypes		6,529,943	13,495	6,543,438	
71	0604200F	Future Advanced Weapon Analysis & Programs	05	39,602		39,602	U
72	0604201F	Integrated Avionics Planning and Development	05	58,531		58,531	U
73	0604222F	Nuclear Weapons Support	05	4,468		4,468	U
74	0604270F	Electronic Warfare Development	05	1,909		1,909	U
75	0604281F	Tactical Data Networks Enterprise	05	207,746		207,746	U
76	0604287F	Physical Security Equipment	05	14,421		14,421	U
77	0604329F	Small Diameter Bomb (SDB) - EMD	05	73,158		73,158	U
78	0604421F	Counterspace Systems	05				U
79	0604425F	Space Situation Awareness Systems	05				U
80	0604426F	Space Fence	05				U
81	0604429F	Airborne Electronic Attack	05	7,153		7,153	U

82 0604441F Space Based Infrared System (SBIRS) 05 U
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83	0604602F	Armament/Ordnance Development	05	21,507	46,540	46,540			U
84	0604604F	Submunitions	05	2,503	2,705	2,705			U
85	0604617F	Agile Combat Support	05	49,005	31,240	31,240			U
86	0604618F	Joint Direct Attack Munition	05	9,901					U
87	0604706F	Life Support Systems	05	8,710	9,060	9,060			U
88	0604735F	Combat Training Ranges	05	57,200	87,350	87,350			U
89	0604800F	F-35 - EMD	05	433,903	292,947	292,947			U
90	0604853F	Evolved Expendable Launch Vehicle Program (SPACE) - EMD	05	381,360					U
91	0604932F	Long Range Standoff Weapon	05	102,350	451,290	451,290			U
92	0604933F	ICBM Fuze Modernization	05	172,946	178,991	178,991			U
93	0605030F	Joint Tactical Network Center (JTNC)	05	1,131	12,736	12,736			U
94	0605031F	Joint Tactical Network (JTN)	05		9,319	9,319			U
95	0605213F	F-22 Modernization Increment 3.2B	05	67,717	13,600	13,600			U
96	0605214F	Ground Attack Weapons Fuze Development	05	903					U
97	0605221F	KC-46	05	211,509	93,845	93,845			U
98	0605223F	Advanced Pilot Training	05	7,107	105,999	105,999			U
99	0605229F	Combat Rescue Helicopter	05	263,327	354,485	354,485			U

100	0605278F	HC/MC-130 Recap RDT&E	05	8,707	U
101	0605431F	Advanced EHF MILSATCOM (SPACE)	05	221,584	U

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83	0604602F	Armament/Ordnance Development	05				46,540		46,540	U
84	0604604F	Submunitions	05				2,705		2,705	U
85	0604617F	Agile Combat Support	05				31,240		31,240	U
86	0604618F	Joint Direct Attack Munition	05							U
87	0604706F	Life Support Systems	05				9,060		9,060	U
88	0604735F	Combat Training Ranges	05				87,350		87,350	U
89	0604800F	F-35 - EMD	05				292,947		292,947	U
90	0604853F	Evolved Expendable Launch Vehicle Program (SPACE) - EMD	05							U
91	0604932F	Long Range Standoff Weapon	05				451,290		451,290	U
92	0604933F	ICBM Fuze Modernization	05				178,991		178,991	U
93	0605030F	Joint Tactical Network Center (JTNC)	05				12,736		12,736	U
94	0605031F	Joint Tactical Network (JTN)	05				9,319		9,319	U
95	0605213F	F-22 Modernization Increment 3.2B	05				13,600		13,600	U
96	0605214F	Ground Attack Weapons Fuze Development	05							U
97	0605221F	KC-46	05				93,845		93,845	U
98	0605223F	Advanced Pilot Training	05				105,999		105,999	U
99	0605229F	Combat Rescue Helicopter	05				354,485		354,485	U

100	0605278F	HC/MC-130 Recap RDT&E	05	U
101	0605431F	Advanced EHF MILSATCOM (SPACE)	05	U

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83	0604602F	Armament/Ordnance Development	05	58,590		58,590	U
84	0604604F	Submunitions	05	2,990		2,990	U
85	0604617F	Agile Combat Support	05	20,028		20,028	U
86	0604618F	Joint Direct Attack Munition	05	15,787		15,787	U
87	0604706F	Life Support Systems	05	8,919		8,919	U
88	0604735F	Combat Training Ranges	05	35,895		35,895	U
89	0604800F	F-35 - EMD	05	69,001		69,001	U
90	0604853F	Evolved Expendable Launch Vehicle Program (SPACE) - EMD	05				U
91	0604932F	Long Range Standoff Weapon	05	614,920		614,920	U
92	0604933F	ICBM Fuze Modernization	05	172,902		172,902	U
93	0605030F	Joint Tactical Network Center (JTNC)	05				U
94	0605031F	Joint Tactical Network (JTN)	05				U
95	0605213F	F-22 Modernization Increment 3.2B	05				U
96	0605214F	Ground Attack Weapons Fuze Development	05				U
97	0605221F	KC-46	05	88,170		88,170	U
98	0605223F	Advanced Pilot Training	05	265,465		265,465	U
99	0605229F	Combat Rescue Helicopter	05	457,652		457,652	U

100	0605278F	HC/MC-130 Recap RDT&E	05	U
101	0605431F	Advanced EHF MILSATCOM (SPACE)	05	U

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102	0605432F	Polar MILSATCOM (SPACE)	05	44,306					U
103	0605433F	Wideband Global SATCOM (SPACE)	05	73,901					U
104	0605458F	Air & Space Ops Center 10.2 RDT&E	05	21,109	119,745	119,745			U
105	0605830F	Acq Workforce- Global Battle Mgmt	05						U
106	0605931F	B-2 Defensive Management System	05	278,437	194,570	194,570			U
107	0101125F	Nuclear Weapons Modernization	05	131,063	91,237	91,237			U
108	0207171F	F-15 EPAWSS	05	241,495	209,847	209,847			U
109	0207328F	Stand In Attack Weapon	05		3,400	3,400			U
110	0207423F	Advanced Communications Systems	05						U
111	0207701F	Full Combat Mission Training	05	10,809	16,727	16,727			U
112	0303267F	Auctioned Spectrum Relocation Fund	05	54,499					U
113	0303367F	Spectrum Access Research and Development	05	62,053					U
114	0305176F	Combat Survivor Evader Locator	05	30,282					U
115	0307581F	JSTARS Recap	05	113,334	417,201	417,201			U
116	0401310F	C-32 Executive Transport Recapitalization	05		6,017	6,017			U
117	0401319F	Presidential Aircraft Recapitalization (PAR)	05	311,252	434,069	434,069			U
118	0701212F	Automated Test Systems	05	14,029	18,528	18,528			U

119	1203176F	Combat Survivor Evader Locator	05	24,967	24,967		U

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102	0605432F	Polar MILSATCOM (SPACE)	05							U
103	0605433F	Wideband Global SATCOM (SPACE)	05							U
104	0605458F	Air & Space Ops Center 10.2 RDT&E	05				119,745		119,745	U
105	0605830F	Acq Workforce- Global Battle Mgmt	05							U
106	0605931F	B-2 Defensive Management System	05				194,570		194,570	U
107	0101125F	Nuclear Weapons Modernization	05				91,237		91,237	U
108	0207171F	F-15 EPAWSS	05				209,847		209,847	U
109	0207328F	Stand In Attack Weapon	05				3,400		3,400	U
110	0207423F	Advanced Communications Systems	05							U
111	0207701F	Full Combat Mission Training	05				16,727		16,727	U
112	0303267F	Auctioned Spectrum Relocation Fund	05							U
113	0303367F	Spectrum Access Research and Development	05							U
114	0305176F	Combat Survivor Evader Locator	05							U
115	0307581F	JSTARS Recap	05				417,201		417,201	U
116	0401310F	C-32 Executive Transport Recapitalization	05				6,017		6,017	U
117	0401319F	Presidential Aircraft Recapitalization (PAR)	05				434,069		434,069	U
118	0701212F	Automated Test Systems	05				18,528		18,528	U

119	1203176F	Combat Survivor Evader Locator	05	24,967	24,967	U

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102	0605432F	Polar MILSATCOM (SPACE)	05				U
103	0605433F	Wideband Global SATCOM (SPACE)	05				U
104	0605458F	Air & Space Ops Center 10.2 RDT&E	05				U
105	0605830F	Acq Workforce- Global Battle Mgmt	05	3,617		3,617	U
106	0605931F	B-2 Defensive Management System	05	261,758		261,758	U
107	0101125F	Nuclear Weapons Modernization	05	91,907		91,907	U
108	0207171F	F-15 EPAWSS	05	137,095		137,095	U
109	0207328F	Stand In Attack Weapon	05	43,175		43,175	U
110	0207423F	Advanced Communications Systems	05	14,888		14,888	U
111	0207701F	Full Combat Mission Training	05	1,015		1,015	U
112	0303267F	Auctioned Spectrum Relocation Fund	05				U
113	0303367F	Spectrum Access Research and Development	05				U
114	0305176F	Combat Survivor Evader Locator	05				U
115	0307581F	JSTARS Recap	05				U
116	0401310F	C-32 Executive Transport Recapitalization	05	7,943		7,943	U
117	0401319F	Presidential Aircraft Recapitalization (PAR)	05	673,032		673,032	U
118	0701212F	Automated Test Systems	05	13,653		13,653	U

119	1203176F	Combat Survivor Evader Locator	05	939	939	U

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120	1203269F	GPS IIIC	05						U
121	1203940F	Space Situation Awareness Operations	05		10,029	10,029			U
122	1206421F	Counterspace Systems	05		66,370	66,370			U
123	1206425F	Space Situation Awareness Systems	05		48,448	48,448			U
124	1206426F	Space Fence	05		35,937	35,937			U
125	1206431F	Advanced EHF MILSATCOM (SPACE)	05		145,610	145,610			U
126	1206432F	Polar MILSATCOM (SPACE)	05		33,644	33,644			U
127	1206433F	Wideband Global SATCOM (SPACE)	05		14,263	14,263			U
128	1206441F	Space Based Infrared System (SBIRS) High EMD	05		311,844	311,844			U
129	1206442F	Evolved SBIRS	05		71,018	71,018			U
130	1206853F	Evolved Expendable Launch Vehicle Program (SPACE) - EMD	05		297,572	297,572			U
		System Development & Demonstration		3,983,019	4,476,762	4,476,762			
131	0604256F	Threat Simulator Development	06	21,377	35,405	35,405			U
132	0604759F	Major T&E Investment	06	64,538	82,874	82,874			U
133	0605101F	RAND Project Air Force	06	33,373	34,346	34,346			U
134	0605502F	Small Business Innovation Research	06	407,570					U
135	0605712F	Initial Operational Test & Evaluation	06	13,829	15,523	15,523			U

136	0605807F	Test and Evaluation Support	06	676,417	678,289	678,289		U

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120	1203269F	GPS IIIC	05							U
121	1203940F	Space Situation Awareness Operations	05				10,029		10,029	U
122	1206421F	Counterspace Systems	05				66,370		66,370	U
123	1206425F	Space Situation Awareness Systems	05				48,448		48,448	U
124	1206426F	Space Fence	05				35,937		35,937	U
125	1206431F	Advanced EHF MILSATCOM (SPACE)	05				145,610		145,610	U
126	1206432F	Polar MILSATCOM (SPACE)	05				33,644		33,644	U
127	1206433F	Wideband Global SATCOM (SPACE)	05				14,263		14,263	U
128	1206441F	Space Based Infrared System (SBIRS) High EMD	05				311,844		311,844	U
129	1206442F	Evolved SBIRS	05				71,018		71,018	U
130	1206853F	Evolved Expendable Launch Vehicle Program (SPACE) - EMD	05				297,572		297,572	U
		System Development & Demonstration					4,476,762		4,476,762	
131	0604256F	Threat Simulator Development	06				35,405		35,405	U
132	0604759F	Major T&E Investment	06				82,874		82,874	U
133	0605101F	RAND Project Air Force	06				34,346		34,346	U
134	0605502F	Small Business Innovation Research	06							U
135	0605712F	Initial Operational Test & Evaluation	06				15,523		15,523	U

136	0605807F	Test and Evaluation Support	06	678,289	678,289	U

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120	1203269F	GPS IIIC	05	451,889		451,889	U
121	1203940F	Space Situation Awareness Operations	05	46,668		46,668	U
122	1206421F	Counterspace Systems	05	20,676		20,676	U
123	1206425F	Space Situation Awareness Systems	05	134,463		134,463	U
124	1206426F	Space Fence	05	20,215		20,215	U
125	1206431F	Advanced EHF MILSATCOM (SPACE)	05	151,506		151,506	U
126	1206432F	Polar MILSATCOM (SPACE)	05	27,337		27,337	U
127	1206433F	Wideband Global SATCOM (SPACE)	05	3,970		3,970	U
128	1206441F	Space Based Infrared System (SBIRS) High EMD	05	60,565		60,565	U
129	1206442F	Evolved SBIRS	05	643,126		643,126	U
130	1206853F	Evolved Expendable Launch Vehicle Program (SPACE) - EMD	05	245,447		245,447	U
		System Development & Demonstration		5,272,191		5,272,191	
131	0604256F	Threat Simulator Development	06	34,256		34,256	U
132	0604759F	Major T&E Investment	06	91,844		91,844	U
133	0605101F	RAND Project Air Force	06	34,614		34,614	U
134	0605502F	Small Business Innovation Research	06				U
135	0605712F	Initial Operational Test & Evaluation	06	18,043		18,043	U

136	0605807F	Test and Evaluation Support	06	692,784		692,784	U

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137	0605826F	Acq Workforce- Global Power	06		219,809	219,809			U
138	0605827F	Acq Workforce- Global Vig & Combat Sys	06		223,179	223,179			U
139	0605828F	Acq Workforce- Global Reach	06		138,556	138,556			U
140	0605829F	Acq Workforce- Cyber, Network, & Bus Sys	06		221,393	221,393			U
141	0605830F	Acq Workforce- Global Battle Mgmt	06		152,577	152,577			U
142	0605831F	Acq Workforce- Capability Integration	06		196,561	196,561			U
143	0605832F	Acq Workforce- Advanced Prgm Technology	06		28,322	28,322			U
144	0605833F	Acq Workforce- Nuclear Systems	06		126,611	126,611			U
145	0605860F	Rocket Systems Launch Program (SPACE)	06	10,899					U
146	0605864F	Space Test Program (STP)	06	40,507					U
147	0605898F	Management HQ - R&D	06		9,154	9,154			U
148	0605976F	Facilities Restoration and Modernization - Test and Evaluation Support	06	134,111	135,507	135,507			U
149	0605978F	Facilities Sustainment - Test and Evaluation Support	06	28,091	28,720	28,720			U
150	0606017F	Requirements Analysis and Maturation	06	45,134	35,453	35,453			U

151	0606116F	Space Test and Training Range Development	06	17,912	U

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137	0605826F	Acq Workforce- Global Power	06				219,809		219,809	U
138	0605827F	Acq Workforce- Global Vig & Combat Sys	06				223,179		223,179	U
139	0605828F	Acq Workforce- Global Reach	06				138,556		138,556	U
140	0605829F	Acq Workforce- Cyber, Network, & Bus Sys	06				221,393		221,393	U
141	0605830F	Acq Workforce- Global Battle Mgmt	06				152,577		152,577	U
142	0605831F	Acq Workforce- Capability Integration	06				196,561		196,561	U
143	0605832F	Acq Workforce- Advanced Prgm Technology	06				28,322		28,322	U
144	0605833F	Acq Workforce- Nuclear Systems	06				126,611		126,611	U
145	0605860F	Rocket Systems Launch Program (SPACE)	06							U
146	0605864F	Space Test Program (STP)	06							U
147	0605898F	Management HQ - R&D	06				9,154		9,154	U
148	0605976F	Facilities Restoration and Modernization - Test and Evaluation Support	06				135,507		135,507	U
149	0605978F	Facilities Sustainment - Test and Evaluation Support	06				28,720		28,720	U
150	0606017F	Requirements Analysis and Maturation	06				35,453		35,453	U

151 0606116F Space Test and Training Range Development 06 U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Sec
137	0605826F	Acq Workforce- Global Power	06	233,924		233,924	U
138	0605827F	Acq Workforce- Global Vig & Combat Sys	06	263,488		263,488	U
139	0605828F	Acq Workforce- Global Reach	06	153,591		153,591	U
140	0605829F	Acq Workforce- Cyber, Network, & Bus Sys	06	232,315		232,315	U
141	0605830F	Acq Workforce- Global Battle Mgmt	06	169,868		169,868	U
142	0605831F	Acq Workforce- Capability Integration	06	226,219		226,219	U
143	0605832F	Acq Workforce- Advanced Prgm Technology	06	38,400		38,400	U
144	0605833F	Acq Workforce- Nuclear Systems	06	125,761		125,761	U
145	0605860F	Rocket Systems Launch Program (SPACE)	06				U
146	0605864F	Space Test Program (STP)	06				U
147	0605898F	Management HQ - R&D	06	10,642		10,642	U
148	0605976F	Facilities Restoration and Modernization - Test and Evaluation Support	06	162,216		162,216	U
149	0605978F	Facilities Sustainment - Test and Evaluation Support	06	28,888		28,888	U
150	0606017F	Requirements Analysis and Maturation	06	35,285		35,285	U

151 0606116F Space Test and Training Range Development 06 U

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152	0606392F	Space and Missile Center (SMC) Civilian Workforce	06	171,666					U
153	0308602F	ENTEPRISE INFORMATION SERVICES (EIS)	06	4,265	29,049	29,049			U
154	0702806F	Acquisition and Management Support	06	14,168	14,980	14,980			U
155	0804731F	General Skill Training	06	1,353	1,434	1,434			U
156	0909999F	Financing for Cancelled Account Adjustments	06	1,004					U
157	1001004F	International Activities	06	4,626	4,569	4,569			U
158	1206116F	Space Test and Training Range Development	06		25,773	25,773			U
159	1206392F	Space and Missile Center (SMC) Civilian Workforce	06		169,887	169,887			U
160	1206398F	Space & Missile Systems Center - MHA	06		9,531	9,531			U
161	1206860F	Rocket Systems Launch Program (SPACE)	06		20,975	20,975			U
162	1206864F	Space Test Program (STP)	06		25,398	25,398			U
		Management Support		1,690,840	2,663,875	2,663,875			
163	0603423F	Global Positioning System III - Operational Control Segment	07	376,645					U
164	0604222F	Nuclear Weapons Support	07		27,579	27,579			U
165	0604233F	Specialized Undergraduate Flight Training	07	17,754	5,776	5,776			U

166	0604445F	Wide Area Surveillance	07	50,486	16,247	16,247		U

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152	0606392F	Space and Missile Center (SMC) Civilian Workforce	06							U
153	0308602F	ENTEPRISE INFORMATION SERVICES (EIS)	06				29,049		29,049	U
154	0702806F	Acquisition and Management Support	06				14,980		14,980	U
155	0804731F	General Skill Training	06				1,434		1,434	U
156	0909999F	Financing for Cancelled Account Adjustments	06							U
157	1001004F	International Activities	06				4,569		4,569	U
158	1206116F	Space Test and Training Range Development	06				25,773		25,773	U
159	1206392F	Space and Missile Center (SMC) Civilian Workforce	06				169,887		169,887	U
160	1206398F	Space & Missile Systems Center - MHA	06				9,531		9,531	U
161	1206860F	Rocket Systems Launch Program (SPACE)	06				20,975		20,975	U
162	1206864F	Space Test Program (STP)	06				25,398		25,398	U
		Management Support					2,663,875		2,663,875	
163	0603423F	Global Positioning System III - Operational Control Segment	07							U
164	0604222F	Nuclear Weapons Support	07				27,579		27,579	U
165	0604233F	Specialized Undergraduate Flight Training	07				5,776		5,776	U

166	0604445F	Wide Area Surveillance	07	16,247	16,247	U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Sec
152	0606392F	Space and Missile Center (SMC) Civilian Workforce	06				U
153	0308602F	ENTEPRISE INFORMATION SERVICES (EIS)	06	20,545		20,545	U
154	0702806F	Acquisition and Management Support	06	12,367		12,367	U
155	0804731F	General Skill Training	06	1,448		1,448	U
156	0909999F	Financing for Cancelled Account Adjustments	06				U
157	1001004F	International Activities	06	3,998		3,998	U
158	1206116F	Space Test and Training Range Development	06	23,254		23,254	U
159	1206392F	Space and Missile Center (SMC) Civilian Workforce	06	169,912		169,912	U
160	1206398F	Space & Missile Systems Center - MHA	06	10,508		10,508	U
161	1206860F	Rocket Systems Launch Program (SPACE)	06	19,721		19,721	U
162	1206864F	Space Test Program (STP)	06	25,620		25,620	U
		Management Support		2,839,511		2,839,511	
163	0603423F	Global Positioning System III - Operational Control Segment	07				U
164	0604222F	Nuclear Weapons Support	07				U
165	0604233F	Specialized Undergraduate Flight Training	07	11,344		11,344	U

166 0604445F Wide Area Surveillance 07 U

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Line No	Program Element Number	Item	Act	FY 2017 (Base + OCO)	FY 2018 PB Request with CR Adj Base	FY 2018 Total PB Requests* with CR Adj Base	FY 2018 PB Request with CR Adj OCO	FY 2018 Total PB Requests+ with CR Adj OCO	Sec
167	0605018F	AF Integrated Personnel and Pay System (AF-IPPS)	07	9,956	21,915	21,915			U
168	0605024F	Anti-Tamper Technology Executive Agency	07	32,646	33,150	33,150			U
169	0605117F	Foreign Materiel Acquisition and Exploitation	07	58,360	66,653	66,653			U
170	0605278F	HC/MC-130 Recap RDT&E	07		38,579	38,579			U
171	0606018F	NC3 Integration	07		12,636	12,636			U
172	0606942F	Assessments and Evaluations Cyber Vulnerabilities	07						U
173	0101113F	B-52 Squadrons	07	74,550	111,910	111,910			U
174	0101122F	Air-Launched Cruise Missile (ALCM)	07	437	463	463			U
175	0101126F	B-1B Squadrons	07	4,562	62,471	62,471			U
176	0101127F	B-2 Squadrons	07	122,973	193,108	193,108			U
177	0101213F	Minuteman Squadrons	07	173,718	210,845	210,845			U
178	0101313F	Integrated Strategic Planning and Analysis Network (ISPAN) - USSTRATCOM	07	39,120	25,736	25,736			U
179	0101316F	Worldwide Joint Strategic Communications	07	5,876	6,272	6,272			U
180	0101324F	Integrated Strategic Planning & Analysis Network	07		11,032	11,032			U

181	0101328F	ICBM Reentry Vehicles	07				U
183	0102110F	UH-1N Replacement Program	07	86,856	108,617	108,617	U

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167	0605018F	AF Integrated Personnel and Pay System (AF-IPPS)	07				21,915		21,915	U
168	0605024F	Anti-Tamper Technology Executive Agency	07				33,150		33,150	U
169	0605117F	Foreign Materiel Acquisition and Exploitation	07				66,653		66,653	U
170	0605278F	HC/MC-130 Recap RDT&E	07				38,579		38,579	U
171	0606018F	NC3 Integration	07				12,636		12,636	U
172	0606942F	Assessments and Evaluations Cyber Vulnerabilities	07							U
173	0101113F	B-52 Squadrons	07				111,910		111,910	U
174	0101122F	Air-Launched Cruise Missile (ALCM)	07				463		463	U
175	0101126F	B-1B Squadrons	07				62,471		62,471	U
176	0101127F	B-2 Squadrons	07				193,108		193,108	U
177	0101213F	Minuteman Squadrons	07				210,845		210,845	U
178	0101313F	Integrated Strategic Planning and Analysis Network (ISPAN) - USSTRATCOM	07				25,736		25,736	U
179	0101316F	Worldwide Joint Strategic Communications	07				6,272		6,272	U
180	0101324F	Integrated Strategic Planning & Analysis Network	07				11,032		11,032	U

181	0101328F	ICBM Reentry Vehicles	07			U
183	0102110F	UH-1N Replacement Program	07	108,617	108,617	U

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167	0605018F	AF Integrated Personnel and Pay System (AF-IPPS)	07	47,287		47,287	U
168	0605024F	Anti-Tamper Technology Executive Agency	07	32,770		32,770	U
169	0605117F	Foreign Materiel Acquisition and Exploitation	07	68,368		68,368	U
170	0605278F	HC/MC-130 Recap RDT&E	07	32,574		32,574	U
171	0606018F	NC3 Integration	07	26,112		26,112	U
172	0606942F	Assessments and Evaluations Cyber Vulnerabilities	07	99,100		99,100	U
173	0101113F	B-52 Squadrons	07	280,414		280,414	U
174	0101122F	Air-Launched Cruise Missile (ALCM)	07	5,955		5,955	U
175	0101126F	B-1B Squadrons	07	76,030		76,030	U
176	0101127F	B-2 Squadrons	07	105,561		105,561	U
177	0101213F	Minuteman Squadrons	07	156,047		156,047	U
178	0101313F	Integrated Strategic Planning and Analysis Network (ISPAN) - USSTRATCOM	07				U
179	0101316F	Worldwide Joint Strategic Communications	07	10,442		10,442	U
180	0101324F	Integrated Strategic Planning & Analysis Network	07	22,833		22,833	U

181	0101328F	ICBM Reentry Vehicles	07	18,412	18,412	U
183	0102110F	UH-1N Replacement Program	07	288,022	288,022	U

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184	0102326F	Region/Sector Operation Control Center Modernization Program	07	10,868	3,347	3,347			U
185	0105921F	Service Support to STRATCOM - Space Activities	07	8,381					U
186	0205219F	MQ-9 UAV	07	167,239	201,394	201,394			U
187	0205671F	Joint Counter RCIED Electronic Warfare	07						U
188	0207131F	A-10 Squadrons	07	11,353	17,459	17,459			U
189	0207133F	F-16 Squadrons	07	132,113	246,578	246,578			U
190	0207134F	F-15E Squadrons	07	344,184	320,271	320,271			U
191	0207136F	Manned Destructive Suppression	07	12,697	15,106	15,106			U
192	0207138F	F-22A Squadrons	07	364,691	610,942	610,942			U
193	0207142F	F-35 Squadrons	07	73,905	334,530	334,530			U
194	0207161F	Tactical AIM Missiles	07	51,499	34,952	34,952			U
195	0207163F	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07	53,320	61,322	61,322			U
196	0207227F	Combat Rescue - Pararescue	07	350	693	693			U
197	0207247F	AF TENCAP	07	28,412					U
198	0207249F	Precision Attack Systems Procurement	07	625	1,714	1,714			U
199	0207253F	Compass Call	07	13,723	14,040	14,040			U

200 0207268F	Aircraft Engine Component Improvement Program	07	106,049	109,243	109,243	U

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184	0102326F	Region/Sector Operation Control Center Modernization Program	07				3,347		3,347	U
185	0105921F	Service Support to STRATCOM - Space Activities	07							U
186	0205219F	MQ-9 UAV	07				201,394		201,394	U
187	0205671F	Joint Counter RCIED Electronic Warfare	07							U
188	0207131F	A-10 Squadrons	07				17,459		17,459	U
189	0207133F	F-16 Squadrons	07				246,578		246,578	U
190	0207134F	F-15E Squadrons	07				320,271		320,271	U
191	0207136F	Manned Destructive Suppression	07				15,106		15,106	U
192	0207138F	F-22A Squadrons	07				610,942		610,942	U
193	0207142F	F-35 Squadrons	07				334,530		334,530	U
194	0207161F	Tactical AIM Missiles	07				34,952		34,952	U
195	0207163F	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07				61,322		61,322	U
196	0207227F	Combat Rescue - Pararescue	07				693		693	U
197	0207247F	AF TENCAP	07							U
198	0207249F	Precision Attack Systems Procurement	07				1,714		1,714	U
199	0207253F	Compass Call	07				14,040		14,040	U

200 0207268F	Aircraft Engine Component Improvement Program	07	109,243	109,243	U

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184	0102326F	Region/Sector Operation Control Center Modernization Program	07	9,252		9,252	U
185	0105921F	Service Support to STRATCOM - Space Activities	07				U
186	0205219F	MQ-9 UAV	07	115,345	4,500	119,845	U
187	0205671F	Joint Counter RCIED Electronic Warfare	07		4,000	4,000	U
188	0207131F	A-10 Squadrons	07	26,738	1,000	27,738	U
189	0207133F	F-16 Squadrons	07	191,564		191,564	U
190	0207134F	F-15E Squadrons	07	192,883		192,883	U
191	0207136F	Manned Destructive Suppression	07	15,238		15,238	U
192	0207138F	F-22A Squadrons	07	603,553		603,553	U
193	0207142F	F-35 Squadrons	07	549,501		549,501	U
194	0207161F	Tactical AIM Missiles	07	37,230		37,230	U
195	0207163F	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07	61,393		61,393	U
196	0207227F	Combat Rescue - Pararescue	07	647		647	U
197	0207247F	AF TENCAP	07				U
198	0207249F	Precision Attack Systems Procurement	07	14,891		14,891	U
199	0207253F	Compass Call	07	13,901		13,901	U

200 0207268F	Aircraft Engine Component Improvement Program	07	121,203		121,203	U

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201	0207277F	ISR Innovations	07				5,750	5,750	U
202	0207325F	Joint Air-to-Surface Standoff Missile (JASSM)	07	23,108	29,932	29,932			U
203	0207410F	Air & Space Operations Center (AOC)	07	29,916	26,956	26,956			U
204	0207412F	Control and Reporting Center (CRC)	07	12,854	2,450	2,450			U
205	0207417F	Airborne Warning and Control System (AWACS)	07	85,727	151,726	151,726			U
206	0207418F	Tactical Airborne Control Systems	07	2,353	3,656	3,656			U
208	0207431F	Combat Air Intelligence System Activities	07	15,461	13,420	13,420			U
209	0207444F	Tactical Air Control Party-Mod	07	11,437	10,623	10,623			U
210	0207448F	C2ISR Tactical Data Link	07	1,406	1,754	1,754			U
211	0207452F	DCAPES	07	13,286	17,382	17,382			U
212	0207573F	National Technical Nuclear Forensics	07		2,307	2,307			U
213	0207581F	Joint Surveillance/Target Attack Radar System (JSTARS)	07						U
214	0207590F	Seek Eagle	07	28,204	25,397	25,397			U
215	0207601F	USAF Modeling and Simulation	07	14,828	10,175	10,175			U
216	0207605F	Wargaming and Simulation Centers	07	4,090	12,839	12,839			U
217	0207610F	Battlefield Abn Comm Node (BACN)	07						U

218	0207697F	Distributed Training and Exercises	07	4,241	4,190	4,190	U
219	0208006F	Mission Planning Systems	07	69,104	85,531	85,531	U

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201	0207277F	ISR Innovations	07				5,750		5,750	U
202	0207325F	Joint Air-to-Surface Standoff Missile (JASSM)	07				29,932		29,932	U
203	0207410F	Air & Space Operations Center (AOC)	07				26,956		26,956	U
204	0207412F	Control and Reporting Center (CRC)	07				2,450		2,450	U
205	0207417F	Airborne Warning and Control System (AWACS)	07				151,726		151,726	U
206	0207418F	Tactical Airborne Control Systems	07				3,656		3,656	U
208	0207431F	Combat Air Intelligence System Activities	07				13,420		13,420	U
209	0207444F	Tactical Air Control Party-Mod	07				10,623		10,623	U
210	0207448F	C2ISR Tactical Data Link	07				1,754		1,754	U
211	0207452F	DCAPES	07				17,382		17,382	U
212	0207573F	National Technical Nuclear Forensics	07				2,307		2,307	U
213	0207581F	Joint Surveillance/Target Attack Radar System (JSTARS)	07							U
214	0207590F	Seek Eagle	07				25,397		25,397	U
215	0207601F	USAF Modeling and Simulation	07				10,175		10,175	U
216	0207605F	Wargaming and Simulation Centers	07				12,839		12,839	U
217	0207610F	Battlefield Abn Comm Node (BACN)	07							U

218	0207697F	Distributed Training and Exercises	07	4,190	4,190 U
219	0208006F	Mission Planning Systems	07	85,531	85,531 U

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201	0207277F	ISR Innovations	07				U
202	0207325F	Joint Air-to-Surface Standoff Missile (JASSM)	07	60,062		60,062	U
203	0207410F	Air & Space Operations Center (AOC)	07	106,102		106,102	U
204	0207412F	Control and Reporting Center (CRC)	07	6,413		6,413	U
205	0207417F	Airborne Warning and Control System (AWACS)	07	120,664		120,664	U
206	0207418F	Tactical Airborne Control Systems	07	2,659		2,659	U
208	0207431F	Combat Air Intelligence System Activities	07	10,316		10,316	U
209	0207444F	Tactical Air Control Party-Mod	07	6,149		6,149	U
210	0207448F	C2ISR Tactical Data Link	07	1,738		1,738	U
211	0207452F	DCAPES	07	13,297		13,297	U
212	0207573F	National Technical Nuclear Forensics	07	1,788		1,788	U
213	0207581F	Joint Surveillance/Target Attack Radar System (JSTARS)	07	14,888		14,888	U
214	0207590F	Seek Eagle	07	24,699		24,699	U
215	0207601F	USAF Modeling and Simulation	07	17,078		17,078	U
216	0207605F	Wargaming and Simulation Centers	07	6,141		6,141	U
217	0207610F	Battlefield Abn Comm Node (BACN)	07		42,349	42,349	U

218	0207697F	Distributed Training and Exercises	07	4,225	4,225	U
219	0208006F	Mission Planning Systems	07	63,653	63,653	U

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220	0208007F	Tactical Deception	07		3,761	3,761			U
221	0208087F	AF Offensive Cyberspace Operations	07	24,109	35,693	35,693	4,000	4,000	U
222	0208088F	AF Defensive Cyberspace Operations	07	38,035	20,964	20,964			U
223	0208097F	Joint Cyber Command and Control (JCC2)	07						U
224	0208099F	Unified Platform (UP)	07						U
228	0208288F	Intel Data Applications	07						U
229	0301017F	Global Sensor Integrated on Network (GSIN)	07	3,296	3,549	3,549			U
230	0301112F	Nuclear Planning and Execution System (NPES)	07	3,926	4,371	4,371			U
236	0301400F	Space Superiority Intelligence	07	12,380					U
237	0301401F	Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness	07		3,721	3,721			U
238	0302015F	E-4B National Airborne Operations Center (NAOC)	07	25,104	35,467	35,467			U
239	0303001F	Family of Advanced BLoS Terminals (FAB-T)	07	50,071					U
240	0303131F	Minimum Essential Emergency Communications Network (MEECN)	07	40,099	48,841	48,841			U
241	0303133F	High Frequency Radio Systems	07						U

242	0303140F	Information Systems Security Program	07	36,074	42,973	42,973	U
243	0303141F	Global Combat Support System	07	50	105	105	U

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220	0208007F	Tactical Deception	07				3,761		3,761	U
221	0208087F	AF Offensive Cyberspace Operations	07				39,693		39,693	U
222	0208088F	AF Defensive Cyberspace Operations	07				20,964		20,964	U
223	0208097F	Joint Cyber Command and Control (JCC2)	07							U
224	0208099F	Unified Platform (UP)	07							U
228	0208288F	Intel Data Applications	07							U
229	0301017F	Global Sensor Integrated on Network (GSIN)	07				3,549		3,549	U
230	0301112F	Nuclear Planning and Execution System (NPES)	07				4,371		4,371	U
236	0301400F	Space Superiority Intelligence	07							U
237	0301401F	Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness	07				3,721		3,721	U
238	0302015F	E-4B National Airborne Operations Center (NAOC)	07				35,467		35,467	U
239	0303001F	Family of Advanced BLoS Terminals (FAB-T)	07							U
240	0303131F	Minimum Essential Emergency Communications Network (MEECN)	07				48,841		48,841	U
241	0303133F	High Frequency Radio Systems	07							U

242	0303140F	Information Systems Security Program	07	42,973	42,973	U
243	0303141F	Global Combat Support System	07	105	105	U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Sec
220	0208007F	Tactical Deception	07	6,949		6,949	U
221	0208087F	AF Offensive Cyberspace Operations	07	40,526		40,526	U
222	0208088F	AF Defensive Cyberspace Operations	07	24,166		24,166	U
223	0208097F	Joint Cyber Command and Control (JCC2)	07	13,000		13,000	U
224	0208099F	Unified Platform (UP)	07	28,759		28,759	U
228	0208288F	Intel Data Applications	07		1,200	1,200	U
229	0301017F	Global Sensor Integrated on Network (GSIN)	07	3,579		3,579	U
230	0301112F	Nuclear Planning and Execution System (NPES)	07	29,620		29,620	U
236	0301400F	Space Superiority Intelligence	07				U
237	0301401F	Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness	07	6,633		6,633	U
238	0302015F	E-4B National Airborne Operations Center (NAOC)	07	57,758		57,758	U
239	0303001F	Family of Advanced BLoS Terminals (FAB-T)	07				U
240	0303131F	Minimum Essential Emergency Communications Network (MEECN)	07	99,088		99,088	U
241	0303133F	High Frequency Radio Systems	07	51,612		51,612	U

242	0303140F	Information Systems Security Program	07	34,612		34,612	U
243	0303141F	Global Combat Support System	07				U

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244	0303142F	Global Force Management - Data Initiative	07	1,851	2,147	2,147			U
246	0304260F	Airborne SIGINT Enterprise	07	95,284	121,948	121,948			U
247	0304310F	Commercial Economic Analysis	07		3,544	3,544			U
250	0305015F	C2 Air Operations Suite - C2 Info Services	07						U
251	0305020F	CCMD Intelligence Information Technology	07	1,507	1,542	1,542			U
252	0305099F	Global Air Traffic Management (GATM)	07	4,219	4,453	4,453			U
253	0305110F	Satellite Control Network (SPACE)	07	14,099					U
254	0305111F	Weather Service	07	24,193	26,654	26,654			U
255	0305114F	Air Traffic Control, Approach, and Landing System (ATCALS)	07	17,732	6,306	6,306			U
256	0305116F	Aerial Targets	07	2,981	21,295	21,295			U
259	0305128F	Security and Investigative Activities	07	405	415	415			U
260	0305145F	Arms Control Implementation	07	4,667					U
261	0305146F	Defense Joint Counterintelligence Activities	07	339	3,867	3,867			U
264	0305173F	Space and Missile Test and Evaluation Center	07	4,250					U
265	0305174F	Space Innovation, Integration and	07	6,233					U

	Rapid Technology Development				
266 0305179F	Integrated Broadcast Service (IBS)	07	8,833		U

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Appropriation: 3600F Research, Development, Test & Eval, AF

Line No	Program Element Number	Item	Act	FY 2018 Emergency Requests** Emergency	FY 2018 Less Enacted Div B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req Emergency	FY 2018 Total PB Requests* with CR Adj Base + OCO + Emergency**	FY 2018 Less Enacted DIV B P.L.115-96*** MDDE + Ship Repairs	FY 2018 Remaining Req with CR Adj Base + OCO + Emergency	Sec
244	0303142F	Global Force Management - Data Initiative	07				2,147		2,147	U
246	0304260F	Airborne SIGINT Enterprise	07				121,948		121,948	U
247	0304310F	Commercial Economic Analysis	07				3,544		3,544	U
250	0305015F	C2 Air Operations Suite - C2 Info Services	07							U
251	0305020F	CCMD Intelligence Information Technology	07				1,542		1,542	U
252	0305099F	Global Air Traffic Management (GATM)	07				4,453		4,453	U
253	0305110F	Satellite Control Network (SPACE)	07							U
254	0305111F	Weather Service	07				26,654		26,654	U
255	0305114F	Air Traffic Control, Approach, and Landing System (ATCALS)	07				6,306		6,306	U
256	0305116F	Aerial Targets	07				21,295		21,295	U
259	0305128F	Security and Investigative Activities	07				415		415	U
260	0305145F	Arms Control Implementation	07							U
261	0305146F	Defense Joint Counterintelligence Activities	07				3,867		3,867	U
264	0305173F	Space and Missile Test and Evaluation Center	07							U
265	0305174F	Space Innovation, Integration and	07							U

Rapid Technology Development

266 0305179F Integrated Broadcast Service (IBS) 07 U

R-119PB: FY 2019 President's Budget (Published Version), as of February 1, 2018 at 12:30:16

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Sec
244	0303142F	Global Force Management - Data Initiative	07	2,170		2,170	U
246	0304260F	Airborne SIGINT Enterprise	07	106,873		106,873	U
247	0304310F	Commercial Economic Analysis	07	3,472		3,472	U
250	0305015F	C2 Air Operations Suite - C2 Info Services	07	8,608		8,608	U
251	0305020F	CCMD Intelligence Information Technology	07	1,586		1,586	U
252	0305099F	Global Air Traffic Management (GATM)	07	4,492		4,492	U
253	0305110F	Satellite Control Network (SPACE)	07				U
254	0305111F	Weather Service	07	26,942	3,000	29,942	U
255	0305114F	Air Traffic Control, Approach, and Landing System (ATCALS)	07	6,271		6,271	U
256	0305116F	Aerial Targets	07	8,383		8,383	U
259	0305128F	Security and Investigative Activities	07	418		418	U
260	0305145F	Arms Control Implementation	07				U
261	0305146F	Defense Joint Counterintelligence Activities	07	3,845		3,845	U
264	0305173F	Space and Missile Test and Evaluation Center	07				U
265	0305174F	Space Innovation, Integration and	07				U

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267	0305182F	Spacelift Range System (SPACE)	07	21,082					U
268	0305202F	Dragon U-2	07	37,217	34,486	34,486			U
269	0305205F	Endurance Unmanned Aerial Vehicles	07	50,000					U
270	0305206F	Airborne Reconnaissance Systems	07	13,465	4,450	4,450			U
271	0305207F	Manned Reconnaissance Systems	07	20,975	14,269	14,269			U
272	0305208F	Distributed Common Ground/Surface Systems	07	18,898	27,501	27,501			U
273	0305220F	RQ-4 UAV	07	244,807	214,849	214,849			U
274	0305221F	Network-Centric Collaborative Targeting	07	18,088	18,842	18,842			U
275	0305238F	NATO AGS	07	38,904	44,729	44,729			U
276	0305240F	Support to DCGS Enterprise	07	23,084	26,349	26,349			U
277	0305265F	GPS III Space Segment	07	165,794					U
278	0305600F	International Intelligence Technology and Architectures	07	2,360	3,491	3,491			U
279	0305614F	JSPOC Mission System	07	76,467					U
280	0305881F	Rapid Cyber Acquisition	07	4,123	4,899	4,899			U
281	0305906F	NCMC - TW/AA System	07	4,951					U
282	0305913F	NUDET Detection System (SPACE)	07	21,093					U
283	0305940F	Space Situation Awareness Operations	07	92,482					U

284	0305984F	Personnel Recovery Command & Ctrl (PRC2)	07	2,445	2,445		U

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267	0305182F	Spacelift Range System (SPACE)	07							U
268	0305202F	Dragon U-2	07				34,486		34,486	U
269	0305205F	Endurance Unmanned Aerial Vehicles	07							U
270	0305206F	Airborne Reconnaissance Systems	07				4,450		4,450	U
271	0305207F	Manned Reconnaissance Systems	07				14,269		14,269	U
272	0305208F	Distributed Common Ground/Surface Systems	07				27,501		27,501	U
273	0305220F	RQ-4 UAV	07				214,849		214,849	U
274	0305221F	Network-Centric Collaborative Targeting	07				18,842		18,842	U
275	0305238F	NATO AGS	07				44,729		44,729	U
276	0305240F	Support to DCGS Enterprise	07				26,349		26,349	U
277	0305265F	GPS III Space Segment	07							U
278	0305600F	International Intelligence Technology and Architectures	07				3,491		3,491	U
279	0305614F	JSPOC Mission System	07							U
280	0305881F	Rapid Cyber Acquisition	07				4,899		4,899	U
281	0305906F	NCMC - TW/AA System	07							U
282	0305913F	NUDET Detection System (SPACE)	07							U
283	0305940F	Space Situation Awareness Operations	07							U

284	0305984F	Personnel Recovery Command & Ctrl (PRC2)	07	2,445	2,445	U

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267	0305182F	Spacelift Range System (SPACE)	07				U
268	0305202F	Dragon U-2	07	48,518	22,100	70,618	U
269	0305205F	Endurance Unmanned Aerial Vehicles	07				U
270	0305206F	Airborne Reconnaissance Systems	07	175,334		175,334	U
271	0305207F	Manned Reconnaissance Systems	07	14,223		14,223	U
272	0305208F	Distributed Common Ground/Surface Systems	07	24,554	29,500	54,054	U
273	0305220F	RQ-4 UAV	07	221,690		221,690	U
274	0305221F	Network-Centric Collaborative Targeting	07	14,288		14,288	U
275	0305238F	NATO AGS	07	51,527		51,527	U
276	0305240F	Support to DCGS Enterprise	07	26,579		26,579	U
277	0305265F	GPS III Space Segment	07				U
278	0305600F	International Intelligence Technology and Architectures	07	8,464		8,464	U
279	0305614F	JSPOC Mission System	07				U
280	0305881F	Rapid Cyber Acquisition	07	4,303		4,303	U
281	0305906F	NCMC - TW/AA System	07				U
282	0305913F	NUDET Detection System (SPACE)	07				U
283	0305940F	Space Situation Awareness Operations	07				U

284	0305984F	Personnel Recovery Command & Ctrl (PRC2)	07	2,466		2,466	U

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285	0307577F	Intelligence Mission Data (IMD)	07		8,684	8,684			U
286	0308699F	Shared Early Warning (SEW)	07	6,154					U
287	0401115F	C-130 Airlift Squadron	07	15,599	10,219	10,219			U
288	0401119F	C-5 Airlift Squadrons (IF)	07	65,057	22,758	22,758			U
289	0401130F	C-17 Aircraft (IF)	07	12,021	34,287	34,287			U
290	0401132F	C-130J Program	07	16,199	26,821	26,821			U
291	0401134F	Large Aircraft IR Countermeasures (LAIRCM)	07	5,011	5,283	5,283			U
292	0401218F	KC-135s	07		9,942	9,942			U
293	0401219F	KC-10s	07	3,500	7,933	7,933			U
294	0401314F	Operational Support Airlift	07	13,332	6,681	6,681			U
295	0401318F	CV-22	07	27,704	22,519	22,519			U
296	0401840F	AMC Command and Control System	07		3,510	3,510			U
297	0408011F	Special Tactics / Combat Control	07	6,902	8,090	8,090			U
298	0702207F	Depot Maintenance (Non-IF)	07	1,507	1,528	1,528			U
299	0708055F	Maintenance, Repair & Overhaul System	07		31,677	31,677			U
300	0708610F	Logistics Information Technology (LOGIT)	07	53,369	33,344	33,344			U
301	0708611F	Support Systems Development	07	10,552	9,362	9,362			U

302	0804743F	Other Flight Training	07	1,841	2,074	2,074		U

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285	0307577F	Intelligence Mission Data (IMD)	07				8,684		8,684	U
286	0308699F	Shared Early Warning (SEW)	07							U
287	0401115F	C-130 Airlift Squadron	07				10,219		10,219	U
288	0401119F	C-5 Airlift Squadrons (IF)	07				22,758		22,758	U
289	0401130F	C-17 Aircraft (IF)	07				34,287		34,287	U
290	0401132F	C-130J Program	07				26,821		26,821	U
291	0401134F	Large Aircraft IR Countermeasures (LAIRCM)	07				5,283		5,283	U
292	0401218F	KC-135s	07				9,942		9,942	U
293	0401219F	KC-10s	07				7,933		7,933	U
294	0401314F	Operational Support Airlift	07				6,681		6,681	U
295	0401318F	CV-22	07				22,519		22,519	U
296	0401840F	AMC Command and Control System	07				3,510		3,510	U
297	0408011F	Special Tactics / Combat Control	07				8,090		8,090	U
298	0702207F	Depot Maintenance (Non-IF)	07				1,528		1,528	U
299	0708055F	Maintenance, Repair & Overhaul System	07				31,677		31,677	U
300	0708610F	Logistics Information Technology (LOGIT)	07				33,344		33,344	U
301	0708611F	Support Systems Development	07				9,362		9,362	U

302 0804743F	Other Flight Training	07	2,074	2,074	U

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Sec
285	0307577F	Intelligence Mission Data (IMD)	07	4,117		4,117	U
286	0308699F	Shared Early Warning (SEW)	07				U
287	0401115F	C-130 Airlift Squadron	07	105,988		105,988	U
288	0401119F	C-5 Airlift Squadrons (IF)	07	25,071		25,071	U
289	0401130F	C-17 Aircraft (IF)	07	48,299		48,299	U
290	0401132F	C-130J Program	07	15,409		15,409	U
291	0401134F	Large Aircraft IR Countermeasures (LAIRCM)	07	4,334		4,334	U
292	0401218F	KC-135s	07	3,493		3,493	U
293	0401219F	KC-10s	07	6,569		6,569	U
294	0401314F	Operational Support Airlift	07	3,172		3,172	U
295	0401318F	CV-22	07	18,502		18,502	U
296	0401840F	AMC Command and Control System	07	1,688		1,688	U
297	0408011F	Special Tactics / Combat Control	07	2,541		2,541	U
298	0702207F	Depot Maintenance (Non-IF)	07	1,897		1,897	U
299	0708055F	Maintenance, Repair & Overhaul System	07	50,933		50,933	U
300	0708610F	Logistics Information Technology (LOGIT)	07	13,787		13,787	U
301	0708611F	Support Systems Development	07	4,497		4,497	U

302	0804743F	Other Flight Training	07	2,022	2,022	U

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303	0808716F	Other Personnel Activities	07	57	107	107			U
304	0901202F	Joint Personnel Recovery Agency	07	3,556	2,006	2,006			U
305	0901218F	Civilian Compensation Program	07	2,878	3,780	3,780			U
306	0901220F	Personnel Administration	07	4,968	7,472	7,472			U
307	0901226F	Air Force Studies and Analysis Agency	07	1,415	1,563	1,563			U
308	0901538F	Financial Management Information Systems Development	07	10,478	91,211	91,211			U
309	1201921F	Service Support to STRATCOM - Space Activities	07		14,255	14,255			U
310	1202247F	AF TENCAP	07		31,914	31,914			U
311	1203001F	Family of Advanced BLoS Terminals (FAB-T)	07		32,426	32,426			U
312	1203110F	Satellite Control Network (SPACE)	07		18,808	18,808			U
314	1203165F	NAVSTAR Global Positioning System (Space and Control Segments)	07		10,029	10,029			U
315	1203173F	Space and Missile Test and Evaluation Center	07		25,051	25,051			U
316	1203174F	Space Innovation, Integration and Rapid Technology Development	07		11,390	11,390			U
317	1203179F	Integrated Broadcast Service (IBS)	07		8,747	8,747			U
318	1203182F	Spacelift Range System (SPACE)	07		10,549	10,549			U

319	1203265F	GPS III Space Segment	07	243,435	243,435	U

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303	0808716F	Other Personnel Activities	07				107		107	U
304	0901202F	Joint Personnel Recovery Agency	07				2,006		2,006	U
305	0901218F	Civilian Compensation Program	07				3,780		3,780	U
306	0901220F	Personnel Administration	07				7,472		7,472	U
307	0901226F	Air Force Studies and Analysis Agency	07				1,563		1,563	U
308	0901538F	Financial Management Information Systems Development	07				91,211		91,211	U
309	1201921F	Service Support to STRATCOM - Space Activities	07				14,255		14,255	U
310	1202247F	AF TENCAP	07				31,914		31,914	U
311	1203001F	Family of Advanced BLoS Terminals (FAB-T)	07				32,426		32,426	U
312	1203110F	Satellite Control Network (SPACE)	07				18,808		18,808	U
314	1203165F	NAVSTAR Global Positioning System (Space and Control Segments)	07				10,029		10,029	U
315	1203173F	Space and Missile Test and Evaluation Center	07				25,051		25,051	U
316	1203174F	Space Innovation, Integration and Rapid Technology Development	07				11,390		11,390	U
317	1203179F	Integrated Broadcast Service (IBS)	07				8,747		8,747	U
318	1203182F	Spacelift Range System (SPACE)	07				10,549		10,549	U

319	1203265F	GPS III Space Segment	07	243,435	243,435	U

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303	0808716F	Other Personnel Activities	07	108		108	U
304	0901202F	Joint Personnel Recovery Agency	07	2,023		2,023	U
305	0901218F	Civilian Compensation Program	07	3,772		3,772	U
306	0901220F	Personnel Administration	07	6,358		6,358	U
307	0901226F	Air Force Studies and Analysis Agency	07	1,418		1,418	U
308	0901538F	Financial Management Information Systems Development	07	99,734		99,734	U
309	1201921F	Service Support to STRATCOM - Space Activities	07	14,161		14,161	U
310	1202247F	AF TENCAP	07	26,986	5,000	31,986	U
311	1203001F	Family of Advanced BLoS Terminals (FAB-T)	07	80,168		80,168	U
312	1203110F	Satellite Control Network (SPACE)	07	17,808		17,808	U
314	1203165F	NAVSTAR Global Positioning System (Space and Control Segments)	07	8,937		8,937	U
315	1203173F	Space and Missile Test and Evaluation Center	07	59,935		59,935	U
316	1203174F	Space Innovation, Integration and Rapid Technology Development	07	21,019		21,019	U
317	1203179F	Integrated Broadcast Service (IBS)	07	8,568		8,568	U
318	1203182F	Spacelift Range System (SPACE)	07	10,641		10,641	U

319	1203265F	GPS III Space Segment	07	144,543	144,543	U

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320	1203400F	Space Superiority Intelligence	07		12,691	12,691			U
321	1203614F	JSpOC Mission System	07		99,455	99,455			U
322	1203620F	National Space Defense Center	07		18,052	18,052			U
323	1203699F	Shared Early Warning (SEW)	07		1,373	1,373			U
324	1203906F	NCMC - TW/AA System	07		5,000	5,000			U
325	1203913F	NUDET Detection System (SPACE)	07		31,508	31,508			U
326	1203940F	Space Situation Awareness Operations	07		99,984	99,984			U
327	1206423F	Global Positioning System III - Operational Control Segment	07		510,938	510,938			U
9999	9999999999	Classified Programs		12,971,689	14,938,002	14,938,002	112,408	112,408	U
		Operational Systems Development		17,256,679	20,585,302	20,585,302	122,158	122,158	
328	0901560F	Continuing Resolution Programs	20		-7,336,882	-7,336,882	229,847	229,847	U
		Undistributed			-7,336,882	-7,336,882	229,847	229,847	
Total Research, Development, Test & Eval, AF				28,381,681	27,577,477	27,577,477	365,205	365,205	

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320	1203400F	Space Superiority Intelligence	07				12,691		12,691	U
321	1203614F	JSpOC Mission System	07				99,455		99,455	U
322	1203620F	National Space Defense Center	07				18,052		18,052	U
323	1203699F	Shared Early Warning (SEW)	07				1,373		1,373	U
324	1203906F	NCMC - TW/AA System	07				5,000		5,000	U
325	1203913F	NUDET Detection System (SPACE)	07				31,508		31,508	U
326	1203940F	Space Situation Awareness Operations	07				99,984		99,984	U
327	1206423F	Global Positioning System III - Operational Control Segment	07				510,938		510,938	U
9999	9999999999	Classified Programs		165,244	-165,244		15,215,654	-165,244	15,050,410	U
		Operational Systems Development					20,872,704		20,707,460	
328	0901560F	Continuing Resolution Programs	20				-7,107,035		-7,107,035	U
		Undistributed					-7,107,035		-7,107,035	
Total Research, Development, Test & Eval, AF				255,744	-255,744		28,198,426	-255,744	27,942,682	

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Line No	Program Element Number	Item	Act	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Sec
320	1203400F	Space Superiority Intelligence	07	16,278		16,278	U
321	1203614F	JSpOC Mission System	07	72,256		72,256	U
322	1203620F	National Space Defense Center	07	42,209		42,209	U
323	1203699F	Shared Early Warning (SEW)	07				U
324	1203906F	NCMC - TW/AA System	07				U
325	1203913F	NUDET Detection System (SPACE)	07	19,778		19,778	U
326	1203940F	Space Situation Awareness Operations	07	19,572		19,572	U
327	1206423F	Global Positioning System III - Operational Control Segment	07	513,235		513,235	U
9999	9999999999	Classified Programs		16,247,930	474,321	16,722,251	U
		Operational Systems Development		22,605,546	586,970	23,192,516	
328	0901560F	Continuing Resolution Programs	20				U
		Undistributed					
		Total Research, Development, Test & Eval, AF		39,892,149	600,465	40,492,614	

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3	01	0601108F	High Energy Laser Research Initiatives	Volume 1 - 19

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Fiscal Year (FY) 2019 Budget Estimates
RDT&E Descriptive Summaries
Budget Activities
February 2018

INTRODUCTION AND EXPLANATION OF CONTENTS

1. (U) GENERAL
   A. This document has been prepared to provide information on the United States Air Force (USAF) Research, Development, Test and Evaluation (RDT&E) program elements and projects in the FY 2019 President's Budget (PB).
      1) All exhibits in this document have been assembled in accordance with DoD 7000.14R, Financial Management Regulation, Volume 2B, Chapter 5, Section 050402. Exception:
         a) Exhibit R-1, RDT&E Program, which was distributed under a separate cover due to classification.
      2) Other comments on exhibit contents in this document:
         a) Exhibits R-2/2a and R-3 provide narrative information for all RDT&E program elements and projects within the USAF FY 2019 RDT&E program with the exception of classified program elements. The format sand contents of this document are in accordance to the guidelines and requirements of the Congressional committees in so far as possible.
         b) The "Other Program Funding Summary portion of the R-2 includes, in addition to RDTE& funds, Procurement funds and quantities, Military Construction appropriation funds on specific development programs, Operations and Maintenance appropriation funds where they are essential to the development effort described, and where appropriate, Department of Energy (DOE) costs.

2. (U) CLASSIFICATION
   A. All exhibits contained in Volumes I, II, and III are unclassified. Classified exhibits are not included in the submission due to the level of security classification and necessity of special security clearances.

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Department of the Air Force

Research and Development (RDT&E) Military Construction Program

Fiscal Year (FY) 2019 Budget Estimates

Justification Data Submitted to Congress
February 2018

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DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 2019 RESEARCH AND DEVELOPMENT(RDT&E) REQUEST
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DEPARTMENT OF THE AIR FORCE
FISCAL YEAR 2019 RESEARCH AND DEVELOPMENT(RDT&E)
PROGRAM SUMMARY

PROGRAM SUMMARY

	AUTHORIZATION REQUEST ($000s)	APPROPRIATION REQUEST ($000s)
Military Construction		
Major Construction	**111,000**	**0**
Total Military Construction	**111,000**	**0**

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1. COMPONENT AIR FORCE	FY 2020 MILITARY CONSTRUCTION PROJECT DATA (computer generated)	2. DATE

3. INSTALLATION, SITE AND LOCATION	4. PROJECT TITLE
EDWARDS AIR FORCE BASE EDWARDS AFB SITE # 1 CALIFORNIA	JOINT SIMULATION ENVIRONMENT FACILITY -EDWARDS

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. RPSUID/PROJECT NUMBER	8. PROJECT COST ($000)
64759	317-932	1684/FSPM173504	43,000

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT	COST ($000)
PRIMARY FACILITIES				31,929
AVIONICS RESEARCH LABORATORY (317-932)	SM	6,702	4,669	(31,290)
FACILITY SUSTAINABILITY & ENERGY MEASURES SUPPORTING FACILITIES	SM	6,702	95	(639)
				5,852
DEMOLITION	SM	12	587	(7)
PAVEMENTS	LS			(2,310)
SITE IMPROVEMENTS	LS			(1,430)
UTILITIES	LS			(1,055)
COMMUNICATIONS INFRASTRUCTURE	LS			(300)
EMERGENCY GENERATOR	LS			(750)
SUBTOTAL				37,781
CONTINGENCY (5.0%)				1,889
TOTAL CONTRACT COST				39,670
SUPERVISION, INSPECTION AND OVERHEAD (5.7%)				2,261
DESIGN/BUILD - DESIGN COST (4.0% OF SUBTOTAL)				1,511
TOTAL REQUEST				43,442
TOTAL REQUEST (ROUNDED)				43,000
EQUIPMENT FROM OTHER APPROPRIATIONS (NON-ADD)				(72,800)

10. Description of Proposed Construction: Construct a two story 6,702 SM Joint Simulation Environment Facility with reinforced concrete foundation and slab floor, structural steel frame, split-face masonry unit walls, standing seam metal roof, sensitive compartmentalized information facilities (SCIF), special access program facilities (SAPF), fire detection and protection systems, utilities, emergency generator, communication support, pavements, site improvements including covered walkways to buildings 1020 and 1030, and all other necessary support. Facilities will be designed as permanent construction in accordance with DoD Unified Facilities Criteria 1-200-01, General Building Requirements and UFC 1-200-02, High Performance and Sustainable Building Requirements. This project will comply with DoD antiterrorism/force protection requirements per UFC 4-010-01. Demolish one 12 SM facility, building 1019, and demolish two modular structures.

Air Conditioning: 300 Tons

11. Requirement: 14112 SM Adequate: 0 SM Substandard: 7410 SM

PROJECT: Joint Simulation Environment Facility - Edwards

REQUIREMENT: Adequate facilities are required for/to accommodate F-35 Block C2/D2 developmental test and early operational test and evaluation and F-22 Sensor Enhancement developmental testing. This will require a Joint Simulation Environment (JSE) capability including integration with F-22 and other platforms and capabilities. The JSE will provide a unique capability, providing a

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EDWARDS AIR FORCE BASE EDWARDS AFB SITE # 1 CALIFORNIA	JOINT SIMULATION ENVIRONMENT FACILITY -EDWARDS

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. RPSUID/PROJECT NUMBER	8. PROJECT COST ($000)
64759	317-932	1684/FSPM173504	43,000

government owned simulation environment supporting multi-platform integrated testing. The collaborative JSE facility will include up to four F-35 simulator cockpits, four F-22 simulator cockpits, six adversary (Red) simulator cockpits, and two hardware-in-the-loop cockpits. This capability will provide a unique opportunity to create a non-proprietary AF multi-platform domain. The United States Navy, Marine Corps, Army, Defense Advanced Research Project Agency and defense contractor teams all stand to benefit from this unique capability and the feedback gathered from this collaborative JSE. Future A2/AD weapons systems (including B-21, PCA, and others) would also use this facility when available. Additionally, this facility will house Tactical Command & Control (TAC/C2) capabilities for both blue (Air Force) and red forces, and working areas for the integration of Space and Cyber capabilities, tactical data links, augmented reality and Joint Interoperability initiatives research and development activities. This facility project exceeds the section 2805 limit of $6M. This design shall conform to criteria established in the Air Force Corporate Facilities Standards (AFCFS), the Installation Facilities Standards (IFS), but will not employ a standard facility design because there is no AF standard facility design for this project and there is no applicable standard design from Air Force Civil Engineer Center (AFCEC).

CURRENT SITUATION: It is becoming increasingly difficult to create an operationally realistic environment, and upcoming 5th Generation aircraft testing cannot be fully performed in open air ranges. Additionally, emerging USAF high-priority programs limit open air range access. These factors drive the requirement for a ground test facility that can accommodate multi-level security, with multiple airframes and weapon systems. Aircraft simulators that are currently available are based on proprietary hardware and software, and are aircraft specific. They cannot be readily reconfigured to simulate different aircraft which limits their effectiveness for supporting developmental and operational testing.

IMPACT IF NOT PROVIDED: F-35 and 5th generation integrated testing cannot be accomplished. Testing will continue to be constrained by the limits of open air ranges.

ADDITIONAL: Funding authority for this project is FY 2017 National Defense Authorization Act, Section 2806, which ammends FY 2016 NDAA language to include DOD research, development, test and evaluations facilities not designated as a Science and Technology Reinvention Laboratory under Section 2803 Defense Laboratory Modernization Pilot Program, subsection (a). It authorizes the Secretary of Defense to fund military construction projects using amounts appropriated or otherwise made available to the Department of Defense for research, development, test, and evaluation. This project will support research, development, testing, and evaluation in accordance with NDAA Section 2803, subsection (d) (1) (2) (3) (4). This project meets the criteria/scope specified in Part II of Military Handbook 1190, Facility Planning and Design Guide, Air Force Manual 32-1084, "Facility Requirements", and the weapon system Facility Requirement Plan. A preliminary economic analysis has been accomplished comparing new construction to an add/alter option and it was determined that new construction is the most cost effective alternative. Sustainable principles, to include Life Cycle cost effective

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64759	317-932	1684/FSPM173504	43,000

practices, will be integrated into the design, development and construction of the project in accordance with UFC 1-200-02, dated 1 March 2013. Base Civil Engineer: 661-277-2910. Joint Simulation Environment Facility: 6,702 SM = 72,140 SF.

JOINT USE CERTIFICATION: This facility can be used by other components on an "as available" basis; however, the scope of the project is based on Air Force requirements.

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EDWARDS AIR FORCE BASE EDWARDS AFB SITE # 1 CALIFORNIA	JOINT SIMULATION ENVIRONMENT FACILITY -EDWARDS

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
64759	317-932	1684/FSPM173504	43,000

12. SUPPLEMENTAL DATA:

a. Estimated Design Data:

(1) Project to be accomplished by design-build procedures

(2) Basis:

(a) Standard or Definitive Design - NO

(b) Where Design Was Most Recently Used -

(3) All Other Design Costs 1,680

(4) Construction Contract Award 20 FEB

(5) Construction Start 20 APR

(6) Construction Completion 22 APR

(7) Energy Study/Life-Cycle analysis was/will be performed NO

b. Equipment associated with this project provided from other appropriations:

EQUIPMENT NOMENCLATURE	PROCURING APPRO	FISCAL YEAR APPROPRIATED OR REQUESTED	COST ($000)
FLIGHT SIMULATOR EQUIPMENT	3600	2022	72,000
FURNISHINGS	3600	2022	500
COMMUNICATIONS EQUIPMENT	3600	2022	300

c. Pursuant to the FY 2016 NDAA, Section 2803(d)3, endorsement by more than one military department for this project is provided in the FY 2019 3600 budget exhibit under PE 0604759F.

1. COMPONENT AIR FORCE	FY 2020 MILITARY CONSTRUCTION PROJECT DATA (computer generated)	2. DATE

3. INSTALLATION, SITE AND LOCATION	4. PROJECT TITLE
EGLIN AIR FORCE BASE EGLIN AFB SITE # 1 (EGLIN MAIN AND RESERVATION) FLORIDA	CYBERSPACE TEST FACILITY

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. RPSUID/PROJECT NUMBER	8. PROJECT COST ($000)
64759	311-173	1695/FTFA163007	38,000

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT	COST ($000)
PRIMARY FACILITIES				27,074
AIRCRAFT RESEARCH ENGINEERING FAC (311-173)	SM	4,833	5,492	(26,543)
SUSTAINABILITY AND ENERGY MEASURES	LS			(531)
SUPPORTING FACILITIES				7,314
UTILITIES	LS			(1,440)
PAVEMENTS	LS			(2,455)
SITE IMPROVEMENTS	LS			(1,015)
PRIVATIZED UTILITY CONNECTION FEE	LS			(300)
COMMUNICATIONS	LS			(1,354)
EMERGENCY GENERATOR	LS			(750)
SUBTOTAL				34,388
CONTINGENCY (5.0%)				1,719
TOTAL CONTRACT COST				36,107
SUPERVISION, INSPECTION AND OVERHEAD (5.7%)				2,058
TOTAL REQUEST				38,165
TOTAL REQUEST (ROUNDED)				38,000
EQUIPMENT FROM OTHER APPROPRIATIONS (NON-ADD)				(5,000.0)

10. Description of Proposed Construction: Construct a cyberspace security test facility utilizing conventional design and construction methods to accomodate the mission of the facility. A sprinkler-equipped facility consisting of a concrete foundation, split-faced concrete block over a steel frame and sloped standing seam metal roof. Approximately half of the facility will need to be SCIF rated. Project provides utilities, HVAC, secure communications, site improvements, landscaping, parking, emergency generator capabilities, and all support facilities to provide a complete and usable facility. Facility will be designed as permanent construction in accordance with the Department of Defense (DoD) Unified Facilities Criteria (UFC) 1-200-01, General Building Requirements and UFC 1-200-02, High Performance and Sustainable Building Requirements. This project will comply with DoD antiterrorism/force protection requirements per UFC 4-010-01. A temporary facility (aproximately 14,000 SF) will be required interim to this facility and will not be funded as part of this effort.

Air Conditioning: 400 Tons

11. Requirement: 4833 SM Adequate: 0 SM Substandard: 0 SM

PROJECT: Cyberspace Test Facility

REQUIREMENT: The recently approved 96CTG and associate units require secure, networked laboratories to accomplish critical integrated weapons system test execution, Cybersecurity, and Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR) testing. As additional tools

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1. COMPONENT AIR FORCE	FY 2020 MILITARY CONSTRUCTION PROJECT DATA (computer generated)	2. DATE

3. INSTALLATION, SITE AND LOCATION	4. PROJECT TITLE
EGLIN AIR FORCE BASE EGLIN AFB SITE # 1 (EGLIN MAIN AND RESERVATION) FLORIDA	CYBERSPACE TEST FACILITY

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. RPSUID/PROJECT NUMBER	8. PROJECT COST ($000)
64759	311-173	1695/FTFA163007	38,000

and test capabilities are brought on line, this state-of-the-art facility will provide the critical Developmental Test and Evaluation, Operational Test and Evaluation, and training and exercise capabilities currently unavailable. This facility will bring all weapons cybersecurity test expertise into a unified environment including expertise from academic, industrial, and other federal agencies. This facility will also benefit Special Operations Command AFSOC 18FTS, Redstone Test Center, and Naval Air Station Patuxent. This facility project exceeds the section 2805 limit of $6M.

CURRENT SITUATION: There are no existing facilities on Eglin AFB with the capability to collocate the number of personnel that the 96 CTG will need to house at Eglin AFB or support the necessary testing equipment needed for the growth in cyber testing requirements to be executed by the 96 CTG. While Eglin AFB may have facilities that could be remodeled/refurbished to accommodate these personnel or the required equipment; using several, geographically separated facilities would debilitate the effectiveness of the required Developmental Test & Evaluation / Operational Test & Evaluation.

IMPACT IF NOT PROVIDED: Test and Evaluation is one of AFMC's core mission areas. Without this facility, new Cybersecurity and C4ISR testing will be extremely impeded. The AFTC mission to conduct DT&E of air, space and cyberspace systems, and provide timely, objective and accurate information to acquisition decision makers will be diminished. There will be a direct negative impact to the warfighter's need to maintain C4ISR, Cybersecurity, and information superiority while minimizing risks to fielding warfighter weapons systems.

ADDITIONAL: This project meets applicable criteria/scope specified in AF Manual 32-1084, Facility Requirements. Economic analysis is being processed and a preliminary review has been accomplished, with a new facilty being the recommendation. This project will be accomplished using RDT&E (3600) funds to support the 96/TS Cyberspace Test facility requirements Under title 10 USC SEC 2358 DEFENSE LABORATORY MODERNIZATION PILOT PROGRAM "(d)(4) cannot be fully funded within the thresholds specified in section 2805 of title 10, United States Code. "(e) Funding Limitation - The maximum amount of funds appropriated or otherwise made available for research, development, test, and evaluation that may be obligated in any fiscal year for military construction projects under this section is $150,000,000. "(f) Termination of Authority - The authority provided by this section to fund military construction projects using funds appropriated or otherwise made available for research, development, test, and evaluation shall terminate on October 1, 2020."

This expansion of required manning and test facilities requires proximity to B85 on Eglin AFB (current location of the 46TS) for reach back into secure networks and integration of C4ISR systems.

This design shall conform to criteria established in the Air Force Corporate Facilities Standards (AFCFS), the Installation Facilities Standards (IFS), but will not employ a standard facility design because there is no AF standard facility design for this project and there is no applicable standard design from Air Force Civil Engineer Center (AFCEC). The Supporting Facility costs exceed the Primary

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EGLIN AIR FORCE BASE EGLIN AFB SITE # 1 (EGLIN MAIN AND RESERVATION) FLORIDA	CYBERSPACE TEST FACILITY

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. RPSUID/PROJECT NUMBER	8. PROJECT COST ($000)
64759	311-173	1695/FTFA163007	38,000

facility costs by more than 25% due to the inclusion of an emergency generator, otherwise, the costs fall within the 25% criteria.
96th Test Wing Base Civil Engineer: (850) 882-2876.
Cyberspace Facility: 4,833 SM = 52,003 SF.

JOINT USE CERTIFICATION: This facility can be used by other components on an "as available" basis; however, the scope of the project is based on Air Force requirements.

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3. INSTALLATION AND LOCATION	4. PROJECT TITLE
EGLIN AIR FORCE BASE EGLIN AFB SITE # 1 (EGLIN MAIN AND RESERVATION) FLORIDA	CYBERSPACE TEST FACILITY

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
64759	311-173	1695/FTFA163007	38,000

12. SUPPLEMENTAL DATA:

a. Estimated Design Data:

(1) Status:

(a) Date Design Started	06-OCT-18
(b) Parametric Cost Estimates used to develop costs	YES
* (c) Percent Complete as of 01 JAN 2018	15%
* (d) Date 35% Designed	11-JAN-19
(e) Date Design Complete	16-NOV-19
(f) Energy Study/Life-Cycle analysis was/will be performed	YES

(2) Basis:

(a) Standard or Definitive Design -	NO
(b) Where Design Was Most Recently Used -	

(3) Total Cost (c) = (a) + (b) or (d) + (e):	($000)
(a) Production of Plans and Specifications	0
(b) All Other Design Costs	2,280
(c) Total	2,280
(d) Contract	0
(e) In-house	0

(4) Construction Contract Award	20 JAN
(5) Construction Start	20 MAR
(6) Construction Completion	21 MAY

* Indicates completion of Project Definition with Parametric Cost Estimate which is comparable to traditional 35% design to ensure valid scope, cost and executability.

b. Equipment associated with this project provided from other appropriations:

EQUIPMENT NOMENCLATURE	PROCURING APPROPRIATION	FISCAL YEAR APPROPRIATED OR REQUESTED	COST ($000)
FF&E	3600	2020	2,100
AUDIO VISUAL EQUIPMENT	3600	2020	2,900

c. Pursuant to the FY 2016 NDAA, Section 2803(d)3, endorsement by more than one military department for this project is provided in the FY 2019 3600 budget exhibit under PE 0604759F.

1. COMPONENT AIR FORCE	FY 2020 MILITARY CONSTRUCTION PROJECT DATA (computer generated)	2. DATE

3. INSTALLATION, SITE AND LOCATION	4. PROJECT TITLE
NELLIS AIR FORCE BASE NELLIS SITE # 1 NEVADA	JOINT SIMULATION ENVIRONMENT FACILITY- NELLIS

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. RPSUID/PROJECT NUMBER	8. PROJECT COST ($000)
64759	317-932	3056/RKMF203007	30,000

9. COST ESTIMATES

ITEM	U/M	QUANTITY	UNIT	COST ($000)
PRIMARY FACILITIES				22,088
AVIONICS RESEARCH LABORATORY (317-932)	SM	4,735	4,573	(21,655)
SUSTAINABILITY & ENERGY MEASURES (2.0%)	LS			(433)
SUPPORTING FACILITIES				3,879
UTILITIES	LS			(883)
SITE IMPROVEMENTS	LS			(635)
PAVEMENTS	LS			(850)
COMMUNICATIONS SUPPORT	LS			(861)
EMERGENCY GENERATOR SYSTEM	LS			(650)
SUBTOTAL				25,967
CONTINGENCY (5.0%)				1,298
TOTAL CONTRACT COST				27,265
SUPERVISION, INSPECTION AND OVERHEAD (5.7%)				1,554
DESIGN/BUILD - DESIGN COST (4.0% OF SUBTOTAL)				1,039
TOTAL REQUEST				29,858
TOTAL REQUEST (ROUNDED)				30,000
EQUIPMENT FROM OTHER APPROPRIATIONS (NON-ADD)				(94,450)

10. Description of Proposed Construction: Provide a 4,735 SM, Joint Simulation Environment Facility (JSE) to house the Joint Simulation Environment (JSE). Work will include reinforced concrete foundation and floor slab, structural steel frames, split-face masonry unit walls, standing metal seam roofing system with parapet, sensitive compartmentalized information facilities (SCIF), special access program facilities (SAPF), fire detection and protection system, utilities, emergency generator, communication support, pavements and all other necessary support. Facilities will be designed as permanent construction in accordance with the DoD Unified Facilities Criteria (UFC) 1-200-01, General Building Requirements and UFC 1-200-02, High Performance and Sustainable Building Requirements. This project will comply with DoD antiterrorism/force protection requirements per UFC 4-010-01.

Air Conditioning: 300 Tons

11. Requirement: 4735 SM Adequate: 0 SM Substandard: 0 SM

PROJECT: Joint Simulation Environment Facility - Nellis

REQUIREMENT: Adequate facilities are required for/to accommodate F-35 C2/D2 developmental test and early operational test and evaluation and F-22 Sensor Enhancement developmental testing. This will require a Joint Simulation Environment (JSE) capability including integration with F-22 and other platforms and capabilities. The JSE will provide a unique capability, providing a government owned simulation environment supporting multi-platform integrated

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5. PROGRAM ELEMENT	6. CATEGORY CODE	7. RPSUID/PROJECT NUMBER	8. PROJECT COST ($000)
64759	317-932	3056/RKMF203007	30,000

testing. The collaborative JSE facility will include up to eight F-35 simulator cockpits, a minimum four F-22 simulator cockpits, and up to eight adversary (Red) simulator cockpits. This capability will provide a unique opportunity to create a non-proprietary AF multi-platform domain. The United States Navy, Marine Corps, Army, Defense Advanced Research Project Agency and defense contractor teams all stand to benefit from this unique capability and the feedback gathered from this collaborative JSE. Future C2/D2 weapons systems (including B-21, PCA and others) could also use this facility. Additionally, this facility will house Tactical Command & Control (TAC/C2) capabilities for both blue and red forces, and working areas for the integration of Space and Cyber capabilities, tactical data links, augmented reality and Joint Interoperability initiatives research and development activities. This facility project exceeds the section 2805 limit of $6M.

CURRENT SITUATION: It is becoming increasingly difficult to create an operationally realistic environment, and upcoming 5th Generation aircraft testing cannot be fully performed in open air ranges. Additionally, emerging USAF high priority programs limit open air range access. These factors drive the requirement for a ground test facility that can accommodate multi-level security, with multiple airframes and weapon systems. Aircraft simulators that are currently available are based on proprietary hardware and software, and are aircraft specific. They cannot be readily reconfigured to simulate different aircraft which limits their effectiveness for supporting developmental and operational testing.

IMPACT IF NOT PROVIDED: F-35 and 5th generation integrated testing cannot be accomplished. Nellis will continue to be limited in our ability to test 5th generation aircraft, and will be unable to realize the increased test capability the JSE can provide. Testing will continue to be constrained by the limits of open air ranges. Building an JSE facility at Nellis and integrating into an already established plan for a Virtual Test and Training Center - Nellis provides an unprecedented level of synergy/warfighter advanced readiness benefit across testing, tactics development and advanced training.

ADDITIONAL: Funding authority for this project is FY 2017 National Defense Authorization Act, Section 2806, which ammends FY 2016 NDAA language to include DOD research, development, test and evaluations facilities not designated as a Science and Technology Reinvention Laboratory under Section 2803 Defense Laboratory Modernization Pilot Program, subsection (a). It authorizes the Secretary of Defense to fund military construction projects using amounts appropriated or otherwise made available to the Department of Defense for research, development, test, and evaluation. This project will support research, development, testing, and evaluation in accordance with NDAA Section 2803, subsection (d) (1) (2) (3) (4). This project meets the criteria/scope specified in Part II of Military Handbook 1190, Facility Planning and Design Guide, Air Force Manual 32-1084, "Facility Requirements" and the weapon system Facility Requirement Plan. An analysis of reasonable options for accomplishing this project (status quo, renovations, and new construction) was done. It indicates there is only one option that will meet operational requirements; new construction. A certificate of exception has been

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5. PROGRAM ELEMENT	6. CATEGORY CODE	7. RPSUID/PROJECT NUMBER	8. PROJECT COST ($000)
64759	317-932	3056/RKMF203007	30,000

prepared. Sustainable principles, to include Life Cycle cost-effective practices, will be integrated into the design, development and construction of the project in accordance with UFC 1-200-02, dated 1 March 2013.

99th Air Base Wing Base Civil Engineer: 702-652-4833.
(Joint Simulation Environment Facility - Nellis: 4,735 SM = 50,967 SF)

JOINT USE CERTIFICATION: This facility can be used by other components on an "as available" basis; however, the scope of the project is based on Air Force requirements.

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3. INSTALLATION AND LOCATION	4. PROJECT TITLE
NELLIS AIR FORCE BASE NELLIS SITE # 1 NEVADA	JOINT SIMULATION ENVIRONMENT FACILITY- NELLIS

5. PROGRAM ELEMENT	6. CATEGORY CODE	7. PROJECT NUMBER	8. PROJECT COST ($000)
64759	317-932	3056/RKMF203007	30,000

12. SUPPLEMENTAL DATA:

a. Estimated Design Data:

(1) Project to be accomplished by design-build procedures

(2) Basis:

(a) Standard or Definitive Design - NO

(b) Where Design Was Most Recently Used -

(3) All Other Design Costs 1,400

(4) Construction Contract Award 20 FEB

(5) Construction Start 20 MAR

(6) Construction Completion 22 MAR

(7) Energy Study/Life-Cycle analysis was/will be performed YES

b. Equipment associated with this project provided from other appropriations:

EQUIPMENT NOMENCLATURE	PROCURING APPRO	FISCAL YEAR APPROPRIATED OR REQUESTED	COST ($000)
FLIGHT SIMULATOR EQUIPMENT	3600	2020	94,000
FURNISHINGS	3600	2020	300
COMMUNICATIONS-ELECTRONIC EQUI	3600	2020	150

c. Pursuant to the FY 2016 NDAA, Section 2803(d)3, endorsement by more than one military department for this project is provided in the FY 2019 3600 budget exhibit under PE 0604759F.

DEPARTMENT OF THE NAVY
OFFICE OF THE ASSISTANT SECRETARY
RESEARCH, DEVELOPMENT AND ACQUISITION
1000 NAVY PENTAGON
WASHINGTON DC 20350-1000

5 FEB 2017

MEMORANDUM FOR DIRECTOR OF AIR FORCE TEST AND EVALUATION

From: Department of Navy, Modeling & Simulation, Department of the Navy (Assistant Secretary of the Navy (Research Development and Test)
TO: Air Force Test and Evaluation

SUBJECT: ENDORSEMENT OF JOINT SIMULATION ENVIRONMENT FACILITIES

Reference: (a) FY2016 NDAA Section 2803 Defense Laboratory Modernization Pilot Program

In accordance with subsection (d)(3) of reference (a), Department of Navy Modeling & Simulation Executive supports and endorses Joint Simulation Environment Facilities to be built at Edwards AFB and Nellis AFB. This will support reuse and collaboration with Naval Aviation Modeling & Simulation facilities and organizations.

This endorsement does not represent a reprioritization of any submitted or future Naval needs or requirements (funded or unfunded) for this funding authorization. This does not represent any commitment for future Naval funding.

The Department of Navy M&S point of contact is Ms. Amy Markowich, Naval M&S Executive, amy.markowich@navy.mil, 301-342-6169.

Amy Markowich
AMY MARKOWICH

Director, Integrated Battlespace Simulation and Test Department, AIR-5.4
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MEMORANDUM FOR DIRECTOR OF AIR FORCE TEST AND EVALUATION

FROM: Naval Air Systems Command Cyber Warfare Detachment Executive
TO: Air Force Test and Evaluation

SUBJECT: ENDORSEMENT OF CYBERSPACE TEST GROUP FACILITY

Reference: (a) FY2016 NDAA Section 2803 Defense Laboratory Modernization Pilot Program

In accordance with subsection (d)(3) of reference (a), Naval Air Systems Command Cyber Warfare Executive endorses the Air Force Cyberspace Test Group Facility to be built at Eglin AFB. This endorsement will facilitate enhanced collaboration with Naval Air Systems Command Cyber Warfare Laboratory development and advanced Modeling & Simulation efforts.

This endorsement does not represent a reprioritization of any submitted or future Naval needs or requirements (funded or unfunded) for this funding authorization. This does not represent any commitment for future Naval funding.

Naval Air Systems Command Cyber Warfare Detachment Executive point of contact is Amy Markowich, amy.markowich@navy.mil, 301-342-6169.

Amy Markowich
AMY MARKWOICH

The following Program Elements are not providing RDT&E exhibits due to classification:

0101815F	ADVANCED STRATEGIC PROGRAM
0207424F	EVALUATION AND ANALYSIS PROGRAM
0208161F	SPECIAL EVALUATION SYSTEM
0208162F	ADVANCED TECHNOLOGY PROGRAM
0301310F	NATIONAL AIR INTELLIGENCE CENTER
0301314F	COBRA BALL
0301315F	MISSILE AND SPACE TECHICAL COLLECTION
0301324F	FOREST GREEN
0301386F	GDIP COLLECTION MANAGEMENT
0304111F	SPECIAL ACTIVITES
0304311F	SELECTED ACTIVITIES
0304348F	ADVANCED GEOSPATIAL INTELLIGENCE (AGI)
0305124F	SPECIAL APPLICATIONS PROGRAM
0305127F	FOREIGN COUNTERINTELLIGENCE ACTIVITES
0305159F	DEFENSE RECONNAISSANCE SUPPORT ACTIVITIES
0305172F	COMBINED ADVANCED APPLICATIONS
0604446F	WIDE AREA SURVEILLANCE - SP
0605798F	ANALYSIS SUPPORT GROUP

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	5.598	5.652	5.568	0.000	5.568	5.672	5.770	5.891	5.997	Continuing	Continuing
64536A: *INTELLIGENCE EXPLOITATION TOOLS (IET)*	-	4.442	4.488	4.421	0.000	4.421	4.503	4.580	4.676	4.760	Continuing	Continuing
64537A: *INTELLIGENCE ANALYSIS CAPABILITIES (IAC)*	-	1.156	1.164	1.147	0.000	1.147	1.169	1.190	1.215	1.237	Continuing	Continuing

A. Mission Description and Budget Item Justification

Intelligence Advanced Development (IAD) develops and demonstrates technology required to support warfighter needs for timely all source intelligence information. IAD supports global awareness, consistent battlespace knowledge, precision information, and the execution of time critical missions. IAD focuses on enhancing defense intelligence capabilities by exploring new and innovative ways to develop software tools which support the Anti-Access/Area Denial (A2/AD) Contested/Congested Degraded Operations (CDO) problem set. IAD projects provide improved on-time information to the warfighter using new and existing data sources, streamlining data analysis, thus reducing the footprint required, and enhancing performance. The Air Force Research Lab, Rome Research Site, Information Intelligence Systems and Analysis Division (AFRL/RIE), works directly with users, employing evolutionary approaches and integrating finished modules directly into the field. The programs are oriented toward specific shortfalls and deficiencies as documented by the Major Commands (MAJCOMS), unified commands, and Intelligence organizations in their mission and functional area plans. This PE expedites technology transition from the laboratory to operational users via rapid prototyping. It is focused on technology insertion to correct AF intelligence deficiencies at the tactical and operational levels. The PE bridges the transition of new technologies from Advance Technology Demonstrations (ATDs) and Integrated Technology Thrust Programs (ITTPs) into current/new systems, and supports the associated Defense Technology Objectives (DTOs). IAD may also reallocate existing resources to support out-of-cycle new/updated warfighter requirements.

Requirements for this PE are identified and prioritized by Air Combat Command (ACC). Development of new/improved capabilities to meet the requirements is managed by AFRL/RIE. Prototype products, usually in the form of software, are provided to users in incremental capability spirals for operational environment evaluation.

This program is Budget Activity 4, Advanced Component Development and Prototype because efforts are necessary to evaluate integrated technologies, representative modes or prototypes systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force					Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*		**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*			
B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	5.598	5.652	5.611	0.000	5.611
Current President's Budget	5.598	5.652	5.568	0.000	5.568
Total Adjustments	0.000	0.000	-0.043	0.000	-0.043
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.043	0.000	-0.043

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64536A / *INTELLIGENCE EXPLOITATION TOOLS (IET)*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
64536A: *INTELLIGENCE EXPLOITATION TOOLS (IET)*	-	4.442	4.488	4.421	0.000	4.421	4.503	4.580	4.676	4.760	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The mission is to develop prototypes which encompass several areas of intelligence exploitation including the advancement of all source correlation and fusion for the intelligence analyst. The intent is to enhance the overall situational awareness for Air Force, DoD, and Coalition groups which have requirements to correlate various sources of intelligence information, including Communications Intelligence (COMINT), Electronics Intelligence (ELINT), Imagery Intelligence (IMINT), Geospatial Intelligence (GEOINT), Measurement and Signature Intelligence (MASINT), Signals Intelligence (SIGINT),Open-source Intelligence (OSINT) and others, in a timely manner. IET may reallocate existing resources to support out-of-cycle new/updated warfighter requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Intelligence Exploitation Tools (IET)	4.442	4.488	4.421

Description: IET addresses the accurate and timely interpretation of various Intelligence data sources (such as digital imagery, video, documents, and signals) by developing and evaluating methods to manipulate and overlay the disparate products using various imagery, visualization and timeline techniques. This provides the analyst with the ability to fuse multiple intelligence sources for improved situational awareness and to better detect anomalies. Cross domain tools are explored as a means to view and provide data at multiple classification levels. In addition, methods to improve analysis of current and future foreign weapon systems are developed. IET provides enhanced warning and accuracy to allow national and military authorities a greater range of options to avert, diminish or control a crisis.

FY 2018 Plans:

- Continuing development of software focused on improving the way computers and application services supports intelligence analysts through the use of cognitive systems

- Completing development of a capability to enable the detection, geo-location, and tracking of complex wideband and low probability of intercept emitters; improve reporting timeliness and accuracy of worldwide ELINT intercept data

- Completing development of a capability to enable the intelligence analyst to conduct search and discovery either by visual pattern recognition/feature extraction or text-based using queries

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64536A / *INTELLIGENCE EXPLOITATION TOOLS (IET)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Completing development of a framework designed to expose media tools, data, products, workflow and analytical services to the DoD and Intelligence Community (IC) - Continuing development of automated methods that aid in the systematic, continuous, and comprehensive assessment of technical topic, concepts and emergence using information found in open source searches - Continuing enabling Distributed Common Ground Station (DCGS) enterprise support of high-altitude SIGINT missions and execution on NSANet - Continuing development of a software capability to exploit and fuse open source information with DCGS related sources - Continuing development of a Feature Extractor to assist automation of Tech ELINT screening - Continuing development and integration of space based modeling capabilities into the Integrated Many on Many mission planning tool - Continuing implementation of operational metadata capability for DCGS SIGINT collection systems - Continuing user evaluations and prototype releases			
FY 2019 Plans: - Will complete development of software focused on improving the way computers and application services supports intelligence analysts through the use of cognitive systems - Will complete development of automated methods that aid in the systematic, continuous, and comprehensive assessment of technical topic, concepts and emergence using information found in open source searches - Will continue enabling DCGS enterprise support of high-altitude SIGINT missions and execution on NSANet - Will complete development of a software capability to exploit and fuse open source information with DCGS related sources - Will complete development of a Feature Extractor to assist automation of Tech ELINT screening			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64536A / *INTELLIGENCE EXPLOITATION TOOLS (IET)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Will continue development and integration of space based modeling capabilities into the Integrated Many on Many mission planning tool - Will continue implementation of operational metadata capability for DCGS SIGINT collection systems - Will continue user evaluations and prototype releases evaluations and prototype releases ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to pricing			
Accomplishments/Planned Programs Subtotals	4.442	4.488	4.421

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Requirements for new/improved techniques for operational employment of simulation models are identified and prioritized by ACC. Development of the new/improved capabilities to meet these requirements is managed by Air Force Research Laboratory (AFRL) Rome Research Site. Prototype products (usually software), once evaluated by the users, are transitioned from the laboratory to the operational community in spirals. All major contracts within this project are awarded after full and open competition.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64536A / *INTELLIGENCE EXPLOITATION TOOLS (IET)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Intelligence Exploitation Tools (IET)	Various	Various : Various	-	4.180	Jan 2017	4.073	Jan 2018	4.009	Jan 2019	-		4.009	Continuing	Continuing	-
		Subtotal	-	4.180		4.073		4.009		-		4.009	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA	Various	AFRL - Information Directorate : Rome, NY	-	0.262	Oct 2016	0.415	Oct 2017	0.412	Oct 2018	-		0.412	Continuing	Continuing	-
		Subtotal	-	0.262		0.415		0.412		-		0.412	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	4.442		4.488		4.421		-		4.421	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64536A / *INTELLIGENCE EXPLOITATION TOOLS (IET)*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
EIT																												
IET Development	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Initiate development of software capability to ingest open source information and fusing with DCGS related sources	■	■	■	■	■	■	■	■	■	■	■	■	■															
Initiate development of Feature Extractor to assist automation of Tech ELINT screening	■	■	■	■	■	■	■	■	■	■	■	■	■															
Initiate development and integration of space based systems modeling capabilities into IMOM planning tool	■	■	■	■	■	■	■	■	■	■	■	■	■															
Initiate implementation of operational metadata capability for DCGS SIGINT collection systems	■	■	■	■	■	■	■	■	■	■	■	■	■															
FY17 IET User Evaluations		■	■																									
FY17 IET Prototype Releases				■																								
Complete Development of Capability for Quantitative Mission Assessment and Integrating Future ISR and Combat Mission Capabilities	■	■	■	■																								
Complete development of Rivet Joint processing software to enable collecting current/future SIGINT metadata	■	■	■	■																								
FY18 IET User Evaluations						■	■																					
FY18 IET Prototype Releases								■	■																			
Complete development of search and discovery either by visual pattern recognition/ feature extraction or text-based using queries.					■	■	■	■	■																			

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64536A / *INTELLIGENCE EXPLOITATION TOOLS (IET)*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64536A / *INTELLIGENCE EXPLOITATION TOOLS (IET)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
EIT				
IET Development	1	2017	4	2022
Initiate development of software capability to ingest open source information and fusing with DCGS related sources	1	2017	4	2019
Initiate development of Feature Extractor to assist automation of Tech ELINT screening	1	2017	4	2019
Initiate development and integration of space based systems modeling capabilities into IMOM planning tool	1	2017	4	2019
Initiate implementation of operational metadata capability for DCGS SIGINT collection systems	1	2017	4	2019
FY17 IET User Evaluations	2	2017	2	2017
FY17 IET Prototype Releases	4	2017	4	2017
Complete Development of Capability for Quantitative Mission Assessment and Integrating Future ISR and Combat Mission Capabilities	1	2017	4	2017
Complete development of Rivet Joint processing software to enable collecting current/ future SIGINT metadata	1	2017	4	2017
FY18 IET User Evaluations	2	2018	2	2018
FY18 IET Prototype Releases	4	2018	4	2018
Complete development of search and discovery either by visual pattern recognition/ feature extraction or text-based using queries.	1	2018	4	2018
Complete development of software focused on the use of cognitive systems	1	2018	4	2018
FY19 IET User Evaluations	2	2019	2	2019
FY20 IET Requirements Data Call	2	2019	2	2019
FY19 IET Prototype Releases	4	2019	4	2019

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64536A / *INTELLIGENCE EXPLOITATION TOOLS (IET)*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
FY20 IET User Evaluations	2	2020	2	2020
FY20 IET Prototype Releases	4	2020	4	2020
FY21 IET User Evaluations	2	2021	2	2021
FY21 IET Prototype Releases	4	2021	4	2021
FY22 IET Requirements Data Call	2	2022	2	2022
FY22 IET User Evaluations	2	2022	2	2022
FY22 IET Prototype Releases	4	2022	4	2022
FY23 IET Requirements Data Call	2	2023	2	2023
FY23 IET User Evaluations	2	2023	2	2023
FY23 IET Prototype Releases	4	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64537A / *INTELLIGENCE ANALYSIS CAPABILITIES (IAC)*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
64537A: *INTELLIGENCE ANALYSIS CAPABILITIES (IAC)*	-	1.156	1.164	1.147	0.000	1.147	1.169	1.190	1.215	1.237	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The mission is to provide continuing development and upgrades of threat analysis capabilities to produce integrated, predictive air and space intelligence to enable military operations, force modernization decisions, and policy making. Products from IAC allow the Intelligence Analyst to accelerate and increase the accuracy of threat estimates and system descriptions to deployed operational forces. Each of the development projects within the IAC program portfolio transition technologies to the operational communities through the incremental release of upgraded versions over a period of years as development projects progress towards the final configuration. IAC may reallocate existing resources to support out-of-cycle new/ updated warfighter requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Intelligence Intelligence Analysis Capabilities (IAC) Development	1.156	1.164	1.147

Description: IAC develops tools and algorithms for Intelligence Analysts with the ability to produce accurate, predictive, relevant, and timely intelligence that supports client processes, operational planning, and mission execution. IAC develops new and upgraded analysis, modeling and simulation tools focused on intelligence production supporting AF operational and developmental all source analysis functions.

FY 2018 Plans:

- Completing model development and updating the appropriate simulation capability to ensure more accurate release of the data sets to consumers of National Air and Space Intelligence Center intelligence models and resulting data sets.

- Completing prototype development of an enterprise level solution (tools and procedures) that will allow the intelligence analyst to perform predictive intelligence analysis on new areas of interest

- Initiating development of a query class prototype system that will enable users to search large volumes of disparate multimodal and multilingual data sources. This service will be accessible for use by DoD and IC cloud service architectures.

- Initiating development of a prototype Modeling and Simulation tool to address the need for improved threat Integrated Air Defense System (IADS) passive detection/tracking and combat identification.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64537A / *INTELLIGENCE ANALYSIS CAPABILITIES (IAC)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Continuing user evaluations and prototype releases. ***FY 2019 Plans:*** - Will continue development of a query class prototype system that will enable users to search large volumes of disparate multimodal and multilingual data sources. This service will be accessible for use by DoD and IC cloud service architectures. - Will continue development of a prototype Modeling and Simulation tool to address the need for improved threat IADS passive detection/tracking and combat identification. - Will develop Command, Control, Communication, and Computer database and visualization capability for intelligence operators. - Will develop a prototype for providing improved Electronic Warfare (EW) information to operational users by leveraging the capabilities of the modernized, national EW databases. This will include signal identification, waveform ambiguity detection and emitter descriptions across all three national EW databases. - Will continue user evaluations and prototype releases. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** - Funding decreased due to pricing			
Accomplishments/Planned Programs Subtotals	1.156	1.164	1.147

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Requirements of new/upgraded intelligence analysis tools are identified and prioritized by the ACC. Development of capabilities to meet these requirements is managed by AFRL Rome Research Site. Prototype products (usually software), once evaluated by the users, are fielded in incremental capability spirals. All major contracts within this project are awarded after full and open competition.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64537A / *INTELLIGENCE ANALYSIS CAPABILITIES (IAC)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
IAC	Various	Various : Various	-	1.000	Oct 2016	1.075	Oct 2017	1.006	Oct 2018	-		1.006	Continuing	Continuing	-
		Subtotal	-	1.000		1.075		1.006		-		1.006	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA	Various	AFRL - Information Directorate : Rome, NY	-	0.156	Oct 2016	0.089	Oct 2017	0.141	Oct 2018	-		0.141	Continuing	Continuing	-
		Subtotal	-	0.156		0.089		0.141		-		0.141	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.156		1.164		1.147		-		1.147	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64537A / *INTELLIGENCE ANALYSIS CAPABILITIES (IAC)*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603260F / *Intelligence Advanced Development*	**Project (Number/Name)** 64537A / *INTELLIGENCE ANALYSIS CAPABILITIES (IAC)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
IAC				
IAC Development	1	2017	4	2023
FY17 IAC User Evaluations	2	2017	2	2017
FY17 IAC Prototype Releases	4	2017	4	2017
FY18 IAC User Evaluations	2	2018	2	2018
FY18 IAC Prototype Releases	4	2018	4	2018
FY19 IAC User Evaluations	2	2019	2	2019
FY21 IAC Requirements Data Call	2	2020	2	2020
FY19 IAC Prototype Releases	4	2019	4	2019
FY20 IAC User Evaluations	2	2020	2	2020
FY20 IAC Prototype Releases	4	2020	4	2020
FY21 IAC User Evaluations	2	2021	2	2021
FY21 IAC Prototype Releases	4	2021	4	2021
FY22 IAC Requirements Data Call	2	2022	2	2022
FY22 IAC User Evaluations	2	2022	2	2022
FY22 IAC Prototype Releases	4	2022	4	2022
FY23 IAC User Evaluations	2	2023	2	2023
FY23 IAC Prototype Releases	4	2023	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603438F / *Space Control Technology*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	8.506	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
642611: *Technology Insertion Planning and Analysis*	-	8.506	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0603438F, Space Control Technology efforts were transferred to PE 1206438F, Space Control Technology, due to the creation of a new Major Force Program for Space. FY2017 funding and FY2018 OCO is now documented in the exhibits for PE 1206438F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	7.534	0.000	0.000	0.000	0.000
Current President's Budget	8.506	0.000	0.000	0.000	0.000
Total Adjustments	0.972	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	1.190	0.000			
• SBIR/STTR Transfer	-0.218	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	23.551	24.397	18.194	0.000	18.194	27.085	26.444	24.834	25.287	Continuing	Continuing
642597: *Noncooperative Identification Subsystems*	-	21.186	22.442	18.194	0.000	18.194	21.907	22.287	22.749	23.164	Continuing	Continuing
642599: *Cooperative Identification Techniques*	-	2.365	1.955	0.000	0.000	0.000	5.178	4.157	2.085	2.123	Continuing	Continuing

A. Mission Description and Budget Item Justification

Non-cooperative CID employs a number of sensing technologies and signal processing techniques. The observations may be compared to a database of known objects to identify surface or air threats from air platforms. These technologies include: (1) Laser Vision, an Electro-Optical/Infrared (EO/IR) imaging system that significantly increases ID ranges; (2) Hydra Vision, a balanced (robust) amalgamation of sensor data from multiple sources to provide warfighters with higher confidence CID results on surface or air targets potentially including fusion with intelligence sources, identification of non-traditional targets, fusion to counter camouflage, concealment and deception (CCD), and multi-phenomenology features for sustainable databases; (3) Compact AiTR (Aided Target Recognition) and Sustainable Environments (CASE), a CID approach that focuses on tailoring algorithms to utilize smaller, more efficient databases that are faster and less expensive to generate and maintain; (4) Passive RF ID Environment (PRIDE), a program to develop passive RF target ID capability for denied access environment utilizing passive RF and EW information with potential non-traditional ISR capabilities; (5) Radio ID (RID) will develop methods for utilizing advances in digital radio technologies such as software defined radios, to provide low cost ID solutions to enhance Combat ID, improve aircrew situational awareness and assist in fratricide prevention with military and civil air platforms, potentially fusing non-cooperative techniques and cooperative technologies; and (6) Enhanced Combat ID (ECID), a program under Studies to develop a robust ability to quantitatively evaluate promising CID technologies using enhanced modeling and simulation (M&S) capabilities.

Cooperative Combat Identification (CID) employs technologies required to rapidly identify friendly platforms. The program develops, integrates and evaluates technologies that provide AF platforms with a means of positively identifying an air or ground platform as a friendly, via active or passive cooperative identification capabilities. Development funded by this project ensures availability of a Mode 5 upgrade path for implementing ground and air platforms across the Air Force fleet.

Activities also include studies and analysis to support both current program planning and execution and future program planning.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Combat Identification technologies. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

The FY19 funding request was reduced by $5.461M to account for the availability of prior year execution balances.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*

In FY19 project 642599 (Cooperative ID) was erroneously zeroed out. A correction will be made during the execution year to reflect the following: project 642599 (Cooperative ID) - $1.53M; project 642597 (Non-Cooperative ID) - $16.664M.

BA4 - This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	24.418	24.397	23.655	0.000	23.655
Current President's Budget	23.551	24.397	18.194	0.000	18.194
Total Adjustments	-0.867	0.000	-5.461	0.000	-5.461
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.867	0.000			
• Other Adjustments	0.000	0.000	-5.461	0.000	-5.461

Change Summary Explanation

The FY 2019 funding request was reduced by $5.461M to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642597: *Noncooperative Identification Subsystems*	-	21.186	22.442	18.194	0.000	18.194	21.907	22.287	22.749	23.164	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Non-cooperative CID employs a number of sensing technologies and signal processing techniques. The observations may be compared to a database of known objects to identify surface or air threats from air platforms. These technologies include: (1) Laser Vision, an Electro-Optical/Infrared (EO/IR) imaging system that significantly increases ID ranges; (2) Hydra Vision, a balanced (robust) amalgamation of sensor data from multiple sources to provide warfighters with higher confidence CID results on surface or air targets potentially including fusion with intelligence sources, identification of non-traditional targets, fusion to counter camouflage, concealment and deception (CCD), and multi-phenomenology features for sustainable databases; (3) Compact AiTR (Aided Target Recognition) and Sustainable Environments (CASE), a CID approach that focuses on tailoring algorithms to utilize smaller, more efficient databases that are faster and less expensive to generate and maintain; (4) Passive RF ID Environment (PRIDE), a program to develop passive RF target ID capability for denied access environment utilizing passive RF and EW information with potential non-traditional ISR capabilities; (5) Radio ID (RID) will develop methods for utilizing advances in digital radio technologies such as software defined radios, to provide low cost ID solutions to enhance Combat ID, improve aircrew situational awareness and assist in fratricide prevention with military and civil air platforms, potentially fusing non-cooperative techniques and cooperative technologies; and (6) Enhanced Combat ID (ECID), a program under Studies to develop a robust ability to quantitatively evaluate promising CID technologies using enhanced modeling and simulation (M&S) capabilities.

Activities also include studies and analysis to support both current program planning and execution and future program planning.

In FY19 project 642599 (Cooperative ID) was erroneously zeroed out. A correction will be made during the execution year to reflect the following: project 642599 (Cooperative ID) - $1.53M; project 642597 (Non-Cooperative ID) - $16.664M.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Laser Vision/SIREN	1.412	0.000	0.000
Description: Design, fabricate, and evaluate a tactical range laser vibrometry sensor in a targeting pod. Leverage ability of active electro-optic sensors to sense micro-displacements of operating machinery in order to measure the resulting frequency spectrum. Assess utility for air-to-ground combat identification. The Vibrometry Advanced Mode Processor (VAMP) program is research into advanced algorithms for processing data provided by vibrometry sensors in order to develop and demonstrate prototype pilot Aided Target Recognition software.			
FY 2018 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
N/A ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** No change, FY17 was the final year to fund this program			
Title: Laser Vision/VAMP ***Description:*** Design, fabricate, and evaluate a tactical range laser vibrometry sensor in a targeting pod. Leverage ability of active electro-optic sensors to sense micro-displacements of operating machinery in order to measure the resulting frequency spectrum. Assess utility for air-to-ground combat identification. The VAMP program exploits research into advanced algorithms for processing data provided by vibrometry sensors in order to develop and demonstrate prototype pilot Aided Target Recognition (AiTR) software. ***FY 2018 Plans:*** - Continue to develop ID algorithm with relevant data from SIREN sensor - Develop surrogate target measurement capabilities for ground testing and affordable sustainment - Integrate an AiTR software algorithm into the SIREN surrogate targeting pod - Lab demo AiTR with the SIREN sensor ***FY 2019 Plans:*** - Will conduct MASINT flights to collect in-range vibrometry sensor data and associated meta data - Will continue assessments of advanced algorithms for feature extraction and classifier functions - Will update Interface Control Documents to latest vibrometer sensor revision level - Will initiate vehicle database collection and associated software development - Will perform ground/flight Testing ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Initial software spiral development and ground flight testing will be completed in FY18, therefore, funds will be decreased for FY19.	0.700	2.455	1.800
Title: Laser Vision/3-D Ladar ***Description:*** Laser Vision, a family of electro-optical (EO) systems that significantly increase ID ranges. Provide the demonstration and evaluation data necessary to support decisions on future EO technologies supporting CID, including 3-D (3-dimensional) imaging laser radar (Ladar) and exploration of advanced concepts. The 3-D ladar technology provides a display of a	2.901	1.550	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
3-D EO image to the pilot for high confidence combat identification and is a potential for the next generation targeting pods for the USAF. ***FY 2018 Plans:*** - Deliver Flight Receiver Package with re-spun Readout Integrated Circuit (ROIC) and final Focal Plane Arrays (FPA) - Conclude Pod Integration contract with Field/Tower - Award Pod Integration Flight Test contract (DMEA Phase II) - Accomplish Pod-Integration ground test for pre-flight check out ***FY 2019 Plans:*** Complete in FY18. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Laboratory Class flights will be cancelled for FY18. All Flight Receiver Packages, Award Pod Integration Flight Test for FY17 and FY18 will be completed and no funding is required for FY19.			
Title: Hydra Vision/Air to Air ***Description:*** Hydra Vision (Multi-Sensor Enhanced ID) is a balanced (robust) amalgamation of sensor data from multiple sources to provide warfighters with higher confidence CID results on surface or air targets. There are two main thrusts occurring simultaneously, Air-to-Air and Air-to-Ground. ***FY 2018 Plans:*** - Investigate other phenomenology (such as laser radar and Infra-Red Search and Track (IRST)) - Evaluate and select available technology suitable for inclusion into Air Target ID (ATID) - Investigate potential for implementing AAHV techniques in ISR platforms ***FY 2019 Plans:*** - Down select from FY18 phenomenology - Study and refine the most promising solutions - Adapt target recognition algorithms - Generate models and update database to incorporate information from chosen phenomenologys - Prepare for demonstration flights of developed technology ***FY 2018 to FY 2019 Increase/Decrease Statement:***	4.410	5.100	4.300

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
To generate models and update database information will require additional funding, along with increased cost for flight demonstrations for FY18 & FY19.			
Title: Hydra Vision/Air to Ground ***Description:*** Hydra Vision (Multi-Sensor Enhanced ID) is a family of balanced (robust) amalgamation of sensor data from multiple sources to provide warfighters with higher confidence CID results on surface or air targets. ***FY 2018 Plans:*** - Complete actions associated with AGHV Operational Demo with MQ-9 Reaper - Investigate potential transition of AGHV technology into their platform ***FY 2019 Plans:*** Complete in FY18. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Initial Capability Demonstration Completed	0.899	0.065	0.000
Title: Compact AiTR (Aided Target Recognition) and Sustainable Environment (CASE) ***Description:*** CASE is a family of efforts to address efficiency and sustainability issues associated with the development, operation and maintenance of non-cooperative AiTR technology. Develop sustainable multiphenomenology AiTR based on low fidelity, compact, and inexpensive database technology. ***FY 2018 Plans:*** - Complete real time flight demonstration of a compact SAR AiTR algorithm - Investigate feasibility of addressing High Resolution Radar (HRR) AiTR sustainment issues. ***FY 2019 Plans:*** - Will continue flight demo analysis ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Will no longer cover the cost of lab demos transitioning to flight demos	3.685	3.615	2.700
Title: Passive RF ID Environment (PRIDE) ***Description:*** Develop passive RF target ID capability for denied access environment utilizing passive RF and EW information with potential non-traditional ISR capabilities. ***FY 2018 Plans:***	4.684	5.720	3.558

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Develop a passive radar based ID capability and will assess integration for the strike fighter - Develop initial designs for integration of PRIDE capabilities into platform relevant hardware ***FY 2019 Plans:*** - Will conduct Proof-of-concept on target platform to facilitate timely transition ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funds increased in FY19 due to inflation.			
Title: Radio ID (RID) ***Description:*** RID will develop technologies to integrate radio based cooperative technologies with non-cooperative technologies into the cockpit. The benefits will be increased confidence target ID and situational awareness as well as reduced fratricides. RID will start in FY17. ***FY 2018 Plans:*** - Finalize RID Phase 1 development efforts - Plan and execute RID Critical Design Review and Technical Interchange Forums - Down-select vendors for RID Phase II development and demonstration activities ***FY 2019 Plans:*** - Conduct Risk Reduction, Initial Development, PDR, and Lab Demo ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Concept Definition, Risk Analysis and Analyst of Alternative will be completed in FY18, therefore, funds will be decreased for FY19.	1.000	2.000	1.725
Title: Studies ***Description:*** Conduct CID-related studies/demos. ***FY 2018 Plans:*** - Continue study projects leading to new concepts for non-cooperative and cooperative CID efforts - Initiate ECID tool set integration across CID organizations for effective decision making - Continue ECID study projects to evaluate feasibility of new concepts for non-cooperative and cooperative CID efforts ***FY 2019 Plans:*** - Will develop architecture	1.495	1.937	4.111

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Will develop algorithm - Will design system ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase needed to study Combat Air Support (CAS) scenarios with high potential for fratricide			
Accomplishments/Planned Programs Subtotals	21.186	22.442	18.194

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Combat Identification develops technologies for exploitation by the USAF and other services.
Award multiple, competitive contract vehicles emphasizing off-the-shelf technology and maximizing the use of non-developmental items (NDIs).
Management develops a technology to a point it can be demonstrated in a relative combat environment.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0603742F / *Combat Identification Technology*	Project (Number/Name) 642597 / *Noncooperative Identification Subsystems*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hydra Vision (Air-to-Air) - L	C/CPFF	Leidos : Reston, VA	-	0.750	Feb 2017	0.900	Oct 2017	0.900	Oct 2018	-		0.900	Continuing	Continuing	-
Hydra Vision (Air-to-Air) - N	C/CPFF	Northrop Grumman : Linthicum Heights, MD	-	1.500	Oct 2016	1.600	Oct 2017	1.000	Oct 2018	-		1.000	Continuing	Continuing	-
Hydra Vision (Air-to-Air) - R	C/CPFF	Raytheon Company : El Segundo, CA	-	1.900	Oct 2016	1.600	Oct 2017	1.000	Jan 2019	-		1.000	Continuing	Continuing	-
SIREN	C/CPFF	Northrop Grumman : Rowling Meadows, IL	-	1.412	Oct 2016	-		-		-		-	Continuing	Continuing	-
VAMP - EO X DWARVES	C/CPFF	Etegent : Cincinnati, OH	-	0.700	Dec 2016	2.455	Nov 2017	1.800	Nov 2018	-		1.800	Continuing	Continuing	-
3-D Ladar	C/CPFF	Northrop Grumman : Rolling Meadows, IL	-	2.901	Nov 2016	1.550	Dec 2017	-		-		-	Continuing	Continuing	-
Hydra Vision, Target Recognition & Tracking Technology/CASE-S	MIPR	Sandia : Albuquerque, NM	-	0.940	Dec 2016	1.300	Mar 2018	1.200	Mar 2019	-		1.200	Continuing	Continuing	-
Hydra Vision, Target Recognition & Tracking Technology/CASE-Key W	C/CPAF	Key-W : Hanover, MD	-	0.075	Jan 2017	0.100		-		-		-	Continuing	Continuing	-
Software on Chip for Classification, Exploitation and Reconnaissance (SOCCER)	C/CPAF	AER : TBD	-	0.281	May 2018	0.800	Jan 2019	0.800	Jan 2020	-		0.800	Continuing	Continuing	-
Studies - ECID	MIPR	Booz Allen Hamilton : McLean, VA	-	0.898	Dec 2016	0.422	Feb 2018	0.800	Dec 2018	-		0.800	Continuing	Continuing	-
Studies - Decision making for an Integrated CID Environment (DICE) - SBIR Phase III	C/CPFF	Frontier Technologies, Inc : Dayton, OH	-	0.600	Oct 2016	0.317	Apr 2018	-		-		-	Continuing	Continuing	-
Hydra Vision - Air to Ground - R	C/CPFF	Raytheon : ElSegundo, CA	-	0.000	Dec 2016	-		1.000	Jan 2019	-		1.000	Continuing	Continuing	-
Hydra Vision - Air to Ground - L	C/CPAF	Leidos : McLean, VA	-	0.000	Dec 2016	-		0.600	Jan 2019	-		0.600	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hydra Vision- Ops Demo	C/CPFF	General Atomics : San Diego, CA	-	0.119	Dec 2016	0.065	Feb 2018	-		-		-	Continuing	Continuing	-
Hydra Vision Ops Demo	C/CPAF	Yuma Proving Ground : Yuma, AZ	-	0.249	Mar 2017	0.249	May 2018	-		-		-	Continuing	Continuing	-
Hydra Vision Ops Demo - M	C/CPAF	Matrix : Dayton, OH	-	0.150	Mar 2017	0.150	May 2018	-		-		-	Continuing	Continuing	-
Hydra Vision Ops Demo - I	C/CPAF	Infoscitex : Dayton, OH	-	0.200	Mar 2017	0.200	Jan 2018	-		-		-	Continuing	Continuing	-
Hydra Vision Ops Demo - B	C/CPAF	BAE : Dayton, OH	-	0.100	Mar 2017	0.100	May 2018	-		-		-	Continuing	Continuing	-
Hydra Vision - Compact AiTR and Sustainable Environment Analysis - L	C/CPFF	Leidos : Mclean, VA	-	1.872	Oct 2016	1.495	Nov 2017	1.000	Nov 2018	-		1.000	Continuing	Continuing	-
Hydra Vision - Compact AiTR and Sustainable Environment Analysis - R	C/CPFF	Raytheon : El Segundo, CA	-	1.548	Dec 2016	1.000	Nov 2017	1.000	Nov 2018	-		1.000	Continuing	Continuing	-
OPERA	C/CPAF	Not specified. : TBD	-	0.300	Aug 2017	0.300	Oct 2017	-		-		-	Continuing	Continuing	-
Passive Radar Identification Environment (PRIDE) - L	C/CPFF	Leidos : Mclean, VA	-	1.089	Dec 2016	1.000	Jan 2018	1.050	Jan 2019	-		1.050	Continuing	Continuing	-
Passive Radar Identification Environment (PRIDE) -STR	C/CPFF	Systems and Technology Research : Woburn, MA	-	0.489	Dec 2016	1.000	Jan 2018	1.050	Jan 2019	-		1.050	Continuing	Continuing	-
Passive Radar Identification Environment (PRIDE) - IAI	C/CPFF	Integrated Applications Inc : Chantilly, VA	-	0.485	Dec 2016	1.000	Jan 2018	1.050	Jan 2019	-		1.050	Continuing	Continuing	-
Radio Identification (RID)	C/CPFF	TBD : TBD	-	0.370	Jan 2018	2.200	Apr 2018	1.725	Feb 2019	-		1.725	Continuing	Continuing	-
Alternate Band CID (ABC)	C/CPAF	Matrix : Dayton, OH	-	0.480	May 2017	0.800	Jul 2017	-		-		-	Continuing	Continuing	-
Air Target IR Discrimination (ATID)	C/CPFF	TBD : TBD	-	-		-		0.969	Aug 2019	-		0.969	Continuing	Continuing	-
		Subtotal	-	19.408		20.603		16.944		-		16.944	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering Support	MIPR	MITRE : Rome, NY	-	0.084	Mar 2017	0.334	Mar 2018	0.350	Mar 2019	-		0.350	Continuing	Continuing	-
		Subtotal	-	0.084		0.334		0.350		-		0.350	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PRIDE Data Collection	MIPR	46th Test Wing : Eglin AFB, FL	-	0.305	Feb 2017	0.305	Feb 2019	0.200	Feb 2020	-		0.200	Continuing	Continuing	-
PRIDE Data Collection - R	MIPR	Redstone Arsenal : Huntsville, AL	-	0.584	Oct 2017	0.300	Nov 2018	-		-		-	Continuing	Continuing	-
Air-to-Air Hydra Vision Flight Test	MIPR	Redstone Arsenal : Huntsville, AL	-	0.260	Sep 2017	0.200	Oct 2017	-		-		-	Continuing	Continuing	-
		Subtotal	-	1.149		0.805		0.200		-		0.200	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AFRL PMA	MIPR	GSA : Denver, CO	-	0.545	Nov 2016	0.700	Mar 2018	0.700	Mar 2019	-		0.700	Continuing	Continuing	-
		Subtotal	-	0.545		0.700		0.700		-		0.700	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	21.186		22.442		18.194		-		18.194	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Combat Identification Technology				
LASER VISION - Siren	1	2017	4	2018
LASER VISION - Siren Wright Patterson AFRL Tower Test (May 2017)	3	2017	3	2017
LASER VISION - Siren F-16 AATC POD Demo (Sep 2017)	4	2017	4	2017
LASER VISION - VAMP	1	2017	1	2022
LASER VISION - VAMP Lab Demo	4	2019	4	2019
LASER VISION - VAMP POD Demo	3	2021	3	2021
LASER VISION - 3D Ladar (3DTO)	1	2017	1	2019
LASER VISION - 3D Ladar (3DTO) Lab Demo	2	2018	2	2018
LASER VISION - 3D Ladar (3DTO) POD Demo	4	2018	4	2018
Hydra Vision - Air to Air (2 & 3 Features) (TRL-6 begins 3Qt FY18)	1	2017	2	2021
Hydra Vision - Air to Air 3 Feature RT Demo	4	2020	4	2020
Hydra Vision - Increment 1 - Air-to-Ground	1	2017	2	2017
Hydra Vision - Increment 1 - Air-To-Ground OPS Demo (Jun 2017)	3	2017	3	2017
Compact AiTR - Compact Feature AiTR	1	2017	4	2020
Compact AiTR - Compact Feature SAR AiTR Lab Demo (Mar 2017)	2	2017	2	2017
Compact AiTR - Compact Feature LiDAR AiTR Lab Demo (May 2017)	3	2018	3	2018
Compact AiTR- Compact Feature AiTR - Flight Demo (Jul 2017)	4	2018	4	2018
Passive RF ID (PRIDE)	1	2017	2	2022
Passive RF ID (PRIDE) - Lab Demo (Jun 20)	3	2020	3	2020
Passive RF ID (PRIDE) - OPS Demo (Dec 2022)	1	2023	1	2023
Radio ID (RID)	2	2017	4	2022

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642597 / *Noncooperative Identification Subsystems*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Radio ID - Lab Demo #1 (Jul 2019)	4	2019	4	2019
Radio ID - Lab Demo #2 (Jan 2021)	2	2021	2	2021
Radio ID - Flight Demo (Aug 2022)	3	2022	3	2022
Studies	1	2017	4	2023
Enhanced CID (ECID)	1	2017	1	2020

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642599: *Cooperative Identification Techniques*	-	2.365	1.955	0.000	0.000	0.000	5.178	4.157	2.085	2.123	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Cooperative Combat Identification (CID) employs technologies required to rapidly identify friendly platforms. The program develops, integrates and evaluates technologies that provide AF platforms with a means of positively identifying an air or ground platform as a friendly, via active or passive cooperative identification capabilities. Development funded by this project ensures availability of a Mode 5 upgrade path for implementing ground and air platforms across the Air Force fleet.

Fund AIMS Program Office test engineers. The DoD International AIMS PO has system level interoperability testing and certification responsibilities for the present Mark XII system, development and integration of the new Mark XIIA (Mode 5) IFF system, and development/integration of civil Mode S capabilities into Mark XIIA IFF equipment. The AIMS PO ensures IFF equipment equipment/platform functionality IAW established standards and ensures total system interoperability to meet DoD/ Service mission areas (e.g. Offensive Counter Air, Defensive Counter Air, and Integrated Air and Missile Defense). DoD International AIMS PO will continue to test and certify IFF equipment for the Services for as long as IFF is used for CID.

In FY19 project 642599 (Cooperative ID) was erroneously zeroed out. A correction will be made during the execution year to reflect the following: project 642599 (Cooperative ID) - $1.53M; project 642597 (Non-Cooperative ID) - $16.664M.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Air Traffic Control and Radar Beacon Systems Identification Friend or Foe Mark XIIA System (AIMS) Program Office	2.365	1.955	0.000
Description: Develop and maintain technical standards on development, integration, testing, and certification of DoD IFF (Identification Friend or Foe) equipment. Coordinated and executed equipment/subsystem-level certifications and platform certifications of IFF capabilities (33 equipment and 84 platform certifications performed in FY17). Support Foreign Military Sales of U.S. IFF equipment. Support NATO IFF Capabilities Team (Mode 5 IFF is a NATO waveform). Support International Civil Aviation Organization (ICAO) Technical Support Group (develops standards for world-wide civil Air Traffic Control). Create and maintain civil Mode S address assignments and military Mode 5 Platform ID Number (PIN) assignments for every DoD platform using these waveforms in their interrogator and/or transponder equipment.			
FY 2018 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Continue to fund AIMS for interoperability IFF testing (civil and military), FAA liaison, to support of Mode 4 / Mode 5 equipment, updating and developing IFF standards. N/A ***FY 2019 Plans:*** - Will continue to fund AIMS for interoperability IFF testing (civil and military), FAA liaison, to support of Mode 4 / Mode 5 equipment, updating and developing IFF standards. N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Project funding erroneously zeroed out.			
Accomplishments/Planned Programs Subtotals	2.365	1.955	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 N/A: *None*	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Remarks

D. Acquisition Strategy

Combat Identification develops technologies for exploitation by the USAF and the other services. Award multiple, competitive contract vehicles emphasizing off-the-shelf technology and maximizing the use of non-developmental items (NDIs). Management develops a technology to a point it can be demonstrated in a relative combat environment.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Systems Engineering / Program Management (AIMSPO)	C/Various	WRALC/ENT : Robins AFB, GA	-	2.165	May 2017	1.805	Feb 2018	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	2.165		1.805		0.000		-		0.000	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Office Support	Various	Various : Various	-	0.200	Oct 2016	0.150	Oct 2017	-		-		-	Continuing	Continuing	-
		Subtotal	-	0.200		0.150		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	2.365		1.955		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Cooperative Identification Techniques																												
AIMS Program Office Activities																												
AIMS Program Office Annual Workshop (Mar 2017)																												
AIMS Program Office Annual Workshop (May 2018)																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603742F / *Combat Identification Technology*	**Project (Number/Name)** 642599 / *Cooperative Identification Techniques*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Cooperative Identification Techniques				
AIMS Program Office Activities	1	2017	4	2022
AIMS Program Office Annual Workshop (Mar 2017)	2	2017	2	2017
AIMS Program Office Annual Workshop (May 2018)	3	2018	3	2018

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603790F / *NATO Research and Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	4.174	3.851	2.305	0.000	2.305	4.955	4.701	4.147	4.222	0.000	28.355
64NATO: *Nato Coop R&D*	-	4.174	3.851	2.305	0.000	2.305	4.955	4.701	4.147	4.222	0.000	28.355
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2016, PE 0603791F, International Space Cooperative Research & Development, Project 645035, International Space Coop R&D, efforts were transferred to PE 0603790F, NATO Research and Development, Project 64NATO, NATO Coop R&D, in order to consolidate international cooperative research and development activities.

A. Mission Description and Budget Item Justification

These funds will be used to initiate air, space, and cyber international cooperative research, and development (ICR&D) agreements with North Atlantic Treaty Organization (NATO) member states, major non-NATO allies and friendly foreign countries. Each of the selected activities and projects are required to have a concluded international agreement (IA), prior to funds being released, that implements the provisions of Title 10 U.S. Code, Section 2350a. This legislation (Title 10 U.S. Code, Section 2350) authorizes funds to significantly improve U.S. and allied conventional defense capabilities by leveraging the best defense technologies, eliminating costly duplication of R&D efforts, accelerating the availability of defense systems, and promoting US and allied interoperability or commonality. These funds will not be used for government civilian salaries, permanent construction, or spent overseas. This program element funds the implementation of Air Force ICR&D agreements in (1) Basic Research (2) Applied Research (3) Advanced Technology Development (4) Advanced Component Development and Prototypes (5) System Development and Demonstration and (6) RDT&E Management Support.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603790F / *NATO Research and Development*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	4.333	3.851	3.934	0.000	3.934
Current President's Budget	4.174	3.851	2.305	0.000	2.305
Total Adjustments	-0.159	0.000	-1.629	0.000	-1.629
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.159	0.000	-1.629	0.000	-1.629

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: International Cooperative Research and Development	4.174	3.851	2.305

Description: Supports bi- and multi-lateral international agreements that meet USAF RDT&E objectives and goals. Each of the cooperative projects that receive funding must meet one or more of the following requirements: enhance warfighter capabilities and coalition interoperability; accelerate the availability of defense systems; strengthen and reinforce strategic partnerships; gain access to the best defense technologies, capabilities and techniques; build relationships and influence with allies; and/or eliminate duplication of R&D efforts.

FY 2018 Plans:
FY18 cooperative projects involve RDT&E efforts in human performance, information systems, aerospace systems, munitions, materials and manufacturing, sensors, space situational awareness, missile warning, military satellite communications, global positioning systems, responsive space capabilities, cyber network defense and information assurance, and space vehicles. These projects include but are not limited to: Monitoring for Advanced Geolocation Processing And Interference Exploitation (MAGPIE); Next Generation Case Technology; Machine Translation for Coalition Forces; Low Pressure Turbine (LPT) Performance Improvement;Performance in Extreme Loading and Impact Conditions for Affordable Next-generation Steels; Enabling Novel Human Assessment and Neurophysiological Characterization of Effectiveness (ENHANCE); Graphene on 3C-SiC on Si for low-loss nanophotonics; SATNAV Augmentation to Improve Navigation Technology (SAINT); Warfighter Benefits of UK Prototype Laser Eye Protection (LEP) Devices; Ceramic Matrix Composites (CMCs) for Hypersonic Hot Structures; Minimal Invasive Repair of Composite Structures; Computational Multi-Scale Modeling of Explosives; Space Environment Impacts; Medium Earth Orbit (MEO) Hosted Energetic Charged Particle (ECP) Constellation; and Mission Execution Tracking and Re-Planning Assistant.

FY 2019 Plans:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603790F / *NATO Research and Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY19 cooperative projects involve RDT&E efforts in human performance, information systems, aerospace systems, munitions, materials and manufacturing, sensors, space situational awareness, missile warning, military satellite communications, global positioning systems, responsive space capabilities, cyber network defense and information assurance, and space vehicles. These projects include but are not limited to; two Classified Projects in Cyber; Physiological Assessment for Warfighter Performance Prediction; Sensors & PID Enhanced by Directed Energy; Real-time Decentralized Task Allocation for Heterogeneous Swarming UAV; Weapon Effects with respect to Military Operations in Urban Terrain; Coated CMCs for Hypersonics; Materials for Long Pulse Laser Protection; Counter Agile Radar Application; Collaborative Space Domain Awareness (SDA) Data Collection and Fusion; Airborne Data Exchange; Cooperative Research on Anti-swarm Fuze-sensor Technology; Adaptive Automation to Support Team Decision Making in Complex Environments;Solid Propellant Rotating Detonation Engine Demonstrator; Autonomous Fighter Risk Reduction Program; Infusion Processing and Fatigue; Analyses of Polymer Matrix Composites considering Environmental Effects; Cognitive Biomarker Sensor Development; Advanced Fuel-Spray Diagnostics for Propulsion Systems; Improved Durable Engines for UAVs; Bio-Inspired Technologies for Unmanned Autonomous Systems; Improved Elements for Next Gen RF-Directed Energy Weapons, Lasers and Detectors for UAS Systems; Measures for Evaluation of Air Vehicle Systems; RF Directed Energy Weapon Target Surrogates; Time Critical Targeting in Urban Environments; WarHead Improvements using Technology for Enhanced Functionality and Increased Survivability against Hard Targets; Protected Tactical Field Demonstration; and Protected Tactical Enterprise Service. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The NATO Coop R&D Program experienced a sixty percent increase in project applications for funding. The increase in project applications coupled with budget constraints limited the number of selected projects, no project received the full funding they requested allowing additional projects to be selected. Some projects with vital non-traditional strategic partners were not selected because of the limited budget. The NATO Coop R&D Program's projected budget is insufficient to sustain the programs' continued popularity, thereby inhibiting growth into key strategic areas.			
Accomplishments/Planned Programs Subtotals	4.174	3.851	2.305

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

A principal goal of the NATO Cooperative R&D program is to effectively utilize the aggregate resources invested by the US and our allies in air, space, and cyber R&D. This program element provides the critical funding incentive needed to pursue air, space and cyber related International Cooperative Research Development and Acquisition (ICRD&A) agreements and helps to (a) leverage USAF and allied resources through cost sharing and economies of scale; (b) exploit the best US and allied technologies for equipping coalition forces; (c) demonstrate areas of commonality or interoperability with our allies; and (d) accelerate the availability of

defense technology and systems. Candidate projects are reviewed against USAF goals, DoD objectives, and warfighter needs prior to being approved. An international agreement defining project objectives, responsibilities and costs is required prior to release of funds. To obtain these funds and ensure service commitment, projects are selected from existing or new RDT&E programs funded in the Future Years Defense Plan (FYDP). Project offices must show matching funds and contributions from associated program elements and equitable allied funding. As appropriate, funding responsibility for out-year requirements and follow-on efforts are transferred to the project office and associated program elements. Any new contracts are awarded after full and open competition.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603790F / *NATO Research and Development*	**Project (Number/Name)** 64NATO / *Nato Coop R&D*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NATO Coop R&D (International Research Projects)	Various	Various : NV	-	3.023	Feb 2017	2.815	Feb 2018	1.125	Feb 2019	-		1.125	Continuing	Continuing	-
		Subtotal	-	3.023		2.815		1.125		-		1.125	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NATO Coop R&D (International Research Projects)	Various	Various : NV	-	1.151	Feb 2017	1.036	Feb 2018	1.180		-		1.180	Continuing	Continuing	-
		Subtotal	-	1.151		1.036		1.180		-		1.180	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	4.174		3.851		2.305		-		2.305	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603790F / *NATO Research and Development*	**Project (Number/Name)** 64NATO / *Nato Coop R&D*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
NATO Coop R&D																												
FY19 ICR&D Projects - Call Letter																												
FY19 ICR&D Projects - nomination package development																												
FY19 ICR&D Projects - Review panel																												
FY19 ICR&D Projects - Coordination of review panel results																												
FY19 ICR&D Approved Project Letter to the MAJCOMs																												
FY19 ICR&D Projects - Agreement development, negotiations, and signature																												
FY19 ICR&D Projects - RDTE cooperative project work																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603790F / *NATO Research and Development*	**Project (Number/Name)** 64NATO / *Nato Coop R&D*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
NATO Coop R&D				
FY19 ICR&D Projects - Call Letter	2	2017	2	2017
FY19 ICR&D Projects - nomination package development	2	2017	3	2017
FY19 ICR&D Projects - Review panel	3	2017	3	2017
FY19 ICR&D Projects - Coordination of review panel results	4	2017	4	2017
FY19 ICR&D Approved Project Letter to the MAJCOMs	4	2017	4	2017
FY19 ICR&D Projects - Agreement development, negotiations, and signature	1	2017	4	2018
FY19 ICR&D Projects - RDTE cooperative project work	1	2018	4	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603830F / *Space Security and Defense Program*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	32.399	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
64A025: *Space Protection Program*	-	32.399	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0603830F, Space Security and Defense Program efforts were transferred to PE 1206730F, Space Security and Defense Program, due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206730F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	32.399	0.000	0.000	0.000	0.000
Current President's Budget	32.399	0.000	0.000	0.000	0.000
Total Adjustments	0.000	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	99.949	10.736	41.856	0.000	41.856	44.109	65.582	66.944	68.165	Continuing	Continuing
641020: *ICBM Guidance Applications*	-	8.439	0.502	7.659	0.000	7.659	10.184	12.887	13.155	13.395	Continuing	Continuing
641021: *ICBM Propulsion Applications*	-	19.242	1.007	9.701	0.000	9.701	6.849	6.967	7.111	7.241	Continuing	Continuing
641022: *ICBM Reentry Vehicle Applications*	-	64.740	7.085	17.920	0.000	17.920	19.439	19.776	20.186	20.554	Continuing	Continuing
641024: *ICBM Command & Control (C2) Applications*	-	0.500	1.004	3.665	0.000	3.665	3.713	21.960	22.417	22.826	Continuing	Continuing
644209: *Long Range Planning (LRP)*	-	7.028	1.138	2.911	0.000	2.911	3.924	3.992	4.075	4.149	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program ensures a responsive design and development engineering infrastructure to address emerging issues and technology insertion/technology application on legacy Intercontinental Ballistic Missile (ICBM), future strategic systems/capability beyond the Ground Based Strategic Deterrent (GBSD) baseline, and other common strategic deterrent mission areas to develop enhanced multi-use capabilities. The ICBM Dem/Val program will provide technology maturation and risk reduction activities to support Minuteman (MM) III sustainment, MM III to GBSD transition, and future ICBM systems (non-GBSD) development. Efforts will identify methods to improve system performance, develop potential future RV designs, mitigate evolving threats, reduce life cycle costs, develop/expand modeling/simulation and experimental platforms for weapon qualification activities, improve nuclear safety and surety, and ensure both viability and endurability of strategic missile systems.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver ICBM Dem/Val capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605833F, and 0605898F.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	108.663	10.736	42.173	0.000	42.173
Current President's Budget	99.949	10.736	41.856	0.000	41.856
Total Adjustments	-8.714	0.000	-0.317	0.000	-0.317
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-5.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	10.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-10.000	0.000			
• SBIR/STTR Transfer	-3.714	0.000			
• Other Adjustments	0.000	0.000	-0.317	0.000	-0.317

Change Summary Explanation

FY 2017 funding reflects a Congressional directed reduction of $5.000M for program growth and a Congressional add of $10.000M for solid rocket motor technology. FY 2017 funding reflects $10.000M in approved reprogramming from ICBM Dem/Val to higher priority Air Force programs ($2.000 to Air Force Global Strike Command Global Assured Communications and $7.999M to Long Range Stand Off weapon).

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641020 / *ICBM Guidance Applications*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
641020: *ICBM Guidance Applications*	-	8.439	0.502	7.659	0.000	7.659	10.184	12.887	13.155	13.395	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Guidance Applications Program (GAP) ensures the development of strategic capability in response to the Nuclear Posture Review, recommendations of the United States Strategic Command (USSTRATCOM) Strategic Advisory Group, USSTRATCOM Commander Guidance, and the Defense Science Board Task Force on Nuclear Deterrence. The program studies and assesses both legacy and future (non-GBSD baseline) ICBM Guidance System technology applications. Efforts are focused on current and future requirements and technologies, reduced life cycle costs, and increased nuclear surety and safety. Activities leverage the efforts of the Science and Technology community and are coordinated with the Navy strategic applications program to enhance synergy and avoid duplication. Key elements include developing responsive technologies with common applications for future strategic guidance capabilities. This program also includes any needed surety and certification and system vulnerability assessments.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Guidance Applications Program	8.439	0.502	7.659
Description: Develop and mature advanced technologies and concepts to support future requirements.			
FY 2018 Plans: • Continue risk reduction, evaluation and testing of strategic and space guidance-related commodities within market for potential use in a future strategic guidance system, and continue to leverage from the Navy Trident Life Extension Program. • Continue risk reduction initiatives involving component technologies and obsolescence for legacy and/or future ICBM applications. • Establish a Strategic Guidance Hardware independent validation & verification capability, perform guidance analysis, and Guidance technology studies.			
FY 2019 Plans: • Continue the evaluation and testing of strategic and space guidance-related commodities within market for potential use in a future (non-GBSD baseline) strategic guidance system; coordinate with the Navy strategic applications program. • Continue initiatives involving component technologies and obsolescence for legacy and/or future ICBM applications. • Expand the Strategic Guidance Hardware independent validation & verification capability to include multi g and combined environments; perform Guidance analyses and Guidance technology studies. Identify emerging technologies for future strategic grade gyros and accelerometers to ensure appropriate test capability development.			
FY 2018 to FY 2019 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641020 / *ICBM Guidance Applications*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Funding increased due to phasing issue in FY18 and new studies in FY19			
Accomplishments/Planned Programs Subtotals	8.439	0.502	7.659

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 PE 0605230F: *GBSD*	109.260	215.721	345.041	-	345.041	570.373	1,527.545	2,539.060	3,018.653	Continuing	Continuing

Remarks

D. Acquisition Strategy

Accomplish studies, analyses, concept development and engineering; efforts will be conducted using contracting strategies deemed most appropriate, generally using competitive contracts and/or other obligating documentation considered most appropriate by obligating and performing agencies involved.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641020 / *ICBM Guidance Applications*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GAP Strategic Instrument Technology Readiness	C/CPFF	Draper : Various	-	4.130	Jan 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	4.130		-		-		-		-	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Non-Destructive Test Capability	Various	Holloman AFB/Little Mountain/Utah : Alamogordo, NM	-	3.204	Jan 2017	0.467	Jan 2018	5.459	Jan 2019	-		5.459	Continuing	Continuing	-
Emerging Strategic Instrument	C/TBD	TBD : TBD	-	-		-		1.100	Jan 2019	-		1.100	Continuing	Continuing	-
		Subtotal	-	3.204		0.467		6.559		-		6.559	Continuing	Continuing	N/A

Remarks

Specific efforts related to strategic sensors in previous fiscal years will not continue in 2018 to avoid duplication with planned GBSD Technology Maturation and Risk Reduction (TMRR) efforts.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GAP, Program Management Administrative Support Services	C/Various	Various : Various	-	1.105	Jan 2017	0.035	Jan 2018	1.100	Jan 2019	-		1.100	Continuing	Continuing	-
		Subtotal	-	1.105		0.035		1.100		-		1.100	Continuing	Continuing	N/A

Remarks

Costs and services in support of program office management and administration processes such as: program oversight, resource justification, budget and programming, milestone and scheduling--PMA costs.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641020 / *ICBM Guidance Applications*

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	8.439		0.502		7.659		-		7.659	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641020 / *ICBM Guidance Applications*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
GAP																												
GAP Strategic Instrument/Component Technology Readiness	■	■	■	■																								
GAP Testing Capabilities Non-Destructive	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Emerging Strategic Instrument Technology Requirements										■	■	■	■	■	■	■	■	■	■	■								

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641020 / *ICBM Guidance Applications*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GAP				
GAP Strategic Instrument/Component Technology Readiness	1	2017	4	2017
GAP Testing Capabilities Non-Destructive	1	2017	4	2023
Emerging Strategic Instrument Technology Requirements	2	2019	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641021 / *ICBM Propulsion Applications*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
641021: *ICBM Propulsion Applications*	-	19.242	1.007	9.701	0.000	9.701	6.849	6.967	7.111	7.241	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Propulsion Applications Program (PAP) develops and assesses strategic propulsion system technology applications for both legacy and future (non-GBSD baseline) systems through projects exploring improvements and/or alternatives to current propulsion systems, conducting studies assessing application of new technologies to meet future common propulsion systems requirements, and assessing opportunities for applying common materials and technology between the ICBM, submarine-launched ballistic missile (SLBM) propulsion systems, and other rocket motor propulsion capabilities. Efforts are focused on current and future requirements and technologies, reduced life cycle costs, and increased nuclear surety, safety, certification and system vulnerability assessments.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Propulsion Applications Program	19.242	1.007	9.701
Description: Assess, develop, evaluate, and demonstrate common solid and liquid propulsion technology and manufacturing leading up to a static fire and test of strategic propulsion systems; develop capability and explore improvements to current and future propulsion systems; and support the research and development industrial base and critical infrastructure. ***FY 2018 Plans:*** • Initiate Minuteman III mechanistic aging study, propulsion modeling & simulation development, and propulsion technology studies and analysis. ***FY 2019 Plans:*** • Continue Minuteman III mechanistic aging study development, propulsion nuclear environment modeling & simulation, and propulsion technology modeling and simulation. • Initiate trade studies and risk reduction of components and subsystem propulsion technologies for future ICBM program insertion. • Initiate propellant studies to develop propellant formulations with increased performance and efficiency for future ICBM program insertion. • Continue rocket motor certification technology. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to phasing issue in FY18 and new studies in FY19			
Accomplishments/Planned Programs Subtotals	19.242	1.007	9.701

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641021 / *ICBM Propulsion Applications*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 PE 0605230F: *GBSD*	109.260	215.721	345.041	-	345.041	570.373	1,527.545	2,539.060	3,018.653	Continuing	Continuing

Remarks

FY2017 reflects a Congressional add of $10.000M to Propulsion Application Program.

D. Acquisition Strategy

Studies, analyses, limited engineering, hardware development and/or testing will be accomplished; efforts will be conducted using contracting strategies deemed most appropriate, generally using competitive contracts and/or other obligating documentation considered most appropriate by obligating and performing agencies involved.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641021 / *ICBM Propulsion Applications*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PAP Thrust Vector Control Study	C/CPFF	Moog : East Aurora, NY	-	1.513	Oct 2016	-		-		-		-	Continuing	Continuing	-
PAP Thrust Vector Control Study 2	C/CPFF	Honeywell : Tempe, AZ	-	0.753	Oct 2016	-		-		-		-	Continuing	Continuing	-
PAP Post Boost Study 1	C/CPFF	Moog : East Aurora, NY	-	0.552	Oct 2016	-		-		-		-	Continuing	Continuing	-
PAP Post Boost Study 2	C/CPAF	Orbital ATK : Elkton, MD	-	1.264	Oct 2016	-		-		-		-	Continuing	Continuing	-
PAP Post Boost Study 3	C/CPFF	Aerojet Rocketdyne : Sacramento, CA	-	0.774	Oct 2016	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	4.856		-		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PAP Integration Support	C/FFP	BAE Systems : Clearfield, UT	-	2.030	Jan 2017	0.350	Jan 2018	0.950	Jan 2019	-		0.950	Continuing	Continuing	-
		Subtotal	-	2.030		0.350		0.950		-		0.950	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PAP Trade Studies/Risk Reduction	MIPR	SNL : Kirtland AFB, NM	-	1.021	Jan 2018	-		3.050	Jan 2019	-		3.050	Continuing	Continuing	-
PAP Propulsion and Solid Rocket Motor Studies	MIPR	AFRL; RSLP : Albuquerque, NM	-	10.000	Jan 2017	-		-		-		-	Continuing	Continuing	-
Propulsion Technology HPM Parametric Study	MIPR	SNL : Albuquerque, NM	-	-		0.200	Oct 2017	0.600	Oct 2018	-		0.600	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641021 / *ICBM Propulsion Applications*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Propulsion Nuclear Environment Study	MIPR	SNL : Albuquerque, NM	-	-		0.200	Oct 2017	0.600	Oct 2018	-		0.600	Continuing	Continuing	-
MMIII Solid Propellant Mechanistic Aging Study	C/TBD	TBD : TBD	-	-		0.200	Apr 2018	2.000	Jan 2019	-		2.000	Continuing	Continuing	-
PAP Propellant Studies	TBD	TBD : TBD	-	-		-		2.100	Jan 2019	-		2.100	Continuing	Continuing	-
		Subtotal	-	11.021		0.600		8.350		-		8.350	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PAP Program Management Administration	Various	Various : Various	-	1.335	Jan 2017	0.057	Jan 2018	0.401	Jan 2019	-		0.401	Continuing	Continuing	-
		Subtotal	-	1.335		0.057		0.401		-		0.401	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	19.242		1.007		9.701		-		9.701	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641021 / *ICBM Propulsion Applications*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641021 / *ICBM Propulsion Applications*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
PAP				
PAP Thrust Vector Control Study	1	2017	3	2017
PAP Post Boost Studies	1	2017	4	2017
PAP Propulsion and Solid Rocket Motor Studies	1	2017	3	2019
PAP Trade Studies/Risk Reduction	2	2017	2	2019
Propulsion Technology HPM Parametric Study	1	2018	2	2019
Propulsion Nuclear Environment Study	1	2018	4	2019
PAP MM III Solid Mechanistic Aging Study	2	2018	4	2019
PAP Propellant Studies	2	2019	4	2021
PAP Propulsion Modularity Updates	1	2020	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641022 / *ICBM Reentry Vehicle Applications*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
641022: *ICBM Reentry Vehicle Applications*	-	64.740	7.085	17.920	0.000	17.920	19.439	19.776	20.186	20.554	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Reentry Vehicle Applications Program (RVAP) ensures the ICBM force is equipped with the safest, most reliable, most survivable Reentry Systems, and explores options for common, multi-mission capabilities. The program enables a responsive engineering infrastructure by developing modeling/simulation and ground and flight test platforms to support Reentry System qualifications. The program ensures the availability of long-lead components and materials while identifying life cycle cost reduction methods. In addition, the program matures and tests advanced Reentry System technologies and designs to meet future requirements. This includes studying and assessing Mk12A, Mk21, Mk21A and future ICBM Reentry System technology applications. The program leverages investments by the Science & Technology community and Navy reentry systems applications program. Testing may occur on a space available basis on Air Force and Navy Force Development Evaluation (FDE) flights.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Reentry Vehicle Applications Program	64.740	7.085	17.920

Description: Mature, evaluate, and test reentry system materials, technologies, and vehicles including modeling/simulation, and ground and flight test platforms for use in current and future strategic applications.

FY 2018 Plans:
• Continue risk reduction studies to mature and evaluate future heatshield development, carbon phenolic replacements, modeling and simulation programs, manufacturing capabilities, reentry system technologies, threat development analysis and countermeasure technologies/strategies, and inform future reentry vehicle capabilities.
• Continue thermal protection system testing and studies.
• Conduct materials development, prototyping, and testing.

FY 2019 Plans:
• Continue risk reduction studies to mature and evaluate future heatshield development, carbon phenolic replacements, modeling and simulation programs, manufacturing capabilities, reentry system technologies, threat development analysis and countermeasure technologies/strategies, and inform future RV capabilities.
• Continue thermal protection system testing and studies.
• Conduct materials development, prototyping, and test.
• Development of a Micro-Electro Mechanical System for potential insertion into the Path Length Module.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641022 / *ICBM Reentry Vehicle Applications*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
• Develop designs and production concepts for trusted strategic radiation-hardened, advanced microelectronics including Application Specific Integrated Circuits (ASIC) and Field Programmable Gate Arrays (FPGA). • Develop new modeling/simulation and ground and flight test platforms for future weapon qualification activities. • Support the Joint Technology Demonstrator program • Develop advanced sensors for surveillance and flight test diagnostics. • Design future RV concepts. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to phasing issue in FY18 and new studies in FY19			
Accomplishments/Planned Programs Subtotals	64.740	7.085	17.920

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 PE 0605230F: *GBSD*	109.260	215.721	345.041	-	345.041	570.373	1,527.545	2,539.060	3,018.653	Continuing	Continuing

Remarks

D. Acquisition Strategy

Studies, analyses, limited engineering, and pre-prototype hardware development will be accomplished; efforts will be conducted using contracting strategies deemed most appropriate, generally using competitive contracts and/or other obligating documentation considered most appropriate by obligating and performing agencies involved.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641022 / *ICBM Reentry Vehicle Applications*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RVAP Support	C/FFP	BAE Systems : Clearfield, UT	-	1.840	Mar 2017	0.500	Mar 2018	1.309	Mar 2019	-		1.309	Continuing	Continuing	-
RVAP FFRDC Support	MIPR	Various : Various	-	4.451	Jan 2017	1.000	Jan 2018	2.546	Jan 2019	-		2.546	Continuing	Continuing	-
		Subtotal	-	6.291		1.500		3.855		-		3.855	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Technology Demonstrator	Various	Various : Various	-	5.625	Jan 2017	0.250	Jan 2018	2.300	Jan 2019	-		2.300	Continuing	Continuing	-
RVAP TPS Testing and Analysis	Various	Various : Various	-	1.854	Jan 2017	0.255	Jan 2018	0.400	Jan 2019	-		0.400	Continuing	Continuing	-
RVAP Flight Testing	TBD	TBD : TBD	-	32.665	Feb 2018	0.400	Feb 2018	0.300	Feb 2019	-		0.300	Continuing	Continuing	-
RVAP Countermeasure Study I	C/CPFF	Textron : Wilmington, MA	-	1.078	Dec 2016	-		-		-		-	Continuing	Continuing	-
RVAP Countermeasure Study II	C/CPFF	Lockheed Martin : King of Prussia, PA	-	1.191	Dec 2016	-		-		-		-	Continuing	Continuing	-
RVAP TPS Materials	C/CPFF	Intermat : Biddeford, ME	-	1.610	Jun 2017	0.500	Nov 2017	-		-		-	Continuing	Continuing	-
RVAP Mk21 MIRV/Shroud	C/CPFF	Lockheed Martin : King of Prussia, MA	-	0.797	May 2017	-		-		-		-	Continuing	Continuing	-
RVAP Modeling and Simulation Programs	TBD	TBD : TBD	-	1.063	Feb 2018	0.980	Feb 2018	1.900	Sep 2019	-		1.900	Continuing	Continuing	-
RVAP Manufacturing Capabilities Study	TBD	TBD : TBD	-	4.600	Feb 2018	1.300	Feb 2018	3.933	Sep 2019	-		3.933	Continuing	Continuing	-
RVAP Future Vehicles Studies	TBD	TBD : TBD	-	5.671	Feb 2018	1.300	Feb 2018	3.932	Sep 2019	-		3.932	Continuing	Continuing	-
		Subtotal	-	56.154		4.985		12.765		-		12.765	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641022 / *ICBM Reentry Vehicle Applications*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RVAP Program Management Administration	Various	Various : Various	-	2.295	Jan 2017	0.600	Jan 2018	1.300	Jan 2019	-		1.300	Continuing	Continuing	-
		Subtotal	-	2.295		0.600		1.300		-		1.300	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	64.740		7.085		17.920		-		17.920	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641022 / *ICBM Reentry Vehicle Applications*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641022 / *ICBM Reentry Vehicle Applications*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
RVAP				
RVAP Countermeasure Studies I & II	1	2017	3	2017
RVAP MIRV/Shroud	1	2017	3	2017
RVAP TPS Materials	1	2017	3	2018
RVAP FFRDC Support	1	2017	4	2019
RVAP TPS Testing and Analysis	1	2017	2	2019
RVAP Flight Testing	1	2017	4	2019
RVAP Future Vehicle Studies	2	2017	4	2022
RVAP Modeling and Simulation	2	2017	2	2020
RVAP Manufacturing Capabilities Study	1	2017	2	2021
RVAP Countermeasure Studies III	2	2020	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641024 / *ICBM Command & Control (C2) Applications*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
641024: *ICBM Command & Control (C2) Applications*	-	0.500	1.004	3.665	0.000	3.665	3.713	21.960	22.417	22.826	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Command and Control Applications Program (C2AP) supports ICBM weapon system connectivity to the President and National Command Authorities. C2AP studies and assesses both legacy and future (non-GBSD baseline) C2 System technology applications. C2AP evaluates and develops assured, survivable, and secure communications and battlespace awareness between the missile Launch Control Centers and Launch Facilities essential for mission execution. Efforts include identifying and developing current and future technologies, as well as concepts that exploit state-of-the-art communications and information transfer techniques to both current and future ICBM systems. Products include studies, demonstrations and tests such as ICBM Weapon System C2 (WSC2) architectures, networks, and systems to meet nuclear command and control requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Command and Control Application Program ***Description:*** Examine and develop concepts for transforming ICBM WSC2 to meet current and future requirements. ***FY 2018 Plans:*** • Continue risk reduction studies to identify, assess, and preserve unique strategic command and control skills and technologies to meet current and future system requirements. • Develop Electronic Technical Orders prototype for ICBM platforms. ***FY 2019 Plans:*** • Continue risk reduction studies to identify, assess, and preserve unique strategic command and control skills and technologies to meet current and future system requirements. • Continue Electronic Technical Orders prototype for ICBM platforms. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to phasing issue in FY18 and new studies in FY19	0.500	1.004	3.665
Accomplishments/Planned Programs Subtotals	0.500	1.004	3.665

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641024 / *ICBM Command & Control (C2) Applications*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 PE 0605230F: *GBSD*	109.260	215.721	345.041	-	345.041	570.373	1,527.545	2,539.060	3,018.653	Continuing	Continuing

Remarks

D. Acquisition Strategy

Studies, analyses, limited engineering, will be accomplished; efforts will be conducted using contracting strategies deemed most appropriate, generally using competitive contracts and/or other obligating documentation considered most appropriate by obligating and performing agencies involved.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641024 / *ICBM Command & Control (C2) Applications*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2AP Technical Services	C/FFP	BAE Systems : Clearfield, UT	-	-		0.273	Jan 2018	0.265	Jan 2019	-		0.265	Continuing	Continuing	-
		Subtotal	-	-		0.273		0.265		-		0.265	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2AP Studies	Various	Various : Various	-	0.490	Jan 2017	0.667	Jan 2018	3.300	Jan 2019	-		3.300	Continuing	Continuing	-
		Subtotal	-	0.490		0.667		3.300		-		3.300	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2AP Program Management	C/FFP	Various : Various	-	0.010	Jan 2017	0.064	Jan 2018	0.100	Jan 2019	-		0.100	Continuing	Continuing	-
		Subtotal	-	0.010		0.064		0.100		-		0.100	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.500		1.004		3.665		-		3.665	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641024 / *ICBM Command & Control (C2) Applications*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C2AP																												
C2AP Studies																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 641024 / *ICBM Command & Control (C2) Applications*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
C2AP				
C2AP Studies	1	2017	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 644209 / *Long Range Planning (LRP)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
644209: *Long Range Planning (LRP)*	-	7.028	1.138	2.911	0.000	2.911	3.924	3.992	4.075	4.149	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Long Range Planning (LRP) effort identifies and analyzes potential modifications to current and future Intercontinental Ballistic Missile (ICBM) Weapon Systems required to meet objectives relative to long-term sustainment, technology insertion, battle space awareness, employment, force structure and future systems. The studies will focus on system supportability, operability, reliability, innovation and maintainability. Options/concepts generated by these studies are evaluated for feasibility, system impacts, and cost. The LRP also lays the groundwork for analysis supporting future weapon systems development and deployment. Pre-milestone activities may be conducted for current or future ICBM weapon systems to include entry criteria for milestone activities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Long Range Planning	7.028	1.138	2.911
Description: Analyze, study and plan current and future ICBM activities to meet requirements for long-term sustainment, technology insertion, employment force structure and future systems. ***FY 2018 Plans:*** • Continue analysis on launch facility technical drawings and understand the MMIII and GBSD Technical Baseline. • Continue Long Range Planning studies to assess ongoing MMIII Sustainment and GBSD transition. • Develop Virtual Instructor Prototype for ICBM Platforms. ***FY 2019 Plans:*** • Continue MMIII vulnerabilities, reliability, and survivability studies for Ground, Communication, and Flight Systems. • Long Range Planning studies to assess ongoing MMIII Sustainment and GBSD transition. • Continue Virtual Instructor Prototype for ICBM Platforms. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to phasing issue in FY18 and new studies in FY19			
Accomplishments/Planned Programs Subtotals	7.028	1.138	2.911

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 644209 / *Long Range Planning (LRP)*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 PE 0605230F: *GBSD*	109.260	215.721	345.041	-	345.041	570.373	1,527.545	2,539.060	3,018.653	Continuing	Continuing

Remarks

D. Acquisition Strategy

Analysis will be accomplished; efforts will be conducted using contracting strategies deemed most appropriate, generally using competitive contracts and/or other obligating documentation considered most appropriate by obligating and performing agencies involved.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 644209 / *Long Range Planning (LRP)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LRP LF Assessment	C/FFP	BAE : Warren, WY	-	1.247	May 2017	0.150	Apr 2018	-		-		-	Continuing	Continuing	-
		Subtotal	-	1.247		0.150		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LRP Integration Support	C/FFP	BAE Systems : Clearfield, UT	-	0.210	Jan 2017	0.275	Jan 2018	0.275	Jan 2019	-		0.275	Continuing	Continuing	-
		Subtotal	-	0.210		0.275		0.275		-		0.275	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Launch Systems Tests	C/CPFF	AFRL : Kirtland AFB, NM	-	1.087	Jan 2017	0.116	Nov 2017	-		-		-	Continuing	Continuing	-
LRP Studies	C/FFP	BAE Systems : Clearfield, UT	-	4.100	Jan 2017	-		-		-		-	Continuing	Continuing	-
LRP Studies II	C/FFP	TBD : TBD	-	-		0.520	Apr 2018	2.361	Jan 2019	-		2.361	Continuing	Continuing	-
		Subtotal	-	5.187		0.636		2.361		-		2.361	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LRP Program Management	Various	Various : Various	-	0.384	Jan 2017	0.077	Jan 2018	0.275	Jan 2019	-		0.275	Continuing	Continuing	-
		Subtotal	-	0.384		0.077		0.275		-		0.275	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 644209 / *Long Range Planning (LRP)*

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	7.028		1.138		2.911		-		2.911	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 644209 / *Long Range Planning (LRP)*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
LRP																												
Launch Facilities Assessment																												
Long Range Planning Studies																												
Launch Systems Tests																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603851F / *Intercontinental Ballistic Missile - Dem/Val*	**Project (Number/Name)** 644209 / *Long Range Planning (LRP)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
LRP				
Launch Facilities Assessment	1	2017	4	2018
Long Range Planning Studies	1	2017	4	2023
Launch Systems Tests	1	2017	4	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603859F / *Pollution Prevention - Dem/Val*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	3.500	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
644852: *Pollution Prevention*	-	3.500	0.002	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project funds R&D activities that demonstrate and prototype alternative weapon system manufacturing, remanufacturing, and maintenance materials and processes that reduce or eliminate hazardous chemicals, materials and waste streams through cost-effective programs and practices, while improving energy efficiency and reducing greenhouse gas emissions. Upon proof of the new process or materials, the resulting product can be transitioned to depot maintenance processes, which results in reduced maintenance costs, reduced depot flow time, and increases asset availability. Specifically, funds target pollution prevention technologies that reduce or eliminate chromium, cadmium, and nickel, as well as reduce or eliminate Hazardous Air Pollutants (HAPS), Volatile Organic Compounds (VOCs), and Class I and II Ozone Depleting Substances (ODS), global warmers and biochemical oxygen demand (BOD) and to increase the use of renewable and alternative fuels.

This effort is in Budget Activity 04, Advanced Component Development and Prototypes, because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.002	0.002	0.000	0.002
Current President's Budget	3.500	0.002	0.000	0.000	0.000
Total Adjustments	3.500	0.000	-0.002	0.000	-0.002
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	3.500	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.002	0.000	-0.002

Change Summary Explanation

Congressional Add for aviation ground equipment.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: N/A	3.500	0.002	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0603859F / *Pollution Prevention - Dem/Val*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: N/A ***FY 2018 Plans:*** N/A N/A ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Project is complete.			
Accomplishments/Planned Programs Subtotals	3.500	0.002	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Pollution Prevention activities are level of effort and use time and materials support contracts.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603859F / *Pollution Prevention - Dem/Val*	**Project (Number/Name)** 644852 / *Pollution Prevention*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Air Force Research Lab	Various	Various : TBD	-	3.500		0.002		-		-		-	Continuing	Continuing	-
		Subtotal	-	3.500		0.002		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	3.500		0.002		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603859F / *Pollution Prevention - Dem/Val*	**Project (Number/Name)** 644852 / *Pollution Prevention*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Pollution Prevention																												
Requirements ID																												
Potential Alternatives																												
Test Plan																												
Test Report																												
Demonstration																												
Final Report																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0603859F / *Pollution Prevention - Dem/Val*	**Project (Number/Name)** 644852 / *Pollution Prevention*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Pollution Prevention				
Requirements ID	1	2017	1	2018
Potential Alternatives	1	2017	1	2018
Test Plan	1	2017	1	2018
Test Report	1	2017	1	2018
Demonstration	1	2017	1	2018
Final Report	1	2017	1	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604015F / *Long Range Strike - Bomber*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	1,290.307	2,003.580	2,314.196	0.000	2,314.196	3,008.889	3,055.888	2,944.785	2,664.595	Continuing	Continuing
643308: *Long Range Strike Bomber*	-	1,290.307	2,003.580	2,314.196	0.000	2,314.196	3,008.889	3,055.888	2,944.785	2,664.595	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	1,358.309	2,003.580	2,662.022	0.000	2,662.022
Current President's Budget	1,290.307	2,003.580	2,314.196	0.000	2,314.196
Total Adjustments	-68.002	0.000	-347.826	0.000	-347.826
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-20.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-48.002	0.000			
• Other Adjustments	0.000	0.000	-347.826	0.000	-347.826

Change Summary Explanation

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604015F / *Long Range Strike - Bomber*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Long Range Strike Bomber	1,290.307	2,003.580	2,314.196
Description: Long Range Strike Bomber ***FY 2018 Plans:*** This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP. ***FY 2019 Plans:*** This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP.			
Accomplishments/Planned Programs Subtotals	1,290.307	2,003.580	2,314.196

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• MILCON PE 0604015: *Long Range Strike Bomber*	-	-	-	-	-	-	81.300	172.700	33.900	Continuing	Continuing

Remarks

E. Acquisition Strategy

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604015F / *Long Range Strike - Bomber*	**Project (Number/Name)** 643308 / *Long Range Strike Bomber*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Actual breakout provided in Special Access Program Annual Report to Congress	Various	N/A : NV	-	1,290.307		2,003.580		2,314.196		-		2,314.196	Continuing	Continuing	-
		Subtotal	-	1,290.307		2,003.580		2,314.196		-		2,314.196	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1,290.307		2,003.580		2,314.196		-		2,314.196	Continuing	Continuing	N/A

Remarks

This program is reported in accordance with Title 10, United States Code, Section 119(a)(1) in the Special Access Program Annual Report to Congress. For further information, please contact the Director of Special Programs, OUSD(AT&L)/DSP.

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604015F / *Long Range Strike - Bomber*	**Project (Number/Name)** 643308 / *Long Range Strike Bomber*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Long Range Strike Bomber																												
Actual schedule provided in Special Access Program Annual Report to Congress																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604015F / *Long Range Strike - Bomber*	**Project (Number/Name)** 643308 / *Long Range Strike Bomber*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Long Range Strike Bomber				
Actual schedule provided in Special Access Program Annual Report to Congress	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	65.458	14.894	0.000	14.894	0.000	0.000	0.000	0.000	Continuing	Continuing
641029: *GPS Receiver Development*	-	0.000	5.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
641030: *GPS Receiver Development*	-	0.000	60.444	14.894	0.000	14.894	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

In FY2018, specific efforts initiated under PE 0305164F, NAVSTAR Global Positioning System (User Equipment) (Space), Project 643833, Military Global Positioning System User Equipment, were transferred to PE 0604201F, Integrated Avionics Planning & Development, Project 641029, Aircraft-Store development, to realign resources with the execution responsibilities supporting aircraft weapon system platforms.

In FY2018, M-Code efforts initiated under PE 0207325F (Joint Air-Surface Standoff Missile-Extended Range), PE 0604329F (Small Diameter Bomb II), PE 0604270F (Advanced IR Counter Measures), 0604327F (Hard and Deeply Buried Targets System) and PE 0604618F (Joint Direct Attack Munition) were transferred to PE 0604201F, Integrated Avionics Planning & Development, Project 641030, Munitions Receiver Development for transparency to stakeholders and to realign resources with the organization executing the efforts.

A. Mission Description and Budget Item Justification

PE 0604201, Project 641029 conducts navigation-aircraft interface standard development to include the Universal Navigation Interface (UNI). The Universal Navigation Interface project develops, enhances, and implements standardized interfaces in current/future aircraft and mission planning to support integration of EGI receivers independent of Operational Flight Program (OFP) cycles. Standardization of navigation-aircraft interface enables a more affordable approach and faster upgrade capabilities to an ever changing threat to navigation accuracy.

PE 0604201F, Project 641030 covers the development, integration and testing of Enhanced Anti-Jam (EAJ) Military Code (M-Code) GPS receivers for AF and joint weapon systems. This includes updates to weapon mission planning software to support new M-Code and EAJ receiver development. These acquisitions will enable the Air Force to increase its operational PNT resiliency while satisfying the DoD and civil mandates. Fielding of EAJ M-Code weapons requires the development, integration and testing of M-Code receivers across the AFPEO Weapons Portfolio.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver M-Code Development capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

This program is in Budget Activity 4, Demonstration and Validation, because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	0.000	65.458	15.006	0.000	15.006
Current President's Budget	0.000	65.458	14.894	0.000	14.894
Total Adjustments	0.000	0.000	-0.112	0.000	-0.112
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.112	0.000	-0.112

Change Summary Explanation

No significant changes

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 641029 / *GPS Receiver Development*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
641029: *GPS Receiver Development*	-	0.000	5.014	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY18, efforts initiated under PE 0305164F, NAVSTAR Global Positioning System (User Equipment) (Space), Project 643833, Military Global Positioning System User Equipment were transferred to PE 0604201F, Integrated Avionics Planning & Development, Project 651029, Aircraft-Store Development for transparency and to realign resources with the execution responsibilities supporting aircraft weapon system platforms.

A. Mission Description and Budget Item Justification

PE 0604201, Project 641029 conducts navigation-aircraft interface standard development to include the Universal Navigation Interface (UNI). The Universal Navigation Interface project develops, enhances, and implements standardized interfaces in current/future aircraft and mission planning to support integration of EGI receivers independent of Operational Flight Program (OFP) cycles. Standardization of navigation-aircraft interface enables a more affordable approach and faster upgrade capabilities to an ever changing threat to navigation accuracy.

This program is in Budget Activity 4, Demonstration and Validation, because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver PNT solutions.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: UNI	0.000	5.014	0.000
Description: Conducts navigation-to-aircraft interface standard development to include the Universal Navigation Interface (UNI). Develops standardized software interfaces in aircraft and mission planning to support integration of EGI receiver boxes capable of receiving Modernized GPS signals (M-code).			
FY 2018 Plans: Conduct studies and risk reduction activities to define standard interfaces across multiple platforms. Award development contract.			
FY 2019 Plans: No FY19 Requirement.			
FY 2018 to FY 2019 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 641029 / *GPS Receiver Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY18 funds cover current scope of requirement.			
Accomplishments/Planned Programs Subtotals	0.000	5.014	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 05 PE0305164F: *NAVSTAR Global Positioning System User Equipment*	36.912	-	-	-	-	-	-	-	-	0.000	36.912

Remarks

In FY2018, PE 0305164F, NAVSTAR Global Positioning System (User Equipment) (Space), Project 643833, Military Global Positioning System User Equipment partial efforts were transferred to PE 0604201F, Integrated Avionics Planning & Development, Project 641029, STORES - Aircraft Interface for transparency and to realign resources with execution responsibilities that support various aircraft weapon system platforms.

D. Acquisition Strategy

Award delivery order on existing PEO Fighter/Bomber with scope to accomplish risk reduction and complete initial Interface Control Document.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 641029 / *GPS Receiver Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
UNI Software Interface Development	TBD	Not specified. : TBD	-	-		5.014		0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	-		5.014		0.000		-		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		5.014		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 641029 / *GPS Receiver Development*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Universal Navigation Interface (UNI)																												
UNI																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 641029 / *GPS Receiver Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Universal Navigation Interface (UNI)				
UNI	3	2018	2	2019

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0604201F / *Integrated Avionics Planning and Development*				Project (Number/Name) 641030 / *GPS Receiver Development*			
COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
641030: *GPS Receiver Development*	-	0.000	60.444	14.894	0.000	14.894	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2018, M-Code efforts initiated under PE 0207325F (Joint Air-Surface Standoff Missile-Extended Range), PE 0604329F (Small Diameter Bomb II), PE 0604270F (Advanced IR Counter Measures), 0604327F (Hard and Deeply Buried Targets System) and PE 0604618F (Joint Direct Attack Munition) were transferred to PE 0604201F, Integrated Avionics Planning & Development, Project 641030, Munitions Receiver Development for transparency to stakeholders and to realign resources with the organization executing the efforts.

A. Mission Description and Budget Item Justification

This munitions receiver development project includes development of a GPS military code (M-code) receiver with enhanced anti-jam (EAJ) and analysis efforts. M-code receivers with EAJ will be developed and integrated with advanced positioning, navigation, and timing (PNT) capabilities to provide the capability to operate in adversarial anti-access/area denial (A2/AD) environments. M-Code receivers with EAJ also provides increased accuracy, better signal acquisition, and advanced security.

Current GPS guided weapons require M-code receivers with EAJ in order to operate in A2/AD jamming environments. An M-code with EAJ capability assures continued weapon system precision and lethality.

Fielding EAJ M-Code weapons requires the development, integration, testing and mission planning of M-Code receivers across the Weapons Portfolio. This will include all systems, subsystems, software, fuzing, and support activities associated with the development and implementation of M-Code receivers.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: M-Code EAJ	-	60.444	14.894
Description: M-Code/EAJ receivers provide an enhanced anti-jam capability. M-Code/EAJ receivers provide the capability to operate in increasing adversarial A2/AD jamming environment. M-Code/EAJ receivers also provide increased accuracy, better signal acquisition, and advanced security.			
FY 2018 Plans: Developed M-code/EAJ receivers for implementation across the AFPEO weapons portfolio.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 641030 / *GPS Receiver Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Develop and integrate M-code/EAJ receivers across the AFPEO weapons portfolio.			
FY 2018 to FY 2019 Increase/Decrease Statement: Funding decrease due to an increase of funding in specific weapons' PEs.			
Accomplishments/Planned Programs Subtotals	-	60.444	14.894

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 07 PE 0207325F, BPAC 675356: *JASSAM-ER*	0.200	1.645	17.594	-	17.594	1.400	14.000	12.000	-	0.000	46.839
• RDTE 05 PE 0604329F, BPAC 655191: *SDB Increment II*	8.001	16.800	41.243	-	41.243	12.100	11.000	21.000	-	0.000	110.144
• RDTE 05 PE 0604270F, BPAC 655305: *Adv Infrared Counter Measures*	10.000	-	-	-	-	-	-	-	-	0.000	10.000
• RDTE 04 PE 0604327F, BPAC 645341: *Direct Strike Penetrators*	34.808	-	32.962	-	32.962	2.200	-	-	-	0.000	69.970
• RDTE 05 PE 0604618F, BPAC 653891: *JDAM Development*	9.901	-	15.787	-	15.787	-	8.001	-	-	0.000	33.689

Remarks

D. Acquisition Strategy

M-Code/EAJ effort uses a Family of Systems approach where the three prime weapons contractors develop receivers capable of operating in any of their AF weapons. The receivers are based on a common, internally-developed IRS, TRD, and threat scenario. This approach uses a combination of contract types based on acquisition phase (TMRR, Development, Production) and risk. The Weapons SPOs share a common development PE to allow flexibility in funding and planning, switching to individual PEs for receiver integration, OT, and production. The M-Code/EAJ Weapons Receiver Development effort leverages technology currently under development by the GPS-D MGUE program and will provide the warfighter with unmatched capability to operate in future A2/AD environments.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 641030 / *GPS Receiver Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M-code Receiver Development	Various	Various : TBD	-	-		51.171	Dec 2017	13.006	Dec 2018	-		13.006	Continuing	Continuing	-
		Subtotal	-	-		51.171		13.006		-		13.006	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M-Code Receiver Development Support	Various	TBD : TBD	-	-		6.453	Apr 2018	-		-		-	Continuing	Continuing	-
		Subtotal	-	-		6.453		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M-Code Receiver Development PMA	Various	Various : TBD	-	-		2.820	Feb 2018	1.888	Feb 2019	-		1.888	Continuing	Continuing	-
		Subtotal	-	-		2.820		1.888		-		1.888	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		60.444		14.894		-		14.894	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 641030 / *GPS Receiver Development*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
M-Code/EAJ Receivers																												
M-Code Receiver Development and Integration																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 641030 / *GPS Receiver Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
M-Code/EAJ Receivers				
M-Code Receiver Development and Integration	1	2018	3	2022

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	34.818	68.719	34.585	0.000	34.585	33.145	54.802	55.821	56.527	Continuing	Continuing
644818: *Imaging and Targeting Support*	-	18.583	45.588	16.942	0.000	16.942	16.987	15.943	16.154	16.138	Continuing	Continuing
645148: *Common-Airborne Sense and Avoid (C-ABSAA)*	-	14.784	21.647	17.643	0.000	17.643	16.158	38.859	39.667	40.389	Continuing	Continuing
646025: *Data Compression*	-	1.451	1.484	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.935

Note

In FY 2019, PE 0604257F, Advanced Technology and Sensors, efforts (Detection Removal and Characterization Operation (DRACO), Sensor Open System Architecture (SOSA) and a majority of Advanced Synthetic Aperture Radar (ASARS 2B) within Project 644818, Imaging and Targeting Support, were transferred to PE 0305206F, Airborne Reconnaissance Systems (ARS), Project 674818, Imaging and Targeting Support, in order to align projects with the proper budget activities.
In FY 2019, PE 0604257, Advanced Technology and Sensors, Data Compression effort was transferred to PE 0305206F, Airborne Reconnaissance Systems (ARS), Project 676025, Data Compression.

A. Mission Description and Budget Item Justification

The Advanced Technology and Sensors (ATS) program coordinates the development of advanced technologies (sensors, data links, targeting networks and products, and quick reaction capabilities) in support of multiple airborne reconnaissance platforms, both manned and unmanned. Its objectives are to develop, demonstrate, and rapidly transition advanced, interoperable, multi-platform solutions to reduce the find, fix, target, and track kill chain timeline, and to provide safe separation and collision avoidance for remotely piloted aircraft. This program also coordinates the development of common collection, processing, and dissemination solutions for near-real time intelligence, surveillance, and reconnaissance. The ATS program also increases interoperability by developing common standards and interfaces.

The funds in this project are distributed in priority order for the goal of building a comprehensive Geospatial Intelligence (GEOINT) capability for the USAF. On an annual basis, developmental technologies are reviewed against warfighter capabilities and requirements based on strategic roadmaps and on the results of the Airborne Sensors for ISR Analysis of Alternatives, as prefaced in the Challenging Targets Initial Capabilities Document. Efforts advancing the technological maturity of promising sensors and processing capabilities are reviewed and prioritized into a recommended list for senior executive direction to implement in the coming year. The program office has the ability to initiate an I&TS project, within the GEOINT Capabilities Working Group (GCWG) construct but outside the normal annual GCWG vetting process, to expedite development and acquisition of urgently needed capabilities for the warfighter. ASARS 2B efforts include, but are not limited to, development, design, fabrication, integration, demonstration, and transition of high altitude, deep look Intelligence, Surveillance and Reconnaissance (ISR) radar.

Funds in any project can also cover activities to include studies and analysis to support both current program planning and execution and future program planning. This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capability. The use of such program

funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

The FY 19 funding request for Project 645148, Common Airborne Sense and Avoid, (C-ABSAA)was reduced by $4 million to account for the availability of prior year execution balances.

This program is in Budget Activity 4, Advanced Component Development and Prototypes because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	34.818	68.719	68.155	0.000	68.155
Current President's Budget	34.818	68.719	34.585	0.000	34.585
Total Adjustments	0.000	0.000	-33.570	0.000	-33.570
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-33.570	0.000	-33.570

Change Summary Explanation

In FY 2019, funding decreased due to multiple projects (DRACO and SOSA) being transferred to Program 0305206F, Airborne Reconnaissance Systems (ARS) Project 674818, Imaging and Targeting Support, in order to establish efforts as programs of record. The majority of the ASARS 2B effort have also been transferred and will be reported under Program 0305206F, Project 674818, Imaging and Targeting Support. Additionally, the FY 19 funding request for Project 645148, Common Airborne Sense and Avoid, (C-ABSAA)was reduced to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600 / 4					R-1 Program Element (Number/Name) PE 0604257F / *Advanced Technology and Sensors*				Project (Number/Name) 644818 / *Imaging and Targeting Support*			
COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
644818: *Imaging and Targeting Support*	-	18.583	45.588	16.942	0.000	16.942	16.987	15.943	16.154	16.138	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2019, PE 0604257F, Advanced Technology and Sensors, efforts (Detection Removal and Characterization Operation (DRACO), Sensor Open System Architecture (SOSA) and a majority of Advanced Synthetic Aperture Radar (ASARS 2B) within Project 644818, Imaging and Targeting Support, were transferred to PE 0305206F, Airborne Reconnaissance Systems (ARS), Project 674818, Imaging and Targeting Support, in order to align projects with the proper budget activities.

A. Mission Description and Budget Item Justification

The purpose of the Imaging and Targeting Support (I&TS) project is to develop, mature, demonstrate, and rapidly transition next-generation, persistent, wide area surveillance and common imagery reconnaissance sensor capabilities (active and passive systems), including sensor data processing, for multiple airborne platforms, as well as sensor products to aid in rapid targeting (geolocation models, sensor-based exploitation tools, sensor networking capabilities).

Developmental efforts pursued include: improved sensor capabilities such as hyperspectral imagery (HSI), measurement and signature intelligence, polarimetric imaging, ground moving target indication (GMTI), maritime search/track, Inverse Synthetic Aperture Radar, foliage penetration and additional radar, electro-optical, nuclear event detection, and other modalities; increased geolocation accuracy; increased dismount detection capability; advanced sensor data correlation; automated target detection; network centric warfare; and other ISR and associated planning and direction; collection; processing and exploitation; analysis and production; and dissemination capabilities. These efforts are intended to reduce both target search and kill chain timelines as well as supporting traditional intelligence activities. This project will also increase interoperability by developing common standards and interfaces.

The funds in this project are distributed in priority order for the goal of building a comprehensive GEOINT/Multi-INT capability for the USAF. On an annual basis, developmental technologies are reviewed against warfighter capabilities and requirements based on strategic roadmaps and on the results of the Airborne Sensors for ISR Analysis of Alternatives, as prefaced in the Challenging Targets Initial Capabilities Document. Efforts advancing the technological maturity of promising sensors and processing capabilities are reviewed and prioritized into a recommended list for senior executive direction to implement in the coming year. The program office has the ability to initiate an I&TS project, within the GCWG construct but outside the normal annual GCWG vetting process, to expedite development and acquisition of urgently needed capabilities for the warfighter. ASARS 2B efforts include, but are not limited to, development, design, fabrication, integration, demonstration, and transition of high altitude, deep look ISR radar.

Traditional focus areas include, but are not limited to: development, demonstration, and rapid transition of common radar and electro-optical sensors (Synthetic Aperture Radar (SAR), Low Frequency SAR, and antenna, Electro-Optical(EO), Infrared (IR), Hyperspectral Imagery (HSI), Light Detection And Ranging (LIDAR) and their operational modes (high resolution imagery, Ground and Dismount Moving Target Indication (GMTI/DMTI), persistent surveillance, wide area motion imagery, Spectral Identification) for multiple airborne platforms at all altitudes; development and demonstration of advanced tactical sensor and associated tasking, processing,

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

exploitation, and dissemination processing algorithms and tools (automatic registration, automatic and assisted target detection, network centric warfare). Development of integrated multi-sensor capabilities to detect and identify obscured targets; development and implementation of standards (Common GMTI/DMTI, National Imagery Transmission Format; and monitoring and enhancement of Imagery Intelligence product quality (radar and EO/IR imagery, GMTI data, and spectral information) and timeliness throughout the image chain (from sensor to user). Development and integration of airborne sensors to support an open systems architecture pod capability. These efforts focus on reducing the find, fix and track elements of the time critical targeting kill-chain timeline while improving operator and decision-maker efficiency and effectiveness.

Activities also include studies and analysis to support both current program planning and execution and future program planning. This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Imaging & Targeting Support (I&TS)	9.505	24.505	15.492	-	15.492
Description: Develop/demonstrate and advance technical maturity of promising sensors and processing capabilities (ex: radar improvement, next-generation HSI, laser detection and ranging/laser identification detection and ranging, and data mitigation technologies). ***FY 2018 Plans:*** - Continue development, modernization, and demonstration of advanced sensors and detection and processing algorithms, hyperspectral imaging technologies, multiband EO/IR and SAR sensor systems, enhanced LIDAR capabilities, polarimetric imaging, and other GEOINT sensing modalities for Anti-Access Area Denial, permissive and non-permissive environments, foliage penetration, and littoral environments as well as other prioritized GCWG technology efforts. Other efforts include but are not limited to MTS-B, DRACO, Full Spectrum HSI MQ-9 Pod, Advanced Large Optical Freeform Telescope (ALOFT), Long Wave Infrared (LWIR) Polarization Information (PI), CERBERUS (Full Spectrum HSI in AgilePod (MQ-9)). Standoff High-altitude Enhanced Reconnaissance Long-range Operational Concept (SHERLOC) and other GCWG approved projects. ***FY 2019 Base Plans:*** - Will continue development, modernization, and demonstration of advanced sensors and detection and processing algorithms, hyperspectral imaging technologies, multiband EO/IR and SAR sensor systems, enhanced lidar capabilities, polarimetric imaging,and other GEOINT sensing modalities for Anti-Access Area Denial, permissive and non-permissive environments, foliage penetration, and littoral environments as well					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
as other prioritized GCWG technology efforts. Other efforts include but are not limited to CERBERUS (Full Spectrum HSI in AgilePod (MQ-9), SHERLOC, ALOFT, LWIR PI, and other GCWG approved projects. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 funding decreased due to a return to normal funding as well as the transfer of DRACO and SOSA to Program 0305206, Project 674818.					
Title: Advanced Synthetic Aperture Radar System (ASARS) 2B ***Description:*** Develop/design/fabricate/integrate/demonstrate/rapidly transition deep look high altitude ISR radar capabilities. ***FY 2018 Plans:*** - Develop/design/fabricate/integrate/demonstrate/rapidly transition deep look high altitude ISR radar capabilities. ***FY 2019 Base Plans:*** - Will continue to develop/design/fabricate/integrate/demonstrate/rapidly transition deep look high altitude ISR radar capabilities. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decrease due to majority of effort moved to Program 0305206F, Project 674818, Imaging and Targeting Support.	6.078	21.083	1.450	-	1.450
Title: Nuclear Forensics - Prompt Diagnostics ***Description:*** Development of nuclear event detection and characterization capabilities. ***FY 2018 Plans:*** - Effort moved to National Technical Nuclear Forensics (NTNF) program (0207573F) in FY18. ***FY 2019 Base Plans:*** N/A	3.000	0.000	0.000	-	0.000
Accomplishments/Planned Programs Subtotals	18.583	45.588	16.942	-	16.942

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 07 PE 0305202F: *Dragon U-2 (JIMP)*	37.217	34.486	48.883	-	48.883	38.682	16.994	17.120	17.428	Continuing	Continuing
• RDTE 07 PE 0305206F: *Airborne Reconnaissance Systems*	13.465	4.450	29.872	-	29.872	41.532	65.006	66.931	66.828	Continuing	Continuing

Remarks

A portion of the funding within the U-2 RDTE line will be used to support ASARS design, development, integration and test.

D. Acquisition Strategy

Imaging and Targeting Support efforts are prioritized on an annual basis by the GCWG, in accordance with the validated gaps in the Challenging Targets Initial Capabilities Document. Resulting funded efforts are then contracted for and/or executed by either various program offices, laboratories, industry, and/or other government agencies.

Advanced Synthetic Aperture Radar 2B efforts are conducted by Air Force Lifecycle Management Center/Intelligence, Surveillance, and Reconnaissance and Special Operations Forces Program Office(AFLCMC/WIN), in conjunction and cooperation with AFLCMC/HBG (Robins AFB) for flight test support.

Acquisition strategy is to maximize commercial and national development efforts and investment through multiple contracting methods, including the use of Engineering Change Proposals to modify existing contracts and new contracts that were awarded both competitively or on a sole source basis.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MTS-B Track Through Launch Transient	SS/CPFF	Raytheon : McKinney, TX	-	1.045	Mar 2017	0.342	Nov 2017	-		-		-	Continuing	Continuing	1.400
DRACO 4.0	SS/CPFF	Lockheed Martin : King of Prussia, PA	-	2.000	Jan 2017	1.900	Nov 2017	-		-		-	Continuing	Continuing	3.900
CERBERUS (Full Spectrum HSI AgilePod)	SS/CPFF	Raytheon : McKinney, TX	-	2.600	Apr 2017	2.458	Jan 2018	-		-		-	Continuing	Continuing	2.000
ALOFT	SS/CPFF	UTC Aerospace Systems : Westford, MA	-	-		1.400	Dec 2017	-		-		-	Continuing	Continuing	1.400
LWIR PI	C/CPFF	Raytheon : El Segundo, CA	-	-		2.000	Jan 2018	-		-		-	Continuing	Continuing	-
Agile Pod Harvest Reaper	SS/CPFF	Various : Various	-	1.615	Feb 2017	0.131	Dec 2017	-		-		-	Continuing	Continuing	0.200
SHERLOC	SS/CPAF	UTAS : Westford, MA	-	-		5.000	May 2018	5.000	Jan 2019	-		5.000	Continuing	Continuing	10.000
PROSIT	SS/CPAF	Various : Various	-	-		2.500	Feb 2018	2.250	Dec 2018	-		2.250	Continuing	Continuing	4.750
Other Technology Efforts (Prioritized by GCWG)	Various	Various : Various	-	2.619	Dec 2016	13.102	Dec 2017	5.607	Nov 2018	-		5.607	Continuing	Continuing	-
ASARS 2B	SS/CPIF	Raytheon : El Segundo, CA	-	3.409	Jul 2017	14.075	Mar 2018	1.450	Mar 2018	-		1.450	Continuing	Continuing	-
Nuclear Forensics - Prompt Diagnostics	MIPR	Various : Various	-	2.950	Feb 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	16.238		42.908		14.307		-		14.307	Continuing	Continuing	N/A

Remarks

On an annual basis, the GEOINT Capabilities Working Group reviews developmental technologies against warfighter capabilities and requirements based on strategic roadmaps and on the Airborne Sensors for ISR Analysis of Alternatives. Projects advancing the technological maturity of promising sensors and processing capabilities are reviewed and prioritized into a recommended list for senior executive direction to implement for the coming fiscal year.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA: Other Govt Cost	Various	Various : Dayton, OH	-	2.345	Dec 2016	2.680	Nov 2017	2.635	Nov 2018	-		2.635	Continuing	Continuing	-
		Subtotal	-	2.345		2.680		2.635		-		2.635	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	18.583		45.588		16.942		-		16.942	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
- ASARS 2B Flight Demonstration																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Imaging and Targeting Support				
I_TS - Advanced SAR Development	1	2017	4	2023
- Key Radar	1	2017	4	2017
-- Flight Demo (Key Radar)	1	2017	3	2018
--- NAVAIR Demo (Key Radar) (Sep 18)	3	2017	3	2018
- AMMOD	1	2017	4	2018
-- Data Collect (AMMOD) (Sep 18)	3	2017	3	2018
ITS - Advanced Hyperspectral Development	1	2017	4	2020
- CERBERUS (Full Spectrum HSI AgilePod)	1	2017	4	2019
I_TS - EO/IR	1	2017	4	2023
- MTS-B Turbulence Correction	1	2017	3	2017
- ALOFT	1	2017	4	2018
- MTS-B Track Through Launch Transient	1	2017	4	2019
- SHERLOC	1	2018	4	2019
- Predator/Reaper Offboard Sensing and Improved Targeting (PROSIT)	1	2018	4	2019
I_TS - LIDAR	1	2017	4	2023
ITS - Sensor Studies/Analysis	1	2017	4	2023
I_TS - Other Technology Efforts (Prioritized by GCWG)	1	2017	4	2023
- AgilePod Harvest Reaper	1	2017	1	2018
Advanced Airborne PCPAD Development	2	2017	4	2023
- DRACO 4.0	2	2017	4	2019
ASARS 2B Technology Development and Maturation	1	2017	4	2019

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 644818 / *Imaging and Targeting Support*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
- ASARS 2B Flight Demonstration	3	2018	4	2018

Note

Starting in FY 2019, DRACO and SOSA efforts were transferred from PE 0604257F, Advanced Technology and Sensors, Project 644818, Imaging and Targeting Support transferred to PE 0305206F, Airborne Reconnaissance Systems, Project 674818. Also, the majority of ASARS will be reported under PE 0305206F, Project 674818, Imaging and Targeting Support.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
645148: *Common-Airborne Sense and Avoid (C-ABSAA)*	-	14.784	21.647	17.643	0.000	17.643	16.158	38.859	39.667	40.389	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Common-Airborne Sense and Avoid (C-ABSAA) is an analysis development, maturation and transition effort in the Materiel Solutions Analysis phase of the acquisition lifecycle which supports emerging warfighter requirements to fully integrate Group 4-5 Remotely Piloted Aircraft (RPA) into the National Airspace System (NAS), international airspace, other nations' sovereign airspace, and operational combat airspace to conduct the entire range of military operations across all mission environments.

C-ABSAA also supports the "Worldwide Operations" key performance parameter in larger RPA requirement documents, and Public Law 112-239 directing DoD collaboration with the Federal Aviation Administration (FAA) and the National Air and Space Administration (NASA) to safely integrate RPA in the NAS. Funding in this project supports the development of a Sense and Avoid (SAA) capability set for Group 4-5 RPA and covers analysis, research, developmental, demonstration, and transition activities as well as infrastructure and other government costs.

Ongoing activities include support to the development of warfighter requirements and analysis of possible solution alternatives, collaboration with the FAA, NASA, and the other Services to develop national policy and standards, and SAA related studies, analysis, modeling and simulation, flight demonstrations of critical technologies, and program transition planning and project execution. RPA platform specific integration and testing is not included.

Activities also include studies and analysis to support both current and future program planning and execution. This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Sense and Avoid (SAA)-Related Requirements Development and Analysis, National Policy Standards Development, and Technology Development and Demonstration	14.784	21.647	17.643	-	17.643
Description: Support development and analysis of warfighter requirements and analysis of possible solution alternatives. Develop SAA technology and capabilities for Group 4-5 remotely. Collaborate with the Federal Aviation Administration, National Air and Space Administration, and other Services to develop national policy and standards. Conduct SAA related studies, analysis, modeling and simulation, demonstrations, program transition planning and project execution.					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: - Complete C-ABSAA Materiel Solution Analysis activities - Begin C-ABSAA Technology Maturation & Risk Reduction Phase - Support development of Capabilities Development Document and System Requirements Document/Technical Requirements Document - Prepare/present all documentation/results as part of C-ABSAA Milestone A decision review - Continue to build and exercise modeling and simulation capabilities to support requirements analysis, cost/capability trades, policy/standards development, and technology maturation and availability evaluation. - Continue SAA science and technology research and development with AFRL for future planning and development. - Continue to collaborate with FAA, NASA, and other Services and agencies on national policy and standards - Begin design/development of open modular architecture to minimize A/C integration costs and facilitate capability upgrades. ***FY 2019 Base Plans:*** - Will continue C-ABSAA Technology Maturation & Risk Reduction Phase - Will support validation of CDD and System Requirements Document/Technical Requirements Document - Will prepare/present all documentation/results as part of C-ABSAA Milestone B decision review - Will continue to collaborate with FAA, NASA, and other Services and agencies on national policy and standards - Will continue development/test/certification of open modular architecture. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 19 funding decrease was a reduction due to prior year balances.					
Accomplishments/Planned Programs Subtotals	14.784	21.647	17.643	-	17.643

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

C-ABSAA materiel solutions will be developed by the Air Force Life Cycle Management Center's Sensors Program Office under direction of the Program Executive Office for Intelligence, Surveillance, and Reconnaissance and Special Operations Forces, in response to a deliberate requirements definition process. C-ABSAA will integrate applicable Better Buying Power 3.0 initiatives throughout its acquisition lifecycle and rely upon acquisition of government data rights to maximize contractor

competition from technology development through production. The program intends to provide the warfighter with platform independent sense and avoid capability for Group 4-5 RPA through increased, time-phased capability improvements as technology and risks achieve satisfactory levels. Group 4-5 RPA platforms will be expected to integrate C-ABSAA capability into their unique systems either via retrofit or in design, development, and/or production.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C-ABSAA Technology Development	C/Various	Various : Various, NV	-	13.254	Oct 2016	20.071	Oct 2017	16.020	Oct 2018	-		16.020	Continuing	Continuing	-
		Subtotal	-	13.254		20.071		16.020		-		16.020	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration (PMA)	Various	Various : Various, NV	-	1.530	Oct 2016	1.576	Oct 2017	1.623	Oct 2018	-		1.623	Continuing	Continuing	-
		Subtotal	-	1.530		1.576		1.623		-		1.623	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	14.784		21.647		17.643		-		17.643	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 645148 / *Common-Airborne Sense and Avoid (C-ABSAA)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Common-Airborne Sense and Avoid				
Analysis of Alternatives	2	2017	2	2018
Materiel Solution Analysis	2	2017	2	2018
Capability Development Document	1	2017	4	2019
Milestone A (Mar 2018)	2	2018	2	2018
Technology Maturation and Risk Reduction	2	2018	1	2022
Milestone B	1	2022	1	2022
Engineering and Manufacturing Development	1	2022	4	2023

Note

In FY15, efforts were reported in PE 0305220F, RQ-4, Project 675148, Common Airborne Sense and Avoid (C-ABSAA). In FY16, efforts were reported in PE 0305206F, Airborne Reconnaissance Systems, Project 675148, C-ABSAA.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 646025 / *Data Compression*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
646025: *Data Compression*	-	1.451	1.484	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.935
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2019, PE 0604257, Advanced Technology and Sensors, Data Compression effort was transferred to PE 0305206F, Airborne Reconnaissance Systems (ARS), Project 676025, Data Compression.

A. Mission Description and Budget Item Justification

The Data Compression effort provides the warfighter with capability to efficiently compress and decompress airborne ISR sensor data and transmit near real time to tactical users through current and future bandwidth limited commercial satellite communications (SATCOM) or military SATCOM. The effort develops, tests, and will implement new sensor data compression and decompression algorithms for current and emerging airborne ISR sensors. Additionally, the program develops compression and decompression capabilities for manned and unmanned airborne platforms, associated ground stations, and Distributed Common Ground System (DCGS). Outputs will meet standard certification for use within the Department of Defense GEOINT and Measurement and Signatures Intelligence(MASINT) architectures. This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Reduction of Data Using Compression Enhancements (RDUCE)	1.451	1.484	0.000	0.000	0.000
Description: The Data Compression effort provides the warfighter a capability to efficiently compress and decompress airborne Intelligence, Surveillance, and Reconnaissance (ISR) sensor data and transmit near real time to tactical users through current and future bandwidth limited commercial satellite communications (SATCOM) or military SATCOM. The effort will develop, test and implement new sensor data compression and decompression algorithms for current and emerging airborne ISR sensors. Additionally, the program develops compression and decompression capabilities for manned and unmanned airborne platforms, associated ground stations, and the DCGS. Outputs will meet standard certification for use within the Department of Defense GEOINT and MASINT architectures. ***FY 2018 Plans:*** - Will continue to develop and test our existing data compression capabilities including SAR, Phase History SAR and HSI/MSI. - Will develop compression capabilities for other phenomenologies,					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 646025 / *Data Compression*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
including, but not limited to, SIGINT, LIDAR, and EO/IR. - Will support integration of compression capabilities into operational sensors including, but not limited to, the U2/ASARS, Global Hawk MP-RTIP/EISS, and Reaper/LynxSAR. - Will continue to develop and test compression and decompression algorithms for Persistent SAR and Smart Data Discrimination. - Will continue to develop documentation for DoD and international standards acceptance of our compression capabilities. - Will continue to provide engineering services for algorithm familiarization, assessment, and improvement. - Will continue to participate in SOSA (and other open standards) planning and integration. ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** - Funding decreased due to effort transferred and reported under Program 0305206, Project 676025, Data Compression.					
Accomplishments/Planned Programs Subtotals	1.451	1.484	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Data Compression acquisition approach is to design and develop compression and decompression technology hardware and software components, interfaces and standards for various airborne intelligence, surveillance, and reconnaissance platforms, ground stations, data storage facilities, and exploitation tools utilizing existing contracts with full and open competition where appropriate. Integration will be accomplished by the requisite program offices.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 646025 / *Data Compression*

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 646025 / *Data Compression*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LIDAR Integration	MIPR	AFRL : Dayton, OH	-	-		0.000	Feb 2018	0.000		-		0.000	Continuing	Continuing	-
Technology Development	C/CPFF	General Atomics : San Diego, CA	-	0.707	Dec 2016	1.312		0.000		-		0.000	Continuing	Continuing	-
ASARS 2B Integration	C/CPFF	Raytheon : El Segundo, CA	-	-		0.000	Dec 2017	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	0.707		1.312		0.000		-		0.000	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Common Sense Testbed Demonstration Support	MIPR	AFRL : Dayton, OH	-	0.250	Oct 2016	0.000	Oct 2017	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	0.250		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Phase History Flight Test	C/CPFF	AFRL : Dayton, OH	-	0.250	Apr 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	0.250		-		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Office Support	Various	Govt/Contractors : Dayton, NV	-	0.244	Oct 2016	0.172	Oct 2017	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	0.244		0.172		0.000		-		0.000	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604257F / *Advanced Technology and Sensors*	Project (Number/Name) 646025 / *Data Compression*	

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.451		1.484		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 646025 / *Data Compression*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604257F / *Advanced Technology and Sensors*	**Project (Number/Name)** 646025 / *Data Compression*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
No project title.				
Persistent E/O IR Data Compression Development	1	2017	4	2018
--LIDAR Integration	3	2018	4	2018
Phase History SAR Data Compression Development	1	2017	4	2018
--ASARS 2B Integration	3	2018	4	2018
-- Phase History SAR Data Compression Demonstration	3	2017	4	2018

Note

In FY 2015, efforts were reported under PE 0305208F, Distributed Common Ground/Surface Systems, Project 676025, Data Compression. In FY 2016, efforts were reported in PE 0305206F, Airborne Reconnaissance Systems, Project 676025, Data Compression. In FY 2017, PE 0305206F, Airborne Reconnaissance Systems, Project 676025, Data Compression, efforts transferred to PE 0604257F, Advanced Technology and Sensors, Project 646025, Data Compression.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604288F / *National Airborne Ops Center (NAOC) Recap*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	7.850	9.740	0.000	9.740	19.549	101.011	135.532	138.000	Continuing	Continuing
646507: *NAOC Recap Development*	-	0.000	7.850	9.740	0.000	9.740	19.549	101.011	135.532	138.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2018, PE 0302015F, E-4B National Airborne Operations Center (NAOC) Project 674777, E-4B Aircraft Modernization efforts were transferred to PE 0604288F, National Airborne Ops Center (NAOC) Recap, Project 646507, NAOC Recap Development, in order to provide greater transparency.

A. Mission Description and Budget Item Justification

The E-4B National Airborne Operations Center (NAOC) is a survivable node of the National Military Command System (NMCS), providing POTUS, SECDEF and the CJCS a worldwide, survivable, and enduring node of the NMCS to fulfill national security requirements throughout all stages of conflict. As a command, control and communications center directing US forces, executing emergency war orders and coordinating the activities of civil authorities including national contingency plans, this capability ensures continuity of operations plans and continuity of government as required in a national emergency or after negation/destruction of ground command and control centers.

The E-4B NAOC Recapitalization effort will replace the aging E-4B fleet which faces capability gaps, diminishing manufacturing sources, increased maintenance costs, and parts obsolescence as it approaches the end of its serviceable life. The recapitalization effort will be informed by Air Force and Department of Defense analyses used to determine a holistic approach to replacing the aging E-4B fleet and integrating its capabilities with other nuclear and national command and control mission sets.

In 2015, the Joint Staff completed a Mission Area Analysis (MAA) focused on the Nuclear Command, Control and Communication (NC3) National Military Command system (NMCS) airborne fleets. This analysis examined alternative architectures and CONOPS for achieving requirements, and suggested potential programmatic, platform, and/or mission system synergies across and between fleet recapitalization programs (E-4B, E-6B, VC-25, C-32A). Further, the Joint Staff documented the essential functions necessary to execute Nuclear Command and Control, and defined the operational role of the NC2 enterprise out to 2030 in a NC2 CONOPS. From 2014-2016, the Joint Staff performed an NC2 Capabilities Based Assessment (CBA) to determine potential gaps in the NC2 mission and architecture. The findings of these studies have culminated in an evolved NMCS "aerial layer mission alignment strategy" that allows the Department of Defense (DoD) to consolidate the airborne command center capabilities provided by the E-4B and E-6B into a single fleet of uniformly-configured aircraft. This concept is known as the Survivable Airborne Operations Center, or SAOC.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver E-4B weapon system capability; furthermore it may include support funding for emerging modification requirements to support PMS, A&AS, equipment and other as required.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604288F / *National Airborne Ops Center (NAOC) Recap*

BA-04 - This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	0.000	7.850	9.813	0.000	9.813
Current President's Budget	0.000	7.850	9.740	0.000	9.740
Total Adjustments	0.000	0.000	-0.073	0.000	-0.073
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.073	0.000	-0.073

Change Summary Explanation

No Significant Program Changes

C. Accomplishments/Planned Programs ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019**
Title: E-4B NAOC Recap	0.000	7.850	9.740
Description: Recapitalization efforts include those activities related to the current E-4B NAOC fleet. Efforts will involve early acquisition activities, to include but not limited to, preparation for a Materiel Development Decision (MDD), an Analysis of Alternatives (AoA), development of initial requirements/acquisition strategy, risk reduction activities, and other efforts necessary to initiate a recapitalization program. ***FY 2018 Plans:*** Conduct Analysis of Alternatives, conduct risk reduction studies & analyses, complete CONEMP development, achieve Material Development Decision (MDD) and begin Materiel Solution Analysis. ***FY 2019 Plans:*** Complete AoA and continue Material Solution Analysis activities. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase funds completion of AoA as well as Material Solution Analysis activities.			
Accomplishments/Planned Programs Subtotals	0.000	7.850	9.740

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604288F / *National Airborne Ops Center (NAOC) Recap*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 07 PE 0302015F: *E-4B National Airborne Operations Center (NAOC)*	1.000	-	0.000	-	0.000	0.000	0.000	0.000	-	Continuing	Continuing

Remarks

E. Acquisition Strategy

The E-4B Recapitalization program is currently pre-Materiel Development Decision (MDD). The current acquisition strategy primarily consists of achieving MDD and then completing the program's Analysis of Alternatives (AoA). A more robust acquisition strategy will follow as the AoA is concluded and ultimately finished.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604288F / *National Airborne Ops Center (NAOC) Recap*	**Project (Number/Name)** 646507 / *NAOC Recap Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Analysis of Alternatives	MIPR	Various : TBD	-	-		4.057	Apr 2018	3.802	Oct 2019	-		3.802	Continuing	Continuing	-
CONEMP Development	MIPR	Various : TBD	-	-		0.251	Apr 2018	-		-		-	Continuing	Continuing	-
Risk Reduction Studies	MIPR	Various : TBD	-	-		2.800	Apr 2018	2.800	Oct 2019	-		2.800	Continuing	Continuing	-
Program Contract Support	MIPR	Various : TBD	-	-		0.742	Apr 2018	0.840	Oct 2019	-		0.840	Continuing	Continuing	-
Materiel Solution Analysis	MIPR	Various : TBD	-	-		-		2.298	Oct 2019	-		2.298	Continuing	Continuing	-
		Subtotal	-	-		7.850		9.740		-		9.740	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		7.850		9.740		-		9.740	Continuing	Continuing	N/A

Remarks

Costs associated with development planning, risk reduction and preliminary planning activities including systems engineering strategy and analysis; completion and reporting of the Analysis of Alternatives.

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604288F / *National Airborne Ops Center (NAOC) Recap*	**Project (Number/Name)** 646507 / *NAOC Recap Development*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604288F / *National Airborne Ops Center (NAOC) Recap*	**Project (Number/Name)** 646507 / *NAOC Recap Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
NAOC Recap Development				
Analysis of Alternatives	3	2018	4	2019
Materiel Solution Analysis	3	2018	2	2020
Milestone A	2	2020	2	2020
Technology Maturation Risk Reduction	3	2020	2	2022

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	8.080	3.295	12.960	0.000	12.960	13.021	13.071	13.141	13.201	Continuing	Continuing
646003: *Partnership Intermediary Agreement(s)*	-	8.080	3.295	3.035	0.000	3.035	3.096	3.146	3.213	3.271	Continuing	Continuing
646030: *AFwerX*	-	0.000	0.000	9.925	0.000	9.925	9.925	9.925	9.928	9.930	Continuing	Continuing

Note

Note: In FY 2012, the Office of the Secretary of Defense (OSD) transferred the Partnership Intermediary Agreement effort to the Air Force.

A. Mission Description and Budget Item Justification

Technology Transfer was titled Defense Technology Transfer and Defense Technology Link (TechLink) in previous Office of the Secretary of Defense (OSD) budgets. The program was devolved from OSD in FY12 to achieve efficiencies in program management. TechLink, DoD's first National level Partnership Intermediary (PI), was established by OSD in 1999 to provide direct Technology Transfer support to all Air Force, Army, Navy, and independent DoD Research Laboratories. TechLink is a performance based, metrics-driven organization.

TechLink brokers technology transfer agreements between Department of Defense (DoD) laboratories and US industry for the manufacture and use of DoD inventions. These agreements enable DoD to leverage the investment and capabilities of the private-sector in development of new defense-related products and services, lowering DoD costs and also helping ensure that DoD-developed or co-developed technologies are transitioned to DoD operational use. This program impacts virtually all technology fields, including medicine, software, electronics, communications, advanced materials, and energy-related technologies.

In FY 2019, Project 646030, AFWERX, was created under this program element to provide centralized funding for AFWERX activities. AFWERX will link innovators to the Air Force's research and development activities, program offices, development planning & experimentation teams, and end users. These linkages will create capability options and prototype opportunities for the Air Force. AFWERX was previously funded in FY 2017 and FY 2018 with execution year funding from various Air Force Science and Technology (S&T) RDT&E program elements.

This Program is Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	3.368	3.295	3.058	0.000	3.058
Current President's Budget	8.080	3.295	12.960	0.000	12.960
Total Adjustments	4.712	0.000	9.902	0.000	9.902
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	5.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.288	0.000			
• Other Adjustments	0.000	0.000	9.902	0.000	9.902

Congressional Add Details ($ in Millions, and Includes General Reductions)	**FY 2017**	**FY 2018**
Project: 646003: *Partnership Intermediary Agreement(s)*		
Congressional Add: *Program Increase*	4.828	0.000
Congressional Add Subtotals for Project: 646003	4.828	0.000
Congressional Add Totals for all Projects	4.828	0.000

Change Summary Explanation

Increase in FY 2019 for AFWERX activities.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*	**Project (Number/Name)** 646003 / *Partnership Intermediary Agreement(s)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
646003: *Partnership Intermediary Agreement(s)*	-	8.080	3.295	3.035	0.000	3.035	3.096	3.146	3.213	3.271	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project accomplishes the following: (1) establish license agreements to transfer patented inventions from Department of Defense (DoD) research laboratories to industry for conversion into new dual-use products and services to support DoD's defense mission and benefit the US economy; and (2) establish collaborative research and development agreements (CRADAs) with the private-sector for development of new, innovative, dual-use technology. Both of these activities enable DoD to leverage the investment and capabilities of the private-sector in development of new defense-related products and services, lowering DoD costs and also helping ensure that DoD-developed or co-developed technologies are transitioned to DoD operational use.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Technology Transfer	3.252	3.295	3.035
Description: Enhance and expand transfer of technologies between Department of Defense (DoD) and the commercial sector. ***FY 2018 Plans:*** Implement cost effective approaches to increase and accelerate transfer of technologies developed at DoD laboratories and facilitate their transition to the warfighter. Evaluate and market DoD laboratory inventions and broker technology transfer agreements/collaborative research and development agreements (CRADAs), to include commercial licenses, that support the US defense mission and benefit the US economy. Engage the innovative capabilities of non-traditional defense contractors in developing and commercializing new dual-use products and services. ***FY 2019 Plans:*** Continue to implement cost effective approaches to increase and accelerate transfer of technologies developed at DoD laboratories and facilitate their transition to the warfighter. Evaluate and market DoD laboratory inventions and broker technology transfer agreements/CRADAs, to include commercial licenses, that will support the US defense mission and benefit the US economy. Engage the innovative capabilities of non-traditional defense contractors in developing and commercializing new dual-use products and services. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $0.260 million. Justification for this decrease is due to Office of Defense (OSD) deflation factors.			
Accomplishments/Planned Programs Subtotals	3.252	3.295	3.035

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*	**Project (Number/Name)** 646003 / *Partnership Intermediary Agreement(s)*

	FY 2017	FY 2018
Congressional Add: Program Increase ***FY 2017 Accomplishments:*** Conducted Congressionally directed effort ***FY 2018 Plans:*** Not applicable	4.828	0.000
Congressional Adds Subtotals	4.828	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

This effort uses a Partnership Intermediary Agreement (PIA) with TechLink at Montana State University. Through this agreement TechLink helps the Department of Defense to establish licensing and other technology transfer agreements with US industry. The effort is run through the Air Force Research Laboratory/Small Business office at Wright Patterson Air Force Base.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*	**Project (Number/Name)** 646003 / *Partnership Intermediary Agreement(s)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
License DoD inventions for conversion into new products and services	PO	TechLink : Bozeman, MT	-	3.252	Apr 2017	3.295	Apr 2018	3.035	Apr 2019	-		3.035	Continuing	Continuing	-
Congressional Add - Enhance technology transfer activities and outreach	PO	TechLink : Bozeman, MT	-	1.600	Dec 2017	-		-		-		-	Continuing	Continuing	-
Congressional Add - Increase transition support and outreach to manufacturing and sustainment activities	PO	MilTech : Bozeman, MT	-	1.000	Dec 2017	-		-		-		-	Continuing	Continuing	-
Congressional Add - Advance Intellectual property/commercialization activities	PO	Various : Various	-	0.928	Jul 2018	-		-		-		-	Continuing	Continuing	-
Congressional Add Expand legal counsel support for technology transfer activities	PO	TBD : TBD	-	1.300	Feb 2018	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	8.080		3.295		3.035		-		3.035	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	8.080		3.295		3.035		-		3.035	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*	**Project (Number/Name)** 646003 / *Partnership Intermediary Agreement(s)*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Partnership Intermediary																												
Tech Transfer Partnership Intermediary																												
Congressional Add																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*	**Project (Number/Name)** 646003 / *Partnership Intermediary Agreement(s)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Partnership Intermediary				
Tech Transfer Partnership Intermediary	1	2017	4	2023
Congressional Add	1	2017	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*	**Project (Number/Name)** 646030 / *AFwerX*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
646030: *AFwerX*	-	0.000	0.000	9.925	0.000	9.925	9.925	9.925	9.928	9.930	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project improves Air Force capabilities by connecting innovators, simplifying technology transfer, and accelerating results. AFWERX will accomplish this mission by: (1) Connecting diverse, innovative members from industry, academia, and government; (2) Creating capabilities options and prototype opportunities for the Air Force; (3) Facilitating streamlined acquisition processes; and (4) Fostering a culture of innovation in the Air Force.

In FY 2019, Project 646030, AFWERX, was created under PE 0604317F, Technology Transfer, to provide centralized funding for AFWERX activities. This is an administrative alignment and not a new start. AFWERX was previously funded in FY 2017 and FY 2018 with execution year funding from various Air Force Science and Technology (S&T) RDT&E program elements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: AFWERX ***Description:*** Connect diverse, innovative members from industry, academia, and government to create capabilities options and prototype opportunities for the Air Force. ***FY 2018 Plans:*** For FY 2017 and FY 2018, this work is performed with execution year funding from various Air Force Science and Technology (S&T) RDT&E program elements. Stood up two AFWERX innovation hubs locations, District of Columbia (DC) and the Las Vegas. Continue to host events, implement new innovative competitions, collaborate with academia and think tanks, and work with industry through technology accelerator programs. ***FY 2019 Plans:*** Continue to utilize the DC Innovation Hub and the Las Vegas Innovation Hub to host events, implement new innovative competitions, collaborate with academia and think tanks, and work with industry through technology accelerator programs. Additional AFWERX Innovation Hub locations may be added as directed by Air Force Senior Leadership. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $9.925 million. Justification for this increase is due to the Air Force centralizing funding for AFWERX activities.	0.000	0.000	9.925
Accomplishments/Planned Programs Subtotals	0.000	0.000	9.925

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*	**Project (Number/Name)** 646030 / *AFwerX*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The District of Columbia (DC) Innovation Hub and the Las Vegas Innovation Hub are contracted under existing Air Force Research Laboratory (AFRL) Partnership Intermediary Agreements (PIAs) which have already been awarded. The DC Innovation Hub in under a PIA with Virginia Tech Applied Research Corporation and the Vegas Innovation Hub is under a PIA with DefenseWerk.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*	**Project (Number/Name)** 646030 / *AFwerX*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Las Vegas Innovation Hub	PO	Defensewerx : Ft Walton Beach, FL	-	-		-		5.000		-		5.000	Continuing	Continuing	-
DC Innovation Hub	PO	VA Tech Applied Res Corp : Arlington, VA	-	-		-		4.925		-		4.925	Continuing	Continuing	-
		Subtotal	-	-		-		9.925		-		9.925	Continuing	Continuing	N/A

Remarks

The DC Innovation Hub stood up in FY 2017. The Las Vegas Innovation Hub opened in January 2018. Operating costs for these innovation hubs are funded in FY 2017 and FY 2018 with execution year funding from various Air Force Science and Technology (S&T) RDT&E program elements.

Additional innovation hubs may be opened in FY 2019 as directed by Air Force Senior Leadership.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		9.925		-		9.925	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*	**Project (Number/Name)** 646030 / *AFwerX*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
AFwerX																												
AFwerX																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604317F / *Technology Transfer*	**Project (Number/Name)** 646030 / *AFwerX*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
AFwerX				
AFwerX	1	2019	4	2023

Note

The DC Innovation Hub stood up in FY 2017. The Las Vegas Innovation Hub opened in January 2018. Operating costs for these innovation hubs are funded in FY 2017 and FY 2018 with execution year funding from various Air Force Science and Technology (S&T) RDT&E program elements.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604327F / *Hard and Deeply Buried Target Defeat System (HDBTDS) Program*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	497.723	52.706	17.365	71.501	0.000	71.501	4.121	0.000	0.000	0.000	0.000	643.416
645341: *Direct Strike Penetrator Systems*	497.723	52.706	17.365	71.501	0.000	71.501	4.121	0.000	0.000	0.000	0.000	643.416
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 475

A. Mission Description and Budget Item Justification

The Direct Strike Penetrator Systems program develops and modifies advanced precision guided penetrator munitions to include development/integration of advanced positioning, navigation, and timing (PNT) capabilities (i.e., GPS, non-GPS, optical, passive, active, etc.) that will provide the Air Force with improved ability to attack Hard and Deeply Buried Targets (HDBT), such as bunker and tunnel facilities, using air-to-surface conventional munitions. Systems developed will hold additional HDBTs at risk, reduce the number of weapons to hold HDBTs at risk, resulting in more targets engaged per mission flown. Direct Strike Penetrators will provide critical global strike capability not met by inventory conventional weapons and will hold at risk the best defended/ protected high value assets essential to an enemy's war fighting ability.

A Hard Target Munitions (HTM) Analysis-of-Alternatives (AoA) was conducted to determine the best weapons and/or development efforts for addressing the HDBT mission area. The HTM AoA determined it was necessary to develop a family of HTMs in order to apply effects to the entire range of HDBTs set. The Air Force is using the AoA to develop, produce and modify HDBT weapons identified as the most effective and affordable. Modeling and simulation is used to assess and characterize current inventory, drive design and explore the utility of new classes of penetrator munitions.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MOP, A2K, A5K, and M-Code weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes, and prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604327F / *Hard and Deeply Buried Target Defeat System (HDBTDS) Program*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	74.308	17.365	72.039	0.000	72.039
Current President's Budget	52.706	17.365	71.501	0.000	71.501
Total Adjustments	-21.602	0.000	-0.538	0.000	-0.538
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-19.600	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.002	0.000			
• Other Adjustments	0.000	0.000	-0.538	0.000	-0.538

Change Summary Explanation

FY2017: -$19.600M, Congressional Adjustment for improved GPS

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Massive Ordnance Penetrator (MOP) ***Description:*** MOP is a 30,000 lb class precision guided penetrator designed to defeat hard and deeply buried targets. Design, develop, and test the baseline and Enhanced Threat Response (ETR) MOP Weapon and integrate it on the B-2. Construct relevant hard and deeply buried targets for testing. Execute MOP testing in support of development efforts. Analyze MOP weapon effectiveness. ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	15.328	0.000	0.000	0.000	0.000
Title: Advanced 5000 lb (A5K) Penetrator	2.570	17.365	38.539	0.000	38.539

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604327F / *Hard and Deeply Buried Target Defeat System (HDBTDS) Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Advanced 5000 lb (A5K) Penetrator is an improved 5000 lb class penetrator to address capability gaps identified in the HTM AoA. Conduct A5K design, development, integration, modeling and simulation, and testing to improve performance against increasingly hardened targets. This effort will utilize existing and improved technologies to field an integrated penetrator weapon system to include: an improved penetrator warhead, a smart fuze system that can detect layers/voids, and a modified JDAM tail kit for all weather, precision guidance, navigation, and control. ***FY 2018 Plans:*** Warhead and smart fuzing development utilize a modeling and simulation based design process. Accomplish trade studies and technical reviews to ensure the A5K system addresses the capability gaps identified in the HTM AoA. Begin integration with the JDAM tailkit with the strake design and initial autopilot development. ***FY 2019 Base Plans:*** Continue A5K modeling and simulation, development, prototype production, integration, testing and qualification of the A5K weapons system to verify the system performance against the prioritized HTM AoA target set. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to additional development and testing activities.					
Title: Military Code (M-Code) and Enhanced Anti-Jam (EAJ) ***Description:*** M-Code and EAJ provides the capability to operate in increasing adversarial A2/AD jamming environments. M-Code and EAJ also provide increased accuracy, better signal acquisition, and advanced security. ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** Develop and integrate Military code (M-Code) across the AFPEO weapons portfolio. ***FY 2019 OCO Plans:***	34.808	0.000	32.962	0.000	32.962

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604327F / *Hard and Deeply Buried Target Defeat System (HDBTDS) Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increase to provide support to M-Code enterprise.					
Accomplishments/Planned Programs Subtotals	52.706	17.365	71.501	0.000	71.501

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• PAAF 01 Line Item 353190: *WRM-Ammunition (MOP)*	3.600	38.382	38.111	-	38.111	0.000	0.000	0.000	-	Continuing	Continuing
• RDTE 05 PE 0604602F: *Armament/Ordnance Development*	4.496	-	0.000	-	0.000	0.000	0.000	0.000	-	0.000	4.496
• RDTE 04 PE 0604201F: *Integrated Avionics Planning & Development*	0.000	60.444	14.894	-	14.894	0.000	0.000	0.000	-	Continuing	Continuing

Remarks

In FY 2018, PE 0604602F, Armament/Ordnance Development, Project 653134, BLU-109 and BLU-113 Upgrade efforts were transferred to PE 0604327F, Hard and Deeply Buried Target Defeat System (HDBTDS) Program, Project 645341, Direct Strike Penetrator Systems, in order to consolidate hard target munitions in one program element.

E. Acquisition Strategy

MOP uses a sole source cost type contract to complete ETR activities.

M-Code/EAJ effort uses a Family of Systems approach where the three prime weapons contractors develop receivers capable of operating in any of their AF weapons. The receivers are based on a common, internally-developed IRS, TRD, and threat scenario. This approach uses a combination of contract types based on acquisition phase (TMRR, Development, Production) and risk. The Weapons SPOs share a common development PE to allow flexibility in funding and planning, switching to individual PEs for receiver integration, OT, and production. The M-Code/EAJ Weapons Receiver Development effort leverages technology currently under development by the GPS-D MGUE program and will provide the warfighter with unmatched capability to operate in future A2/AD environments.

The initial A5K design will be accomplished through modeling, simulation, and analysis producing potential designs. The designs will be developed based on the performance parameters of survivability, lethality, accuracy and penetration. Upon completing the modeling, simulation, and analysis of the A5K prototype designs a government review will determine the optimum A5K design going forward. That design will be used to fabricate test articles to include warheads, fuzing, and modified JDAM tail kits. These assets will be used to conduct and successfully complete qualification testing.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604327F / *Hard and Deeply Buried Target Defeat System (HDBTDS) Program*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604327F / *Hard and Deeply Buried Target Defeat System (HDBTDS) Program*	**Project (Number/Name)** 645341 / *Direct Strike Penetrator Systems*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M-Code/EAJ Receiver Development/Integration	Various	Various : TBD	0.000	25.208	Nov 2017	-		32.962	Dec 2019	-		32.962	Continuing	Continuing	-
MOP Weapon Development	SS/CPIF	Boeing : St Louis, MO	259.463	2.998	Aug 2017	-		-		-		-	0.000	262.461	264.463
MOP Hard Target Munitions (HTM) Capabilities Analysis	Various	Whitney, Bradley & Brown; ARA; Booz Allen : Eglin, FL	3.736	8.875	Sep 2017	-		-		-		-	0.000	12.611	12.611
MOP HTM Concept/ Technology Study	Various	Several local companies : Eglin, FL	3.244	-		-		-		-		-	0.000	3.244	3.244
MOP HTM Weapons Effects/Target Analysis	RO	DTRA : Albuquerque, NM	5.308	-		-		-		-		-	0.000	5.308	5.308
MOP HTM Technical Support	Various	Jacobs Engineering : Eglin, FL	2.769	-		-		-		-		-	0.000	2.769	2.769
A5K Warhead Design, Fuze Design/Update, Strake Design	MIPR	SAIC/ARA : Albuquerque, NM	0.000	2.570	Aug 2017	9.122	Mar 2018	9.752	Mar 2019	-		9.752	Continuing	Continuing	-
A5K JDAM Autopilot	PO	Boeing Tech Services : St. Louis, MO	0.000	-		2.076	Mar 2018	0.915	Mar 2019	-		0.915	Continuing	Continuing	-
		Subtotal	274.520	39.651		11.198		43.629		-		43.629	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MOP Govt Support	Various	Several Govt Labs and test Centers : Eglin AFB, FL	14.386	3.305	Dec 2017	-		-		-		-	0.000	17.691	17.691
A5K System T&E Support	MIPR	SAIC/ARA : Albuquerque, NM	-	-		0.164	Mar 2018	1.155	Mar 2019	-		1.155	Continuing	Continuing	-
		Subtotal	14.386	3.305		0.164		1.155		-		1.155	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604327F / *Hard and Deeply Buried Target Defeat System (HDBTDS) Program*	Project (Number/Name) 645341 / *Direct Strike Penetrator Systems*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MOP System Test & Evaluation	Various	AFLCMC : Eglin, Holloman, Edw, FL	18.304	-		-		-		-		-	0.000	18.304	18.304
MOP Flight Test Range Support	Various	WSMR : WSMR, NM	5.646	-		-		-		-		-	0.000	5.646	5.646
MOP Target Construction and Instrumentation	Various	DTRA : Albuquerque, NM	160.311	-		-		-		-		-	0.000	160.311	160.311
MOP Test and Evaluation Activities	Various	AFTC : Albuquerque, NM	12.368	-		-		-		-		-	0.000	12.368	12.368
A5K Test and Evaluation Activities	Various	96 TW, WSMR, Holloman AFB : Eglin, Holloman,WSMR, FL	-	-		4.829	Mar 2018	25.511	Mar 2019	-		25.511	Continuing	Continuing	-
M-Code/EAJ Test and Evaluation Activities	Various	Various : Eglin, Holloman, Edwards, FL	0.000	6.100	Nov 2017	-		-		-		-	0.000	6.100	-
		Subtotal	196.629	6.100		4.829		25.511		-		25.511	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MOP Program Management Administration (PMA)	Various	AFLCMC/EBD : Eglin AFB, FL	11.576	0.150	Oct 2017	-		-		-		-	0.000	11.726	11.726
M-Code/EAJ PMA	Various	AFLCMC/EBD : Eglin AFB, FL	-	3.500	Sep 2018	-		-		-		-	Continuing	Continuing	-
A5K Program Management Administration (PMA)	Various	AFLCMC/EBD : Eglin AFB, FL	0.612	-		1.174	Jan 2018	1.206	Jan 2019	-		1.206	0.000	2.992	-
		Subtotal	12.188	3.650		1.174		1.206		-		1.206	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604327F / *Hard and Deeply Buried Target Defeat System (HDBTDS) Program*	Project (Number/Name) 645341 / *Direct Strike Penetrator Systems*	

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	497.723	52.706		17.365		71.501		-		71.501	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604327F / *Hard and Deeply Buried Target Defeat System (HDBTDS) Program*	**Project (Number/Name)** 645341 / *Direct Strike Penetrator Systems*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604327F / *Hard and Deeply Buried Target Defeat System (HDBTDS) Program*	**Project (Number/Name)** 645341 / *Direct Strike Penetrator Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Direct Strike Penetrator Systems				
MOP Analysis and Testing	1	2017	4	2018
A5K Design, Development and Testing	4	2017	1	2021
M-Code/EAJ Development/Integration	1	2017	3	2022
M-Code/EAJ Test and Evaluation	4	2017	4	2018

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	32.253	62.618	0.000	62.618	60.667	74.535	82.947	84.458	Continuing	Continuing
642810: *Cyber Workforce Development*	-	0.000	10.461	17.462	0.000	17.462	19.413	19.779	20.938	21.320	Continuing	Continuing
642812: *System Security Engineering*	-	0.000	7.663	13.059	0.000	13.059	17.001	14.589	16.976	17.285	Continuing	Continuing
642816: *Agile/Adaptable Standards*	-	0.000	5.467	4.992	0.000	4.992	4.996	16.905	18.319	18.653	Continuing	Continuing
642834: *Mission Assurance for Fielded Systems*	-	0.000	3.245	20.925	0.000	20.925	12.419	16.353	19.129	19.478	Continuing	Continuing
642836: *Mission Thread Analysis*	-	0.000	5.417	6.180	0.000	6.180	6.838	6.909	7.585	7.722	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Cyber Resiliency of Weapon Systems (CRWS) for Agile Combat Support (ACS) provides funding to increase weapon systems cyber resiliency/security in all phases and activities of the acquisition life cycle by accomplishing two goals. First, CRWS integrates cyber resiliency design tenets into the systems engineering process and builds cyber resiliency into weapon systems. Second, CRWS assesses and enables modifications of fielded systems to protect them from cyber exploitation.
To meet these goals, this effort addresses cyber resiliency and security gaps in five projects. The first project increases cyber security and resiliency skills, knowledge, and experience of acquisitions personnel. The second project prototypes, evaluates, and transitions cyber secure and resilient risk-informed processes, tools, products, and policies into all phases of the acquisition life cycle and sustainment. The third project develops standards for designing new weapon systems by defining a government reference architecture, providing the capability to rapidly update weapon systems cyber components in response to new cyber threats, and allowing future weapon system designers the opportunity to use open system architectures. The fourth project addresses the security and resiliency of fielded weapons systems by designing mitigations strategies and prototyping solutions for known vulnerabilities. The final project systematically reviews Air Force weapons systems' mission sets and addresses gaps in mission assurance (such as a weapon system's critical subsystem and support systems) due to evolving cyber threats.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CRWS capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	40.000	32.253	51.089	0.000	51.089
Current President's Budget	0.000	32.253	62.618	0.000	62.618
Total Adjustments	-40.000	0.000	11.529	0.000	11.529
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-40.000	0.000	11.529	0.000	11.529

Change Summary Explanation

FY 2017 decrease because the FY 2017 Request for Additional Appropriations (RAA) for weapon system cyber resiliency was not appropriated.

FY 2019 increase due to acceleration of weapon systems cyber assessments and mitigation activities.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642810 / *Cyber Workforce Development*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642810: *Cyber Workforce Development*	-	0.000	10.461	17.462	0.000	17.462	19.413	19.779	20.938	21.320	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Cyber Workforce Development project prototypes, evaluates, and transitions techniques that address gaps in expertise, skills, capacity, and knowledge in cyber security and resiliency that are needed to assist acquisition professions in the performance of their acquisition life cycle and sustainment of weapon systems duties. Specifically, this project increases the knowledge and skills required to counter cyber threats to all cyber-systems within weapon systems by going beyond those skills required to only counter cyber threats to Internet Protocol network-based information systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Increase Acquisition Workforce Cyber Expertise	0.000	10.461	17.462
Description: Increases knowledge and advanced skills of acquisition workforce. ***FY 2018 Plans:*** Prototype techniques to increase cyber security/resiliency skills in the functional areas of the acquisition workforce. Prototype cyber expert cell concepts and locations. Develop and execute a recruitment and retaining strategy for skilled acquisition professionals. ***FY 2019 Plans:*** Validate/approve cyber expert cell (now called Cyber Resiliency Support Team) proof-of-concept based on value added to program offices. Initiate a second CRST at an acquisition base. Continue development and fielding of cyber training, establish an Air Force weapons system cyber training curriculum, and establish cross-service training, collaboration and standardization. Continue cyber security personnel recruiting/retaining strategy efforts. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $7.001 million. Justification for this increase is due to an Air Force emphasis on weapon system cyber resiliency across this program.			
Accomplishments/Planned Programs Subtotals	0.000	10.461	17.462

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642810 / *Cyber Workforce Development*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures, whichever is most appropriate.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642810 / *Cyber Workforce Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AF Acquisition Cyber CRST support	Various	AFMC : TBD	-	0.000		6.931	Feb 2018	15.462	Oct 2018	-		15.462	Continuing	Continuing	-
AF Acquisition Workforce	Various	AFMC : TBD	-	0.000		3.530	Feb 2018	2.000	Oct 2018	-		2.000	Continuing	Continuing	-
		Subtotal	-	0.000		10.461		17.462		-		17.462	Continuing	Continuing	N/A

Remarks

This project is a new start in FY 2018.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		10.461		17.462		-		17.462	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642810 / *Cyber Workforce Development*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Cyber Workforce Development																												
Cyber Resiliency Support Team (CRST) (Operating Location 1 - Wright Patterson Air Force Base)																												
Cyber Resiliency Support Team (CRST) (Operating Location 2,3,4 - TBD)																												
Initial Cyber Awareness Training development, fielding and instruction																												
Continue to mature cyber training to include new course development/fielding/instruction, establish Air Force cyber course curriculum, and initiate cross-service training sharing and standardization																												
Recruit/retain cyber security professionals																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642810 / *Cyber Workforce Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Cyber Workforce Development				
Cyber Resiliency Support Team (CRST) (Operating Location 1 - Wright Patterson Air Force Base)	2	2018	4	2023
Cyber Resiliency Support Team (CRST) (Operating Location 2,3,4 - TBD)	1	2019	4	2023
Initial Cyber Awareness Training development, fielding and instruction	2	2018	4	2023
Continue to mature cyber training to include new course development/fielding/ instruction, establish Air Force cyber course curriculum, and initiate cross-service training sharing and standardization	1	2019	4	2023
Recruit/retain cyber security professionals	2	2018	4	2023

Note

This project is a new start in FY 2018.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642812 / *System Security Engineering*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642812: *System Security Engineering*	-	0.000	7.663	13.059	0.000	13.059	17.001	14.589	16.976	17.285	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The System Security Engineering project prototypes, evaluates, and transitions cyber secure and resilient risk-informed processes, tools, products, and policies into all phases and activities of the acquisition life cycle and sustainment processes used to acquire and maintain weapon systems. This activity bolsters Air Force cyber resiliency and cyber security by developing a common security environment, system security engineering processes and policies, acceptance criteria used when acquiring weapon systems, contracting language, and intelligence collection skills and processes to provide intelligence on cyber threats to the weapons system user and acquisition community.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Prototype, Evaluate, and Transition System Security Engineering	-	7.663	13.059
Description: Prototypes, evaluates, and transitions cyber security and resiliency activities into policy, processes, products, and people. ***FY 2018 Plans:*** Prototype a common cyber security environment for sharing of cyber information related to weapon systems across the Air Force. Prototype improvements in intelligence collection skills and processes to identify cyber threats to weapon systems. Prototype products, tools, policy, and processes to integrate cyber security and resiliency in all phases and activities of the acquisition life cycle and sustainment of weapon systems. ***FY 2019 Plans:*** Continue prototyping a common cyber security environment for sharing of cyber information across Air Force weapon systems. Continue to refine and execute intelligence collection/analysis to identify cyber threats. Deliver product prototypes, tools, policy and processes to integrate cyber resiliency/security in all phases and activities of weapon system acquisition. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $5.396 million. Justification for this increase is due to an Air Force emphasis on weapon system cyber resiliency across this program.			
Accomplishments/Planned Programs Subtotals	-	7.663	13.059

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642812 / *System Security Engineering*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures, whichever is most appropriate.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642812 / *System Security Engineering*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Common cyber security enviroment	Various	LCMC : TBD	-	-		2.600	Feb 2018	3.057	Oct 2018	-		3.057	Continuing	Continuing	-
Products, policy, and processes in the acqusition life cycle and sustainment process	Various	LCMC : TBD	-	-		3.963	Feb 2018	7.802	Oct 2018	-		7.802	Continuing	Continuing	-
Intel collection skills to identify cyber threats to weapon systems	Various	LCMC : TBD	-	-		1.100	Feb 2018	2.200	Oct 2018	-		2.200	Continuing	Continuing	-
		Subtotal	-	-		7.663		13.059		-		13.059	Continuing	Continuing	N/A

Remarks

This project is a new start in FY 2018.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		7.663		13.059		-		13.059	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642812 / *System Security Engineering*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
System Security Engineering																												
1. Prototype and deliver common cyber security environment at selected locations #1-3																												
2. Design and deliver common cyber security environment at remaining locations																												
3. Prototype, evaluate, and transition cyber security design requirements																												
4. Prototype, evaluate, and transition cyber security contractual language requirements																												
5. Repeat steps 3 and 4 every 2 years to stay current with rapidly evolving threat advances																												
6. Improve quality and timeliness of intelligence collection process for collection of cyber threats to weapon systems																												
7. Provide intelligence collection supporting CRWS activities, program offices, and user community on a continuing basis																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642812 / *System Security Engineering*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
System Security Engineering				
1. Prototype and deliver common cyber security environment at selected locations #1-3	2	2018	4	2018
2. Design and deliver common cyber security environment at remaining locations	2	2018	4	2023
3. Prototype, evaluate, and transition cyber security design requirements	2	2018	4	2022
4. Prototype, evaluate, and transition cyber security contractual language requirements	2	2018	4	2022
5. Repeat steps 3 and 4 every 2 years to stay current with rapidly evolving threat advances	4	2022	4	2023
6. Improve quality and timeliness of intelligence collection process for collection of cyber threats to weapon systems	2	2018	4	2022
7. Provide intelligence collection supporting CRWS activities, program offices, and user community on a continuing basis	2	2018	4	2023

Note

This project is a new start in FY 2018.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642816 / *Agile/Adaptable Standards*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642816: *Agile/Adaptable Standards*	-	0.000	5.467	4.992	0.000	4.992	4.996	16.905	18.319	18.653	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Agile/Adaptable Standards project prototypes, evaluates, and transitions open mission standards for use in weapon systems to address gaps created by not having a government reference architecture (GRA) for avionics systems and position, navigation, and timing (PNT) systems. The policies, processes, and products will be prototyped, evaluated, and transitioned to allow for designers to build agile and adaptable cyber secure/resilient systems, subsystems, and support systems. In addition, concepts in improving workforce skills, knowledge, and expertise will be prototyped, evaluated, and transitioned to enable the efficient and effective institutionalization of resultant GRAs into all phases and activities of the acquisition life cycle and sustainment of weapon systems. Systems designed with GRA will facilitate responsive updates to new and evolving threats.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Agile and Adaptable Standards	-	5.467	4.992
Description: Develop, prototype, evaluate, and transition agile and adaptable system standards for integration into Air Force weapon systems. ***FY 2018 Plans:*** Prototype open system architecture components for use in advanced avionics systems and position, navigation, and timing (PNT) systems. Prototype techniques to increase cyber security/resiliency acquisition skills, knowledge, and expertise needed for the workforce to facilitate the institutionalizing of government reference architectures enabling adaptive and agile designs for weapons systems. ***FY 2019 Plans:*** Continue prototyping open system architecture components for use in advanced avionics systems and PNT systems. Prototype techniques and methodologies to increase cyber security features of GRAs and open standards. Prototype the use of alternative navigation techniques and software defined receivers. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $0.475 million. Justification for this decrease is provided in the FY 2019 plans above.			
Accomplishments/Planned Programs Subtotals	-	5.467	4.992

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642816 / *Agile/Adaptable Standards*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures, whichever is most appropriate.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642816 / *Agile/Adaptable Standards*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prototype open system architecture components	C/Various	AFLCMC : NV	-	0.000		5.467	Feb 2018	4.992	Oct 2018	-		4.992	Continuing	Continuing	-
		Subtotal	-	0.000		5.467		4.992		-		4.992	Continuing	Continuing	N/A

Remarks

This project is a new start in FY 2018.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		5.467		4.992		-		4.992	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642816 / *Agile/Adaptable Standards*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Agile/Adaptable Standards																												
Develop and update open systems architecture processes																												
Prototype open system architecture components																												
Prototype and update open standards																												
Conduct open systems architecture pathfinders																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642816 / *Agile/Adaptable Standards*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Agile/Adaptable Standards				
Develop and update open systems architecture processes	2	2018	1	2022
Prototype open system architecture components	2	2018	1	2019
Prototype and update open standards	2	2018	3	2022
Conduct open systems architecture pathfinders	2	2018	4	2023

Note

This project is a new start in FY 2018.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642834 / *Mission Assurance for Fielded Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642834: *Mission Assurance for Fielded Systems*	-	0.000	3.245	20.925	0.000	20.925	12.419	16.353	19.129	19.478	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Mission Assurance for Fielded Systems project identifies and verifies weapon system cyber susceptibilities/vulnerabilities and determines the risk to the user, platform, and enterprise by correlating cross-platform impacts and risk to the mission. This effort also identifies mitigations to high risk cyber vulnerabilities and recommends a transition path on the fielded weapon systems, subsystems, and support systems. Activities in this project include: 1) the investigation and identification of changes to Tactics, Techniques, and Procedures (TTPs) and 2) the investigation and prototyping of engineering solutions not effectively mitigated by TTPs to transfer to the program offices for development on their weapon systems, subsystems, and support systems. This project addresses the gap between the cyber security/resiliency that has been accomplished on traditional internet protocol (IP)-based Information Technology (IT) for the Department of Defense Information Network (DODIN) and lack of focused effort of cyber security/resiliency on non-DODIN IT plus non-IP based technologies typically found on fielded weapon systems, subsystems, and support systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Cyber Susceptibility/Vulnerability Evaluations and Mitigation Prototyping	-	3.245	20.925
Description: Evaluate weapon systems and previous cyber security assessments to identify, validate, and prioritize cyber vulnerabilities and susceptibilities. Partner with system owner and acquisition program office to develop common mitigation prototype solutions.			
FY 2018 Plans: Evaluate fielded weapon systems, subsystems, and support systems for cyber susceptibilities and vulnerabilities. Prototype mitigations for cyber vulnerabilities on fielded weapon systems, subsystems and support systems in realistic, high fidelity environments.			
FY 2019 Plans: Continue assessment of fielded weapon systems, subsystems, and support systems for cyber susceptibilities and vulnerabilities (including assessments of fielded weapon systems' hardware assurance, software assurance, and supply chain risk management postures). Continue prototyping mitigations for cyber vulnerabilities on fielded weapon systems, subsystems and support systems in realistic, high fidelity environments. Initiate identification of common cyber vulnerabilities on fielded weapons systems and partner with the system owner and acquisition program office to prototype common mitigation prototypes.			
FY 2018 to FY 2019 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642834 / *Mission Assurance for Fielded Systems*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2019 increase compared to FY 2018 by $17.680 million. Justification due to an Air Force emphasis on weapon system cyber resiliency across this program.			
Accomplishments/Planned Programs Subtotals	-	3.245	20.925

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642834 / *Mission Assurance for Fielded Systems*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Evaluate weapon systems for cyber vulnerabilities	Various	AFLCMC : NV	-	0.000		1.509	Feb 2018	5.925	Oct 2018	-		5.925	Continuing	Continuing	-
Prototype cyber vulnerability mitigations	Various	AFLCMC : NV	-	0.000		1.736	Feb 2018	15.000	Oct 2018	-		15.000	Continuing	Continuing	-
		Subtotal	-	0.000		3.245		20.925		-		20.925	Continuing	Continuing	N/A

Remarks

This project is a new start in FY 2018.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		3.245		20.925		-		20.925	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642834 / *Mission Assurance for Fielded Systems*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642834 / *Mission Assurance for Fielded Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Mission Assurance for Fielded Systems				
Prototype cyber mitigations on known cyber vulnerabilities	2	2018	2	2020
Identify transition plan for tested mitigations to known cyber vulnerabilities	1	2020	3	2020
Perform cyber assessment of weapon systems, subsystems, and support systems	2	2018	4	2023
Verify and determine risk of cyber vulnerabilities found during weapon system assessments	3	2018	4	2023
Prototype cyber mitigations on high risk cyber vulnerabilities found during weapon system assessments	2	2019	4	2023
Identify transition plan for tested mitigations to cyber vulnerabilities found during weapons system assessments	3	2021	4	2023

Note

Additional schedule details can be provided in the appropriate forum. This project is a new start in FY 2018.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	Project (Number/Name) 642836 / *Mission Thread Analysis*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
642836: *Mission Thread Analysis*	-	0.000	5.417	6.180	0.000	6.180	6.838	6.909	7.585	7.722	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Cyber Mission Thread Analysis (CMTA) project establishes an analytical approach for prioritizing where the Air Force should perform detailed cyber investigations based on potential mission impact. The results generated by the analytical approach will provide a system-of-systems mission context for prioritizing cyber vulnerability assessments and risk mitigation strategies and tactics, within programs and across the Air Force enterprise to improve mission assurance and effectiveness in a cyber-contested environment. Activities include investigating existing methodologies, prototyping an analytical process, prototyping software support tools, and building upon that to institutionalize CMTA in our acquisition processes. These activities will provide a common, repeatable, mission level cyber analytical methodology. Each CMTA will identify the functions performed, participating systems, and top level interactions among all relevant participants from the user's point of view. By understanding operational intent, mission dependencies, and the cyber risk landscape, operational and technology experts from various disciplines including acquisition, development, operational support, and sustainment can make objective statements about mission impact and task outcomes, as well as assess potential mitigations.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Cyber Mission Thread Analysis	0.000	5.417	6.180
Description: Prototypes, evaluates, and transitions methodologies, tools, and equipment in support of cyber threat for mission threads analyses. ***FY 2018 Plans:*** Prototype CMTA methodology, analytical/visualization tools, and data repository. Evaluate Air Refueling and Global Strike mission threads to: 1) validate the methodology and tools; and 2) support program offices' cyber evaluations. Identify next priority missions for analysis. ***FY 2019 Plans:*** Initiate CMTAs on missions prioritized in FY 2018 to support program offices and to improve tools and data sharing. Evaluate the effectiveness of the methodology, tools and repository, and update as required. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $0.763 million. Justification for this increase is described in the FY 2019 plans above.			
Accomplishments/Planned Programs Subtotals	0.000	5.417	6.180

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642836 / *Mission Thread Analysis*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

When possible, activities in this effort will leverage current competitively-awarded contracts. Additional necessary contracts funded in this program element will be awarded using either competitive or sole source procedures, whichever is most appropriate.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	Project (Number/Name) 642836 / *Mission Thread Analysis*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prototype cyber threat and functional mission thread analysis methodologies, techniques, and tools	Various	AFLCMC : NV	-	0.000		2.417	Feb 2018	3.180	Oct 2018	-		3.180	Continuing	Continuing	-
Evaluate cyber threat for Air Refueling Mission Thread	Various	AFLCMC : NV	-	0.000		1.500	Feb 2018	1.500	Oct 2018	-		1.500	Continuing	Continuing	-
Evaluate cyber threats for Global Strike Mission Thread	Various	AFLCMC : NV	-	0.000		1.500	Feb 2018	1.500	Oct 2018	-		1.500	Continuing	Continuing	-
		Subtotal	-	0.000		5.417		6.180		-		6.180	Continuing	Continuing	N/A

Remarks

This project is a new start in FY 2018.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		5.417		6.180		-		6.180	Continuing	Continuing	N/A

Remarks

This project is a new start in FY 2018.

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642836 / *Mission Thread Analysis*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604414F / *Cyber Resiliency of Weapon Systems-ACS*	**Project (Number/Name)** 642836 / *Mission Thread Analysis*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Mission Thread Analysis				
Prototype cyber threat to mission thread analysis methodologies, techniques, tools and equipment	2	2018	2	2020
Prioritize and conduct cyber mission thread analyses	2	2018	1	2021
Institutionalize cyber mission thread analysis into policies and processes	3	2020	3	2021
Establish cyber tool set and update libraries	2	2018	4	2023

Note

This project is a new start in FY 2018.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604422F / *Weather System Follow-on*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	82.506	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
644289: *Weather Satellite Follow-On*	-	82.506	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0604422F, Weather System Follow-on efforts were transferred to PE 1206422F, Weather System Follow-on, due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206422F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	118.953	0.000	0.000	0.000	0.000
Current President's Budget	82.506	0.000	0.000	0.000	0.000
Total Adjustments	-36.447	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-30.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-3.111	0.000			
• SBIR/STTR Transfer	-3.336	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604425F / *Space Situation Awareness Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	9.901	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
640290: *Deep Space Advanced Radar Concept*	-	9.901	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0604425F, BA04, Space Situational Awareness Systems efforts were transferred to PE 1206425F, BA04 Space Situational Awareness Systems due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206425F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	10.901	0.000	0.000	0.000	0.000
Current President's Budget	9.901	0.000	0.000	0.000	0.000
Total Adjustments	-1.000	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-1.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	25.890	26.222	28.350	0.000	28.350	28.937	29.439	30.051	30.597	Continuing	Continuing
640211: *GLOBAL ACCESS*	-	7.538	7.318	12.184	0.000	12.184	7.493	7.644	7.804	7.945	Continuing	Continuing
640212: *C2/OPTIMIZATION/ MODELING AND SIMULATION*	-	14.634	16.945	12.763	0.000	12.763	16.086	16.356	16.695	16.999	Continuing	Continuing
640213: *CYBER*	-	3.718	1.959	3.403	0.000	3.403	5.358	5.439	5.552	5.653	Continuing	Continuing

Note

This program, BA 4, PE 0604776F, project 640211, Advanced Planning for Global Response Force Mission, is a new start.
This program, BA 4, PE 0604776F, project 640211, Autonomous Drone Delivery from Airdrop Systems, is a new start.
This program, BA 4, PE 0604776F, project 640211, Optimized HALO Delivery using Probablistic Airdrop Planner, is a new start.
This program, BA 4, PE 0604776F, project 640212, Infrastructure Information Confidence Model, is a new start.
This program, BA 4, PE 0604776F, project 640212, Synchronizing Mobility Allocations and Resources for Transportation, is a new start.
This program, BA 4, PE 0604776F, project 640213, Operationally Transparent Cyber, is a new start.

This program, BA 04 PE 0604776F, project 640211, Hybrid Airship, is a new start.

This program, BA 04 PE 0604776F, project 640212, Modeling & Simulation Innovation, is a new start.

This program, BA 04 PE 0604776F, project 640212, Modeling Dynamics of Modular Causeways to Improve Debarkation Sites, is a new start.
This program, BA 04 PE 0604776F, project 640212, Web Based Seaport Explosive Safety Planning, is a new start.

These projects received approval and were moved to FY17. It was not known at time to update R documents.

This program, BA 04 PE 0604776F, project 640211, Mini Robotic Dredge, is a new start.
This program, BA 04 PE 0604776F, project 640212, Full Spectrum Mission Assurance, is a new start.

A. Mission Description and Budget Item Justification

This program provides for the development, integration, demonstration and detailed assessment of capabilities which improve deployment, distribution and supply chain decision-making/collaboration (e.g., planning stage to real-time execution/retrograde operations) without need for highly specialized operators. Projects in this area

address the following: decision support tools, distribution process simulations/analytics, distribution demand forecasting/execution monitoring, automated decision-maker support (e.g., queuing, alerting, courses of action), automated status monitoring with information fusion to include drilldown capability, and resilient Command & Control (C2) infrastructure capabilities. Current planning, forecasting, and collaboration capabilities do not permit full synchronization of people, processes and assets to execute planned operations. Automated tools must be able to dynamically analyze/predict demand and provide input to advanced distribution planning systems to include the capability for Combatant Commanders to manage theater transportation operations from the port of debarkation to the point of need. Transportation information exchange across the DOD is inhibited by disparate systems, multiple data standards and insufficient interfaces. The ability to rapidly determine the impact of any delays/ changes and conduct "what-if" impact assessments on the closure of force packages is required. This project addresses the required mission support to combatant commanders and other customers in the area of C2, Optimization, and Modeling and Simulations.

Efforts necessary to evaluate integrated technologies in as realistic an operating environment as possible to assess the performance or cost reduction of advanced technology.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	25.890	26.222	28.563	0.000	28.563
Current President's Budget	25.890	26.222	28.350	0.000	28.350
Total Adjustments	0.000	0.000	-0.213	0.000	-0.213
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.213	0.000	-0.213

Change Summary Explanation

In FY 2017, PE 0603713S (BA3) Deployment and Distribution Enterprise Technology (DDET) and PE 0603264S (BA3) Agile Transportation for the 21st Century Theater were transferred to a single PE in the Air Force budget (PE0604776F, (BA4) Deployment and Distribution Enterprise (DDE))in order to support auditability, increase management efficiency, and reduce administrative actions.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640211 / *GLOBAL ACCESS*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
640211: *GLOBAL ACCESS*	-	7.538	7.318	12.184	0.000	12.184	7.493	7.644	7.804	7.945	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 4, PE 0604776F, project 640211, Advanced Planning for Global Response Force Mission, is a new start.
This program, BA 4, PE 0604776F, project 640211, Autonomous Drone Delivery from Airdrop Systems, is a new start.
This program, BA 4, PE 0604776F, project 640211, Optimized HALO Delivery using Probablistic Airdrop Planner, is a new start.

In FY 2017, PE 0603713S (BA3) Deployment and Distribution Enterprise Technology (DDET) and PE 0603264S (BA3) Agile Transportation for the 21st Century Theater were transferred to a single PE in the Air Force budget (PE0604776F, (BA4) Deployment and Distribution Enterprise (DDE))in order to support auditability, increase management efficiency, and reduce administrative actions.

A. Mission Description and Budget Item Justification

This program provides for the development, integration, demonstration and detailed assessment of DOD procedures/technologies targeted at optimizing throughput at the nodes as well as across the conduits of the deployment and distribution supply chains, from origin to point of use as well as return. Needed capabilities include inventory/cargo management, materiel handling innovations, improved physical node access, port throughput improvements, innovative delivery methods (e.g., precision airlift, autonomous re-supply), and cargo/container security. This project addresses required mission support to combatant commanders and other customers of DOD's distribution and transportation systems in the area of deployment/distribution velocity management, manned/unmanned systems to the point of effect, and increased global reach in austere/anti-access environments.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Preamble Initial Look Leading to Accelerated Results	1.600	0.000	0.000	-	0.000
Description: Develop capability to support a deployed engineering assessment team in the expedient recon and load-capacity determination of offload structures and plan/design required repairs. ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** N/A					
Title: Port Improvement via Exigent Repair (PIER) JCTD	2.580	1.653	2.255	-	2.255

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640211 / *GLOBAL ACCESS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Develop robust capability to rapidly restore damaged pier to a minimal militarily-capable to support reception, power projection & sustainment operations. ***FY 2018 Plans:*** TRL 5-7: AT&L endorsed, Congressionally approved BA3 Joint Capability Technology Demonstration (JCTD) to rapidly restore damaged pier to a minimal militarily-capable to support reception, power projection & sustainment operations. ***FY 2019 Base Plans:*** TRL 6-7: Mooring, fendering and fuel discharge: Will address expedient repair to mooring and fender systems with an emphasis on assuring structural integrity ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Development costs vary from year to year based on schedule					
Title: Autonomous Aerial Insertion and Resupply into Dense Urban Complex Terrain (AAIRDUCT) Joint Capabilities Technology Demonstration (JCTD) ***Description:*** Enhance capability of a guided airdrop system to navigate in contested/denied environments where Global Positioning System data is either suspect or unavailable. ***FY 2018 Plans:*** TRL 5: U.S. Army (Natick) led effort to prototype technologies to enable accurate delivery of airdropped supplies in a Global positioning System (GPS) denied environment. ***FY 2019 Base Plans:*** TRL 5: U.S. Army (Natick) led effort to prototype technologies to enable accurate delivery of airdropped supplies in a Global positioning System (GPS) denied environment. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Development costs vary from year to year based on project schedule.	-	1.500	1.950	-	1.950
Title: Enhanced Vision Navigation for Joint Precision Airdrop System (Supports FY17 AAIRDUCT JCTD) ***Description:*** Advanced technologies to improve airdrop capabilities to the warfighter. ***FY 2018 Plans:***	1.613	1.145	0.500	-	0.500

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640211 / *GLOBAL ACCESS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
TRL 5: U.S. Army (Natick) led effort to prototype technologies to enable accurate delivery of airdropped supplies in a Global positioning System (GPS) denied environment. ***FY 2019 Base Plans:*** TRL 6: Support for transition ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Project completing development in FY18 and FY19					
Title: Expeditionary End-to-End Fueling Concept ***Description:*** Addressing gap in theater fuel delivery/distribution capabilities to inform the development of the Army Early Entry Fluid Distribution System as well as provide a development path for Navy/USMC ship-to-shore capabilities. ***FY 2018 Plans:*** TRL 5/6: Prototyping modular pumping system to enhance over-the-shore and inland petroleum discharge capability. ***FY 2019 Base Plans:*** TRL 6: Proof of concept prototype system including a field expedient planning tool and networked control capability. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Development schedule has major development efforts in FY19.	0.400	1.350	2.500	-	2.500
Title: Dropsonde Optimization ***Description:*** Mobility assets lack drop zone situational awareness, pre-drop confirmation of clear/safe drop zone, capability of post-drop assessment, and autonomous/passive bundle geo-location. ***FY 2018 Plans:*** TRL 4-7: Provide a single pass solution based on wind/weather impact from information gained at an optimized/planned drop zone. ***FY 2019 Base Plans:*** TRL 4-7: Interface designs and algorithm coding completed ***FY 2018 to FY 2019 Increase/Decrease Statement:***	0.655	0.000	0.469	-	0.469

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640211 / *GLOBAL ACCESS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Very little increase in FY19.					
Title: Advanced Planning for Global Response Force Mission ***Description:*** Create and leverage analytical and visual tools to provide planners the ability to streamline GRF missions, integrating aircraft load planning with sophisticated airdrop mission simulations. ***FY 2019 Base Plans:*** Development of prototype planning software. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY19 New Start	-	-	0.700	-	0.700
Title: Autonomous Drone Delivery from Airdrop Systems ***Description:*** An air-droppable Unmanned Aircraft System (UAS) to conduct resupply missions in densely populated urban areas. ***FY 2019 Base Plans:*** Drone hardware development and integration. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY19 New start	-	-	0.610	-	0.610
Title: Precision On-Demand Aerial Resupply (Supports FY17 AAIRDUCT JCTD) ***Description:*** Develop a precision on-demand Aerial Resupply capability to provide small units in remote/austere locations the ability to request and track aerial resupply missions in real-time. ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** N/A	0.450	0.000	0.000	-	0.000
Title: Hybrid Airship ***Description:*** Study serves as a risk reducing, stepping stone to a class of air vehicles with energy use per ton-mile approximating the efficiency achieved by overland commercial trucking on improved highway systems.	0.000	0.200	0.200	-	0.200

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640211 / *GLOBAL ACCESS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: TRL 4: Explore future Airship development and mitigate long-term technical risk for future heavy lift airships. ***FY 2019 Base Plans:*** TRL 4: Explore future Airship development and mitigate long-term technical risk for future heavy lift airships.					
Title: Mini Robotic Dredge ***Description:*** Prototype a tactical dredging capability to deepen an usable port facility ***FY 2018 Plans:*** TRL 5/6: Ability to clear a shipping lane/berthing area to allow for pier side unloading operations. ***FY 2019 Base Plans:*** TRL 5-6: Evaluate various cutter heads to determine those suitable for the various types of sediments ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Development costs vary from year to year based on project schedule.	0.240	0.470	1.200	-	1.200
Title: Optimized HALO Delivery using Probablistic Airdrop Planner ***Description:*** A low-cost, low-complexity solution to deliver payloads at improved accuracy, compared to standard ballistic parachutes, but without the expensive parafoil and guidance systems ***FY 2019 Base Plans:*** Develop planner to help optimize airdrop accuarcy ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 19 New start	-	-	0.700	-	0.700
Title: Expedient and Expeditionary Airfield Damage Repair ***Description:*** Provide a truly expeditionary, indigenous-material based repair capability to support high pace, aircraft sortie generation, recovery and egress ***FY 2018 Plans:*** Tools to inform runway repair ***FY 2019 Base Plans:***	-	0.500	0.600	-	0.600

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640211 / *GLOBAL ACCESS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Demonstrate the ability to rapidly assess airfield damage ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Slight increase as project development increases					
Title: Unmanned Logistics System - Air ***Description:*** Provides the warfighter with an assured/organic resupply capability to sustain maneuver units ***FY 2018 Plans:*** Competitive assessment of varying UAS capabilities ***FY 2019 Base Plans:*** Capabilities to support last tactical mile distribution	-	0.500	0.500	-	0.500
Accomplishments/Planned Programs Subtotals	7.538	7.318	12.184	-	12.184

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Requirements for joint deployment and distribution enterprise technology enhancements are annually identified, validated and prioritized by the Joint Deployment & Distribution Enterprise (JDDE) community. Pursuit of the development of new capabilities to meet these requirements is managed by the United States Transportation Command (USTRANSCOM). Prototype products, once evaluated by the users, are spirally transitioned by the operational community.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640211 / *GLOBAL ACCESS*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Logistics Support	Various	Various : Belleville, IL	-	7.538	Nov 2016	7.318	Nov 2017	12.184	Nov 2018	-		12.184	Continuing	Continuing	-
		Subtotal	-	7.538		7.318		12.184		-		12.184	Continuing	Continuing	N/A

Remarks

Funds will be realigned within the PE.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	7.538		7.318		12.184		-		12.184	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640211 / *GLOBAL ACCESS*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
No project title.																												
Integrated Logistics Support																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640211 / *GLOBAL ACCESS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
No project title.				
Integrated Logistics Support	1	2017	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
640212: *C2/OPTIMIZATION/ MODELING AND SIMULATION*	-	14.634	16.945	12.763	0.000	12.763	16.086	16.356	16.695	16.999	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 4, PE 0604776F, project 640212, Infrastructure Information Confidence Model, is a new start.
This program, BA 4, PE 0604776F, project 640212, Synchronizing Mobility Allocations and Resources for Transportation, is a new start.

In FY 2017, PE 0603713S (BA3) Deployment and Distribution Enterprise Technology (DDET) and PE 0603264S (BA3) Agile Transportation for the 21st Century Theater were transferred to a single PE in the Air Force budget (PE0604776F, (BA4) Deployment and Distribution Enterprise (DDE))in order to support auditability, increase management efficiency, and reduce administrative actions.

A. Mission Description and Budget Item Justification

This program provides for the development, integration, demonstration and detailed assessment of capabilities which improve deployment, distribution and supply chain decision-making/collaboration (e.g., planning stage to real-time execution/retrograde operations) without need for highly specialized operators. Projects in this area address the following: decision support tools, distribution process simulations/analytics, distribution demand forecasting/execution monitoring, automated decision-maker support (e.g., queuing, alerting, courses of action), automated status monitoring with information fusion to include drilldown capability, and resilient Command & Control (C2) infrastructure capabilities. Current planning, forecasting, and collaboration capabilities do not permit full synchronization of people, processes and assets to execute planned operations. Automated tools must be able to dynamically analyze/predict demand and provide input to advanced distribution planning systems to include the capability for Combatant Commanders to manage theater transportation operations from the port of debarkation to the point of need. Transportation information exchange across the DOD is inhibited by disparate systems, multiple data standards and insufficient interfaces. The ability to rapidly determine the impact of any delays/ changes and conduct "what-if" impact assessments on the closure of force packages is required. This project addresses the required mission support to combatant commanders and other customers in the area of C2, Optimization, and Modeling and Simulations.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: TRANSCOM Innovation Unit Experimental	-	6.887	1.342	-	1.342
Description: Rapidly develop and integrate technology solutions for the enterprise					
FY 2018 Plans: TRL 4-7: Identify challenges and garner/develop solutions to address those challenges					
FY 2019 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
TRL 4-7: Identify challenges and garner/develop solutions to address those challenges ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Slight increase in FY18 due to shifting of projects					
Title: Analytics Driven Command Decision Support ***Description:*** Developing the capability that improves organizational decision making by providing a holistic methodology that capitalizes on relevant information, captures accurate data, and leverages best practice tools and decision-making processes. ***FY 2018 Plans:*** TRL 5-7: Operational prototype of analytic tool & user manual to enable analytics drive command decision support ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Project ends	0.550	0.450	-	-	-
Title: Data Lake ***Description:*** Develop and demonstrate the capability that allows incongruent data to be brought together to provide automated decision support. ***FY 2018 Plans:*** TRL 4-7: Researching application and prototyping this technology as it relates to the Joint Deployment and Distribution enterprise. ***FY 2019 Base Plans:*** TRL 5-6: Refined reference architecture for a data lake environment targeting performance, usability and data integration ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Development costs vary year to year per project schedule.	0.600	0.700	0.800	-	0.800
Title: End-to-End Deployment and Distribution Modeling ***Description:*** Provide an integrated deployment/distribution environment to provide continuous and optimal balancing of total demand verse capacity from planning through mission execution.	3.684	1.963	2.515	-	2.515

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: TRL 4-6: Assessment of various algorithmic optimization approaches to provide a complete view of the end-to-end mobility system, air refueling (AR) tankers need to be integrated with USTRANSCOM's analytical tool suite for programmatic studies and analysis. ***FY 2019 Base Plans:*** TRL 5-6: Enable users to fully exploit technologies more rapidly and improve analytics ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Development costs vary year to year per schedule.					
Title: Global Mission Scheduling ***Description:*** Development effort to optimize air movement requirements against resources and movement requirements. ***FY 2018 Plans:*** TRL 5-7: Complete engineering prototype ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Project ends.	1.940	0.535	-	-	-
Title: Map Based Planning Services ***Description:*** Enable planners, via a collaborative geospatially enabled environment, to conduct deliberate course of action planning to include force flow feasibility concurrent with plan development. ***FY 2018 Plans:*** TRL 4-6: Prototype globally accessible enclave and explore how data with a geospatial element can be visualized in a geo-temporal context to enhance Combatant Command planning. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Project Ends.	1.500	1.500	-	-	-
Title: Massachusetts Institute of Technology Lincoln Labs	2.520	1.444	1.993	-	1.993

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Partnership with MIT-LL to research efforts to improve enterprise operational architecture supporting high-end analytics, integrated information technology/data structures, understanding of cloud capabilities and multi-level cyber security defense. ***FY 2018 Plans:*** TRL 4-6: Multi-faceted effort prototyping, via Lincoln Secure Enclave Lab, numerous technologies to enhance operational analytics; data integration, mining, & forensic analytics, etc. ***FY 2019 Base Plans:*** TRL 6: Improved basis for network optimization and network design. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Development costs vary based on project schedule.					
Title: Modeling & Simulation Innovation ***Description:*** Select student research/faculty-assisted projects (e.g., Joint Transportation Asset Scheduling Kit, Next Generation Cargo Capability, Applying Post Modern Portfolio Theory to Mitigate Risk in International Shipping, Optimal CH-47/C-130 Workload Balance, Remotely Piloted Aircraft Performing Airdrop Mission). ***FY 2018 Plans:*** TRL 4-6: Collaborative partnership with Air Force Institute of Technology for graduate research addressing Joint Deployment and Distribution challenges. ***FY 2019 Base Plans:*** TRL 4-6: Collaborative partnership with Air Force Institute of Technology for graduate research addressing Joint Deployment and Distribution challenges. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Shift of funding between FY's due to project schedule changes	0.080	0.045	0.125	-	0.125
Title: Support Planning for Air Refueling Tasking and Allocation ***Description:*** Provide collaborative decision aid to enable planners to the optimize use of the worldwide Active Duty, Air National Guard and Air Force Reserve Air Refueling fleets while maintaining or increasing operational effectiveness, agility and capacity. ***FY 2018 Plans:***	1.288	0.162	-	-	-

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
TRL 4-7: Prototype the capability for air refueling planners an integrated human-in-the-loop and machine based cooperative system to optimizing global air refueling operations. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Project Ends.					
Title: Strategies for Enterprise Metadata Management ***Description:*** Comprehensive account of strategies, optional implementations and recommendations for enterprise-wide management of metadata. ***FY 2018 Plans:*** TRL 4-7: Collect, populate and prototype metadata tools and applications. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Project Ends.	1.125	0.375	-	-	-
Title: Technology Transfer ***Description:*** U. S. Transportation Command uses Technology Transfer mechanisms of the Federal Laboratories to facilitate voluntary collaboration by experts from government, industry, and academia, revealing the costs and benefits of innovations, to understand the feasibility of future capabilities. ***FY 2018 Plans:*** TRL 4 - 6: Continue to actively promote and broker Cooperative Research and Development Agreements (CRADAs) between DOD labs and industry for development of technology with both commercial and military applications. This activity will particularly focus on non-traditional defense contractors and is intended to help lower the expense of new defense-related technology development through cost-sharing with industry and to help DOD benefit from private-sector technology investments and innovations. Continue to actively market DOD-developed technologies to U.S. companies and establish Patent License Agreements to commercialize these technologies for both civilian and military. ***FY 2019 Base Plans:*** TRL 4 - 6: Continue to actively promote and broker Cooperative Research and Development Agreements (CRADAs) between DOD labs and industry for development of technology with both commercial and military applications. This activity will particularly focus on non-traditional defense contractors and is intended to help lower the expense of new defense-related technology development through cost-sharing with industry and to	0.293	0.130	0.290	-	0.290

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
help DOD benefit from private-sector technology investments and innovations. Continue to actively market DOD-developed technologies to U.S. companies and establish Patent License Agreements to commercialize these technologies for both civilian and military. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increased labor costs.					
Title: Infrastructure Information Confidence Model ***Description:*** Inform decision makers of the quality of primary and alternate data sources they are using to make decisions ***FY 2019 Base Plans:*** Information collaboration process that analyzes and provides a confidence assessment of structured and unstructured data ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY19 New Start	-	-	0.900	-	0.900
Title: Program Execution ***Description:*** Provide technical assistance and program management support to the USTRANSCOM RDT&E Program. ***FY 2018 Plans:*** TRL 4-6: Program support to explore technology solutions to capability gaps identified through Joint Concept Development documents, the Joint Capabilities Integration and Development System process, Joint Experimentation, etc to increase the responsiveness, efficiency and effectiveness of the Joint Deployment and Distribution Enterprise. ***FY 2019 Base Plans:*** TRL 4-6: Program support to explore technology solutions to capability gaps identified through Joint Concept Development documents, the Joint capabilities Integration and Development System process, Joint Experimentation, etc, to increase the responsiveness, efficiency and effectiveness of the Joint Deployment and Distribution Enterprise. ***FY 2018 to FY 2019 Increase/Decrease Statement:***	0.904	1.164	1.452	-	1.452

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Labor support. changes.					
Title: Synchronizing Mobility Allocations and Resources for Transportation ***Description:*** Develop prototype software for advanced squadron scheduling, collaboration, and predictive modeling. ***FY 2019 Base Plans:*** Design of the squadron scheduler and visualizations. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY19 New Start	-	-	1.537	-	1.537
Title: Full Spectrum Mission Assurance ***Description:*** All-threats/hazards, collaborative transportation risk management activity to identify unacceptable physical/cyber risks ***FY 2018 Plans:*** TRL 5-7: An operational picture environment fed by standardized, reusable, and shareable data layers of actionable info. ***FY 2019 Base Plans:*** TRL 5-7: An operational picture environment fed by standardized, reusable, and shareable data layers of actionable info. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Development costs increase.	0.150	0.810	0.979	-	0.979
Title: Modeling Dynamics of Modular Causeways to Improve Debarkation Sites ***Description:*** High-fidelity model to provide planners with precise knowledge of Modular Causeway behavior. ***FY 2018 Plans:*** TRL 4-7: Developing the ability to simulate causeway operations in order to enhance joint logistics over-the-shore. ***FY 2019 Base Plans:***	-	0.300	0.350	-	0.350

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
TRL 4-7: Design mockups, Design testing, population of database, demonstration and training ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Development costs increase.					
Title: Web Based Seaport Explosive Safety Planning ***Description:*** Provide seaport planners capability to manage net explosive weight/hazard munitions ***FY 2018 Plans:*** TRL 4-6: Reduce planner port layout from 80 to 5 hours ***FY 2019 Base Plans:*** TRL 4-6: Reduce planner port layout from 80 to 5 hours	-	0.480	0.480	-	0.480
Accomplishments/Planned Programs Subtotals	14.634	16.945	12.763	-	12.763

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Requirements for joint deployment and distribution enterprise technology enhancements are annually identified, validated and prioritized by the Joint Deployment & Distribution Enterprise (JDDE) community. Pursuit of the development of new/improved capabilities to meet these requirements is managed by the United States Transportation Command (USTRANSCOM). Prototype products, once evaluated by the users, are spirally transitioned by the operational community.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Logistics Support	Various	Various : Belleville, IL	-	13.964	Nov 2016	16.088	Nov 2017	12.763	Nov 2018	-		12.763	Continuing	Continuing	-
		Subtotal	-	13.964		16.088		12.763		-		12.763	Continuing	Continuing	N/A

Remarks

Funds will be realigned within PE.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Support PMO	Various	Various : Belleville, IL	-	0.670	Apr 2016	0.857	Apr 2017	-		-		-	Continuing	Continuing	-
		Subtotal	-	0.670		0.857		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	14.634		16.945		12.763		-		12.763	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
No project title.																												
Integrated Logistics Support																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640212 / *C2/OPTIMIZATION/MODELING AND SIMULATION*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
No project title.				
Integrated Logistics Support	1	2017	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640213 / *CYBER*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
640213: *CYBER*	-	3.718	1.959	3.403	0.000	3.403	5.358	5.439	5.552	5.653	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 4, PE 0604776F, project 640213, Operationally Transparent Cyber, is a new start.

In FY 2017, PE 0603713S (BA3) Deployment and Distribution Enterprise Technology (DDET) and PE 0603264S (BA3) Agile Transportation for the 21st Century Theater were transferred to a single PE in the Air Force budget (PE0604776F, (BA4) Deployment and Distribution Enterprise (DDE))in order to support auditability, increase management efficiency, and reduce administrative actions.

A. Mission Description and Budget Item Justification

This program provides for the development, integration, demonstration and detailed assessment of capabilities to ensure USTRANSCOM mission assurance is in a persuasive/dynamic cyber environment. USTRANSCOM requires the procedures/technologies to improve cyber surveillance and control of networks across multiple domains and the ability to continue critical network operations in contested unclassified and classified network environments. The Command also needs the ability to differentiate between valid/unauthorized users and determine/quantify the trustworthiness of hardware/software systems. Additionally USTRANSCOM must have the ability to rapidly analyze & correlate data regarding malicious activities, select/evoke real-time defense actuators, perform automated reasoning capabilities that address data quality issues, and the ability to rapidly return to a known/safe operating state.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Cyber Mission Assurance Capability	0.150	0.000	0.000	0.000	0.000
Description: Interface with existing sensor data to provide input for analyses of mission impact, mission performance, and mission effectiveness so appropriate alerts and courses of action can be developed, disseminated, and coordinated.					
FY 2018 Plans: Project cancelled					
FY 2019 Base Plans: N/A					
FY 2019 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640213 / *CYBER*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A					
Title: Identity and Access Management ***Description:*** Need secure means to credential user access to proper applications & data via single sign approach. ***FY 2018 Plans:*** TRL 4-7: Researching to deliver to the enterprise a set of prototype custom attribute solutions. ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Project ends.	0.300	0.200	0.000	0.000	0.000
Title: Operationalizing Cyber Security ***Description:*** Provide USTRANSCOM Joint Cyber Center (JCC) organizational effectiveness tools to enhance cyber-security operations, plans & processes. ***FY 2018 Plans:*** TRL 4-7: Prototype an advanced cyber-security Command and Control model as well as extend research on non-intrusive data gathering to enhance Joint Cyber Center operations. ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Project ends.	1.319	0.638	0.000	0.000	0.000
Title: Lincoln Labs	1.949	1.121	2.092	0.000	2.092

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640213 / *CYBER*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Partnership with MIT-LL to research efforts to improve enterprise operational architecture supporting high-end analytics, integrated information technology/data structures, understanding of cloud capabilities and multi-level cyber security defense. ***FY 2018 Plans:*** TRL 4-6: Multi-faceted prototyping numerous technologies to enhance cyber. ***FY 2019 Base Plans:*** TRL 4-6: Multi-faceted prototyping numerous technologies to enhance cyber. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Changes in development costs based on project schedule.					
Title: Operationally Transparent Cyber ***Description:*** Rapidly identify, track, and eliminate malicious actor behavior and defend against Advanced Persistent Threats in near real-time ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** Increase activity detection rate ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY19 New Start	0.000	0.000	1.311	0.000	1.311
Accomplishments/Planned Programs Subtotals	3.718	1.959	3.403	0.000	3.403

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640213 / *CYBER*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

Requirements for joint deployment and distribution enterprise technology enhancements are annually identified, validated and prioritized by the Joint Deployment & Distribution Enterprise (JDDE) community. Pursuit of the development of new/improved capabilities to meet these requirements is managed by the United States Transportation Command (USTRANSCOM). Prototype products, once evaluated by the users, are spirally transitioned by the operational community.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640213 / *CYBER*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Logistics Support	Various	Various : Belleville, IL	-	3.718	Nov 2016	1.959	Nov 2017	3.403	Nov 2018	-		3.403	Continuing	Continuing	-
		Subtotal	-	3.718		1.959		3.403		-		3.403	Continuing	Continuing	N/A

Remarks

Funds will be realigned within the PE.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	3.718		1.959		3.403		-		3.403	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640213 / *CYBER*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
No project title.																												
Integrated Logistics Support																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604776F / *Deployment & Distribution Enterprise R&D*	**Project (Number/Name)** 640213 / *CYBER*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
No project title.				
Integrated Logistics Support	1	2017	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604857F / *Operationally Responsive Space*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	17.976	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
64A020: *AF Operational TACSATS*	-	17.976	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0604857F, Operationally Responsive Space efforts were transferred to PE 1204857F, Operationally Responsive Space, due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1204857F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	17.921	0.000	0.000	0.000	0.000
Current President's Budget	17.976	0.000	0.000	0.000	0.000
Total Adjustments	0.055	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-10.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	10.500	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.445	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	378.126	840.650	1,186.075	0.000	1,186.075	923.367	635.288	129.651	128.980	Continuing	Continuing
643608: *Advanced Engine Dev*	-	0.000	0.000	790.355	0.000	790.355	588.442	449.657	0.000	0.000	Continuing	Continuing
645345: *Hypersonics Prototyping*	-	0.000	0.000	258.058	0.000	258.058	201.485	61.537	2.978	0.000	Continuing	Continuing
645350: *Experimentation*	-	90.447	95.613	87.205	0.000	87.205	86.762	86.720	88.522	90.135	Continuing	Continuing
645351: *Prototyping*	-	287.679	745.037	50.457	0.000	50.457	46.678	37.374	38.151	38.845	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Technology Transition Program provides funding to demonstrate, prototype, and experiment with technologies and concepts to enable or accelerate their transition to acquisition programs and/or operational use. The Technology Transition Program addresses the gap between initial technology or concept development and demonstration, and successful acquisition and operational capability implementation. Experimentation explores new concepts and their applications in potential future operating environments within a system-of-systems context. Prototyping enables integration and demonstration of emerging technologies as a bridge between the laboratory and the warfighter. The Technology Transition Program allows acquisition program managers (the capability developers) and warfighters (the capability recipients and end users) to prototype, integrate, and demonstrate candidate technologies and assess them in an operational environment in partnership with Program Executive Officers, schoolhouses, simulation facilities, and development planning organizations.

In addition, this program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

For FY 2019, Project 645351, Prototyping, was split into Project 645351, Prototyping; Project 645345, Hypersonics Prototyping; and Project 643608, Advanced Engine Development to provide increased transparency to Congress on prototyping activities within PE 0604858F, Technology Transition Program.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes, or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	349.304	840.650	877.002	0.000	877.002
Current President's Budget	378.126	840.650	1,186.075	0.000	1,186.075
Total Adjustments	28.822	0.000	309.073	0.000	309.073
• Congressional General Reductions	-0.310	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	38.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	6.800	0.000			
• SBIR/STTR Transfer	-13.668	0.000			
• Other Adjustments	-2.000	0.000	309.073	0.000	309.073

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2017	FY 2018
Project: 645350: *Experimentation*		
Congressional Add: *Program Increase - Alternative Energy Research*	19.290	0.000
Congressional Add: *Program Increase - Counter Electronics High Powered Microwave Advanced Missile*	5.787	0.000
Congressional Add: *Program Increase - Logistics Technologies*	11.574	0.000
Congressional Add Subtotals for Project: 645350	36.651	0.000
Congressional Add Totals for all Projects	36.651	0.000

Change Summary Explanation

Reprogramming increase of $6.8 million in FY 2017 for acceleration of Hypersonics Prototyping effort.

Other adjustment decrease of $2.0 million in FY 2017 because FY 2017 Request for Additional Appropriations (RAA) for Hypersonics Prototyping was not appropriated.

Increase in FY 2019 for Hypersonic Prototyping and Adaptive Engine efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 643608 / *Advanced Engine Dev*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
643608: *Advanced Engine Dev*	-	0.000	0.000	790.355	0.000	790.355	588.442	449.657	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Advanced Engine Development project enables demonstration of advanced turbine engine prototypes. The main effort in this project is the Adaptive Engine Transition Program, which is maturing fuel efficient adaptive engine component technologies and reducing associated risk in preparation for next-generation propulsion system development for multiple combat aircraft applications. Adaptive engine technology enables next generation combat aircraft capabilities by combining the efficiency of high bypass turbofans used by commercial airlines with the performance demanded of military fighter engines. This technology has undergone initial development under the auspices of the Air Force Research Laboratory through the Adaptive Engine Technology and Adaptive Engine Technology Demonstrator programs.

Project 643608, Advanced Engine Development is new for FY 2019. Previous to FY 2019, the entirety of work under this project was reported in Project 645351, Prototyping, under the Adaptive Engine Transition Program effort in PE 0604858F, Tech Transition Program. This is administrative realignment to provide increase transparency to Congress and not a new start.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Adaptive Engine Transition Program	0.000	0.000	790.355	0.000	790.355
Description: The Adaptive Engine Transition Program (AETP) will design and manufacture multiple flight-weight adaptive engine prototypes, complete component rig assessments, characterize materials, and inform manufacturing process improvements. By producing flight-weight prototypes, the program will demonstrate adaptive engine technology can be scaled to meet military fighter engine size requirements, while ensuring appropriate manufacturing- and technology-readiness levels. By performing sea-level, altitude, and durability assessments across multiple power settings, the prototype engines will demonstrate fuel efficiency increases, thrust increases, and new component technologies. These assessments will provide data to quantify the capability and reduce risk in areas such as thermal capacity, reliability, and supportability, among others.					
FY 2018 Plans: For FY 2017 and FY 2018, this work is performed under Project 645351, Prototyping, Adaptive Engine Transition Program effort.					
FY 2019 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 643608 / *Advanced Engine Dev*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue detailed design activities. Continue component rig activities. Continue technology, affordability, and sustainability studies. Begin first engine fabrication. Begin additional airframe integration efforts. More details can be provided in an appropriate forum. ***FY 2019 OCO Plans:*** Not Applicable. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $790.355 million. Justification for this increase is due to moving this effort from Project 645351, Prototyping, to Project 643608, Advanced Engine Development.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	790.355	0.000	790.355

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

In FY 2017 and FY 2018, the work for Advanced Engine Development was performed under Project 645351, Prototyping.

D. Acquisition Strategy

For Adaptive Engine Transition Program, the Air Force has awarded two limited source, cost plus incentive fee contracts to General Electric and Pratt & Whitney due to their unique qualifications to design a high performance, flight-weight adaptive turbine engine in the thrust class for AETP. Incentive categories include engine weight, performance factors, and maintainability and supportability, with specific metrics for each area incentivized. The government agency responsible for managing this program is the Air Force Life Cycle Management Center, Propulsion Directorate, Wright-Patterson Air Force Base, Ohio.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 643608 / *Advanced Engine Dev*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Adaptive Engine Transition Program - GE	C/CPIF	GE : Evendale, OH	-	0.000		0.000		396.768	Oct 2018	-		396.768	Continuing	Continuing	-
Adaptive Engine Transition Program - PW	C/CPIF	PW : East Hartford, CT	-	0.000		0.000		389.687	Oct 2018	-		389.687	Continuing	Continuing	-
		Subtotal	-	0.000		0.000		786.455		-		786.455	Continuing	Continuing	N/A

Remarks

In FY 2017 and FY 2018, Adaptive Engine Transition Program data is reported under Project 645351, Prototyping.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Adaptive Engine Transition Program - Program Management Support	Various	Various : TBD	-	0.000		0.000		3.900	Dec 2018	-		3.900	Continuing	Continuing	-
		Subtotal	-	0.000		0.000		3.900		-		3.900	Continuing	Continuing	N/A

Remarks

In FY 2017 and FY 2018, Adaptive Engine Transition Program data is reported under Project 645351, Prototyping.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		0.000		790.355		-		790.355	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 643608 / *Advanced Engine Dev*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Adaptive Engine Transition Program																												
Detailed Design, Engine Fabrication, Engine Assessments																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 643608 / *Advanced Engine Dev*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Adaptive Engine Transition Program				
Detailed Design, Engine Fabrication, Engine Assessments	1	2019	4	2021

Note

In FY 2017 and FY 2018, Adaptive Engine Transition Program schedule is reported under Project 645351, Prototyping.

The Adaptive Engine Transition Program consists of three phases: detailed design, engine fabrication, and engine assessments.

Program deliverables include: military adaptive engine detailed design parameters and models, multiple engine sets of hardware (plus spare parts), matured technologies, major rig assessment data (controls, combustor, etc.), program reviews, and technology, affordability and sustainability studies.

Additional details can be provided in the appropriate forum.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645345 / *Hypersonics Prototyping*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
645345: *Hypersonics Prototyping*	-	0.000	0.000	258.058	0.000	258.058	201.485	61.537	2.978	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Hypersonic Prototyping project enables integration and demonstration of emerging hypersonic technologies in an operational or operational-like environment to capitalize on successful laboratory hypersonic research and development efforts with high warfighter priority. Integration and demonstration of hypersonic prototypes also allows leadership to make informed strategy and resource decisions based for future programs on the results of such hypersonic prototype demonstrations.

Hypersonic Prototyping enables a key linkage between research and development in the lab and fielding advanced technologies to the warfighter. Under this project, Air-Launched Rapid response Weapon (ARRW) and Hypersonic Conventional Strike Weapon (HCSW) will accelerate the technology transfer of hypersonic technologies to enable a responsive, long range strike capability.

Project 645345, Hypersonics Prototyping, is new for FY 2019. In FY 2018, the entirety of this project was previously reported in Project 645351, Prototyping, under the Lifecycle Prototyping effort. In FY 2017, this work was reported in Project 645350, Experimentation (named Transition Prioritization in FY 2017) under the Experimentation and Prototyping effort. This is administrative realignment to provide increase transparency to Congress and not a new start.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Air Launched Rapid response Weapon (ARRW)	0.000	0.000	168.730	0.000	168.730
Description: Integrates Air Force and DARPA enabled system technologies into a prototype that will demonstrate the viability of this concept to be fielded as a long range prompt strike capability. ARRW will design, develop, manufacture, and test, a number of prototype vehicles to inform decisions concerning ARRW acquisition and production.					
FY 2018 Plans: In FY 2018, this work is performed under the Lifecycle Prototyping effort in Project 645351, Prototyping. In FY 2017, this work was performed under the Experimentation and Prototyping effort in Project 645350, Experimentation (named Transition Prioritization in FY 2017).					
FY 2019 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645345 / *Hypersonics Prototyping*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue with ARRW design activities and complete the critical design review. Construction and test of the booster test article. ***FY 2019 OCO Plans:*** Not Applicable ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $168.730 million. Justification for this increase is due to moving this effort from Project 645351, Prototyping, Lifecycle Prototyping effort.					
Title: Hypersonic Conventional Strike Weapon (HCSW) ***Description:*** Integrates Air Force enabled system technologies into a prototype that will demonstrate the viability of this concept to be fielded as a long range prompt strike capability. HCSW will design, develop, manufacture, and test, a number of prototype vehicles to inform decisions concerning HCSW acquisition and production. ***FY 2018 Plans:*** In FY 2018, this work is performed under the Lifecycle Prototyping effort in Project 645351, Prototyping. In FY 2017, this work was performed under the Experimentation and Prototyping effort in Project 645350, Experimentation (named Transition Prioritization in FY 2017). ***FY 2019 Base Plans:*** Continue program office support, analysis, technical risk reduction, development and integration for the Hypersonic Conventional Strike Weapon and its enabling technologies through Preliminary Design Review (PDR). ***FY 2019 OCO Plans:*** Not Applicable ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $89.328 million. Justification for this increase is due to moving this effort from Project 645351, Prototyping, Lifecycle Prototyping effort.	0.000	0.000	89.328	0.000	89.328
Accomplishments/Planned Programs Subtotals	0.000	0.000	258.058	0.000	258.058

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645345 / *Hypersonics Prototyping*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

ARRW - The Air Force applied funding to an existing DARPA other transaction authority contract to Lockheed Martin in order to leverage the synergistic efforts ongoing in the Tactical Boost Glide technology demonstration. The cost type contract incentives schedule through milestone payments. The government agency responsible for managing this program is the Air Force Life Cycle Management Center, Armament Directorate, Eglin AFB FL.

HCSW - The Air Force is conducting a limited source competition for the rapid development of a hypersonic, conventional air-launched, stand-off weapon. An IDIQ contract will be awarded to a single offeror to develop/test all elements of the end-to-end system, integration with existing bomber/fighter Aircraft, all respective operations/mission planning and sustainment efforts, to include operational safety, suitability, and effectiveness. Contract award is anticipated in the second quarter of FY 2018. The government agency responsible for managing this program is the Air Force Life Cycle Management Center, Armament Directorate, Eglin AFB FL.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645345 / *Hypersonics Prototyping*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ARRW - DARPA OTA	SS/FFP	LMCO:Various : TBD	-	0.000		0.000		132.535	Jan 2019	-		132.535	Continuing	Continuing	-
ARRW - Mission Planning	MIPR	Various : TBD	-	0.000		0.000		1.000	Mar 2019	-		1.000	Continuing	Continuing	-
HCSW - Hypersonic program office support, analysis, technical risk reduction, development and integration	Various	Various : TBD	-	0.000		0.000		84.338	Apr 2019	-		84.338	Continuing	Continuing	-
		Subtotal	-	0.000		0.000		217.873		-		217.873	Continuing	Continuing	N/A

Remarks

In FY 2017, Hypersonics Prototyping (ARRW and HCSW) data is reported under Project 645350, Experimentation (called Transition Prioritization in FY 2017). In FY 2018, Hypersonics Prototyping data is reported under Project 645351, Prototyping.

ARRW - This effort is part of the DARPA Other Transaction Authority (OTA) contract.
HCSW - IDIQ Contract is estimated to be awarded in March 2018

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ARRW - Government Test	Various	Multiple : TBD	-	0.000		0.000		30.380	Oct 2018	-		30.380	Continuing	Continuing	-
HCSW - Government test support . Includes flight test equipment, targets, 96 Test Wing and range suppot, and aircraft integration test.	Various	96 TW, Eglin AFB, FL : TBD	-	0.000		0.000		2.500	Mar 2019	-		2.500	Continuing	Continuing	-
		Subtotal	-	0.000		0.000		32.880		-		32.880	Continuing	Continuing	N/A

Remarks

In FY 2017, Hypersonics Prototyping (ARRW and HCSW) data is reported under Project 645350, Experimentation (called Transition Prioritization in FY 2017). In FY 2018, Hypersonics Prototyping data is reported under Project 645351, Prototyping.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645345 / *Hypersonics Prototyping*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ARRW - Program Management Administration	Various	Multiple : TBD	-	0.000		0.000		4.805	Oct 2018	-		4.805	Continuing	Continuing	-
HCSW - Program Management Administration (PMA)	Various	Various : TBD	-	0.000		0.000		2.500	Mar 2019	-		2.500	Continuing	Continuing	-
		Subtotal	-	0.000		0.000		7.305		-		7.305	Continuing	Continuing	N/A

Remarks

In FY 2017, Hypersonics Prototyping (ARRW and HCSW) data is reported under Project 645350, Experimentation (called Transition Prioritization in FY 2017). In FY 2018, Hypersonics Prototyping data is reported under Project 645351, Prototyping.

ARRW & HCSW - Includes A&AS support requirements plus TDY, office and office supplies. FY 2017 and FY 2018 are not full support staffs. FY 2019 is full staffing.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		0.000		258.058		-		258.058	Continuing	Continuing	N/A

Remarks

Additional details on the two Hypersonics prototyping concepts can be provided in the appropriate forum.

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645345 / *Hypersonics Prototyping*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
ARRW																												
DARPA OTA Option 2																												
HCSW																												
Preliminary Design review																												
Critical Design Review																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645345 / *Hypersonics Prototyping*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ARRW				
DARPA OTA Option 2	1	2019	4	2022
HCSW				
Preliminary Design review	1	2019	4	2019
Critical Design Review	1	2019	2	2020

Note

In FY 2017, schedules for Hypersonics Prototyping (ARRW and HCSW) are reported under Project 645350, Experimentation (called Transition Prioritization in FY 2017). In FY 2018, the schedules are reported under Project 645351, Prototyping.

Further schedule details can be provided in the appropriate forum.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645350 / *Experimentation*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
645350: *Experimentation*	-	90.447	95.613	87.205	0.000	87.205	86.762	86.720	88.522	90.135	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Experimentation project funds experimentation campaigns to explore new concepts and their applications in potential future operating environments within a system-of-systems context. Concepts and enabling technologies such as artificial intelligence, machine learning, directed energy weapons and multi-domain operations hold great promise, yet their transition to acquisition programs and fielded capabilities is typically hampered due to uncertainties regarding their military application and organizational implications. Implementing successful transition approaches for complex and widely applicable concepts requires a comprehensive and coordinated campaign of learning. Experimentation campaigns enable organizational learning through the methodical and systematic application of experimentation and supporting analysis. Experimentation campaigns are centered on an operational level warfighting concept to provide context for assessment, and use wargaming, simulation, and field experimentation to evolve, refine, and validate the warfighting concept leading to solid, evidentiary-based materiel and non-materiel capability development approaches with associated recommendations. Experimentation campaigns improve the effectiveness of operations by developing concepts and generating new information to address challenging threats of the future which aids the fielding of advanced technologies by providing the credible evidence decision makers need to make sound strategic decisions and investment choices. Experimentation campaigns are directed by the Air Force Capability Development Council to ensure funding supports the highest Air Force priorities. Further details can be provided in the appropriate forum.

In FY 2017, this project was named Transition Prioritization and included both Experimentation and Prototyping activities. In FY 2018, this project was renamed to Experimentation, and Prototyping activities such as Hypersonics Prototyping were transferred from this project to Project 645351, Prototyping, Lifecycle Prototyping effort.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Sustainment Technology Transition	0.368	0.000	0.000	0.000	0.000
Description: Product support and sustainment technologies.					
FY 2018 Plans: In FY 2018 and beyond, this effort will be accomplished under Project 645351, Prototyping, Lifecycle Prototyping effort.					
FY 2019 Base Plans: Not applicable.					
FY 2019 OCO Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645350 / *Experimentation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Not applicable. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Not applicable.					
Title: Experimentation Campaigns ***Description:*** Execution of experimentation campaigns to explore promising concepts and enabling technologies. Activities may include facilitated workshops, wargaming, modeling and simulation, and virtual and hardware prototyping to enable experimentation campaigns. In FY 2017, this effort was called Experimentation and Prototyping and included Prototyping demonstrations such as Hypersonics Prototyping. In FY 2018, this effort was renamed to Experimentation Campaigns, and prototyping work was transferred to Project 645351, Prototyping, Lifecycle Prototyping effort. ***FY 2018 Plans:*** Conduct experimentation campaigns to advance multi-domain operations and other high priority areas, as directed by the Air Force Capability Development Council. ***FY 2019 Base Plans:*** Continue experimentation campaigns to advance multi-domain operations and other high priority areas, as directed by the Air Force Capability Development Council. Further details can be provided in the appropriate forum. ***FY 2019 OCO Plans:*** Not applicable. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $8.408 million. This decrease is due to Light Attack Experimentation ending in FY 2018.	53.428	95.613	87.205	0.000	87.205
Accomplishments/Planned Programs Subtotals	53.796	95.613	87.205	0.000	87.205

	FY 2017	FY 2018
Congressional Add: Program Increase - Alternative Energy Research	19.290	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645350 / *Experimentation*

	FY 2017	FY 2018
FY 2017 Accomplishments: Conducted Congressionally-directed effort. ***FY 2018 Plans:*** Not applicable.		
Congressional Add: Program Increase - Counter Electronics High Powered Microwave Advanced Missile ***FY 2017 Accomplishments:*** Conducted Congressionally-directed effort. ***FY 2018 Plans:*** Not applicable.	5.787	0.000
Congressional Add: Program Increase - Logistics Technologies ***FY 2017 Accomplishments:*** Conducted Congressionally-directed effort. ***FY 2018 Plans:*** Not applicable.	11.574	0.000
Congressional Adds Subtotals	36.651	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Experimentation campaigns will aid the fielding of advanced technologies by providing the credible evidence decision makers need to make sound strategic decisions and investment choices, to provide the warfighter with advanced capabilities. The Air Force Capability Development Council directs experimentation campaigns. The Air Force Strategic Development Planning and Experimentation office manages and executes each experimentation campaign. Contracting strategies vary based on the activities of each campaign.

For Hypersonic Prototyping ARRW and HCSW efforts, please reference the Acquisition Strategy in Projects 645351, Prototyping, and 645345, Hypersonics Prototyping.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645350 / *Experimentation*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Sustainment Technology Transition	SS/FFP	Lockheed Martin : Various	-	0.368	Jul 2017	0.000		0.000		-		0.000	Continuing	Continuing	-
Experimentation Campaigns	C/Various	Various : Various	-	43.429	Feb 2017	95.613	Feb 2018	87.205	Feb 2019	-		87.205	Continuing	Continuing	-
Hypersonics Prototyping - ARRW DARPA OTA	SS/FFP	Lockheed Martin : Various	-	5.000	Jul 2017	0.000		0.000		-		0.000	Continuing	Continuing	-
Hypersonics Prototyping - ARRW Mission Planning	MIPR	Various : Various	-	0.710	Nov 2017	0.000		0.000		-		0.000	Continuing	Continuing	-
Hypersonics Prototyping - HCSW Hypersonic program office support, analysis, technical risk reduction, development and integration	Various	Various : Various	-	1.135	Jul 2017	0.000		0.000		-		0.000	Continuing	Continuing	-
Congressional Add - Alternative Energy	C/CPAF	Various : Various	-	19.290	Aug 2018	0.000		0.000		-		0.000	Continuing	Continuing	-
Congressional Add - Logistics Technologies	C/CPAF	TBD : TBD	-	11.574	Jan 2018	0.000		0.000		-		0.000	Continuing	Continuing	-
Congressional Add - Counter Electronics High Powered Microwave Advanced Missile	C/CPAF	TBD : TBD	-	5.787	Feb 2018	0.000		0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	87.293		95.613		87.205		-		87.205	Continuing	Continuing	N/A

Remarks

For FY 2018 and beyond, Sustainment Technology Transition data will be reported under Project 645351, Prototyping.

In FY 2018, Hypersonics Prototyping (ARRW and HCSW) data is reported under Project 645351, Prototyping. For FY 2019 and beyond, Hypersonics Prototyping efforts will be reported under Project 645345, Hypersonics Prototyping.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645350 / *Experimentation*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypersonic Prototyping - ARRW Government Test	C/Various	Multiple : TBD	-	0.515	Oct 2017	0.000		0.000		-		0.000	Continuing	Continuing	-
Hypersonic Prototyping - HCSW Government test support . Includes flight test equipment, targets, 96 Test Wing and range suppot, and aircraft integration test.	Various	96 TW, Eglin AFB, FL : TBD	-	0.075	Mar 2017	0.000		0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	0.590		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

In FY 2018, Hypersonics Prototyping (ARRW and HCSW) data is reported under Project 645351, Prototyping. For FY 2019 and beyond, Hypersonics Prototyping efforts will be reported under Project 645345, Hypersonics Prototyping.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypersonic Prototyping - ARRW Program Management Administration	C/Various	Multiple : TBD	-	1.775	Sep 2017	0.000		0.000		-		0.000	Continuing	Continuing	-
Hypersonic Prototyping - HCSW Program management Administration	Various	Multiple : TBD	-	0.789	Mar 2017	0.000		0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	2.564		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Further budget details can be provided in the appropriate forum.

In FY 2018, Hypersonics Prototyping (ARRW and HCSW) data is reported under Project 645351, Prototyping. For FY 2019 and beyond, Hypersonics Prototyping efforts will be reported under Project 645345, Hypersonics Prototyping.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 0604858F / *Tech Transition Program*	Project (Number/Name) 645350 / *Experimentation*	

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	90.447		95.613		87.205		-		87.205	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645350 / *Experimentation*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Experimentation																												
Sustainment Technology Transition	■	■	■	■	■	■	■	■																				
Experimentation Campaigns	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Congressional Adds	■	■	■	■	■	■	■	■																				
Hypersonic Prototyping																												
ARRW - DARPA OTA Option 1			■	■	■	■																						
HCSW - Program Office Support/Analysis			■	■	■	■																						

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645350 / *Experimentation*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Experimentation				
Sustainment Technology Transition	1	2017	4	2018
Experimentation Campaigns	1	2017	4	2023
Congressional Adds	1	2017	4	2018
Hypersonic Prototyping				
ARRW - DARPA OTA Option 1	3	2017	2	2018
HCSW - Program Office Support/Analysis	3	2017	2	2018

Note

For FY 2018 and beyond, Sustainment Technology Transition schedule will be reported under Project 645351, Prototyping, Lifecycle Prototyping effort.

In FY 2018, schedules for Hypersonics Prototyping (ARRW and HCSW) are reported under Project 645351, Prototyping. For FY 2019 and beyond, the schedules will be reported under Project 645345, Hypersonics Prototyping.

Further schedule details regarding individual experimentation campaigns or Hypersonics Prototyping can be provided in the appropriate forum.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645351 / *Prototyping*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
645351: *Prototyping*	-	287.679	745.037	50.457	0.000	50.457	46.678	37.374	38.151	38.845	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2017, Prototyping activities were reported under Project 645350, Experimentation (named Transition Prioritization in FY 2017).

A. Mission Description and Budget Item Justification

The Prototyping project enables integration and demonstration of emerging technologies in an operational or operational-like environment in order to capitalize on successful laboratory research and development efforts with high warfighter priority. Integration and demonstration of prototypes also allows leadership to make informed strategy and resource decisions based on the results of such prototype demonstrations. Prototyping efforts funded from this Project will aim to capitalize on various emerging warfighter technology areas such as cyber weapons, novel aircraft technology, or directed energy weapons.

Prototyping enables a key linkage between research and development in the lab and fielding advanced technologies to the warfighter. Under this project, the Adaptive Engine Transition Program will serve as a model prototyping effort to reestablish the Air Force's experimentation and prototyping culture. The Adaptive Engine Transition Program is maturing fuel-efficient, adaptive-cycle engine technologies and demonstrating flight-weight, prototype adaptive engines. In addition, the Spectral Halo, Space Internet Prototyping, and Low Cost Attritable Aircraft Technology efforts will build upon proof of concept work completed at the Air Force Research Lab. This project will also support other prototyping efforts in the future, enabling similar emerging technology transitions.

For FY 2019, Project 645351, Prototyping, was split into Project 645351, Prototyping; Project 645345, Hypersonics Prototyping; and Project 643608, Advanced Engine Development to provide increased transparency to Congress on prototyping activities within PE 0604858F, Technology Transition Program. This is an administrative only adjustment and not a new start.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Adaptive Engine Transition Program	287.679	592.851	0.000	0.000	0.000
Description: The Adaptive Engine Transition Program (AETP) will design and manufacture multiple flight-weight adaptive engine prototypes, complete component rig assessments, characterize materials, and inform manufacturing process improvements. By producing flight-weight prototypes, the program will demonstrate adaptive engine technology can be scaled to meet military fighter engine size requirements, while ensuring appropriate manufacturing- and technology-readiness levels. By performing sea-level, altitude, and durability assessments across multiple power settings, the prototype engines will demonstrate fuel efficiency increases, thrust increases, and new component technologies. These assessments will provide data to quantify the capability and reduce risk in areas such as thermal capacity, reliability, and supportability, among others.					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645351 / *Prototyping*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Continue detailed design activities. Continue component rig activities. Continue technology, affordability, and sustainability studies. Conduct AETP Air Superiority 2030+ study. More details can be provided in an appropriate forum. ***FY 2019 Base Plans:*** For FY 2019 and beyond, this effort will be reported under Project 643608, Advanced Engine Development. ***FY 2019 OCO Plans:*** Not applicable. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $592.851 million. Justification for this decrease is due to the transfer of entire Adaptive Engine Transition Program effort to Project 643608, Advanced Engine Development.					
Title: Lifecycle Prototyping ***Description:*** Lifecycle prototyping, product support and sustainment technologies. ***FY 2018 Plans:*** Conduct hypersonics prototyping efforts to mature critical enabling technologies required to facilitate successful operations and delivery of effects across the hypersonic regime. Initiate Spectral Halo Pod prototyping effort to enhance exploratory concept which will advance a capability to be used by multi-generation aircraft and also employ multiple domains to disrupt, degrade, and collapse adversarial capabilities. Initiate low cost design and manufacturing of low-cost attritable aircraft technology. Begin flight testing and demonstration of low-cost attritable aircraft prototype with representative payloads and subsystems. May add additional prototyping activities for emerging technologies based on Department guidance. Continue to develop product support and sustainment technologies to support the warfighter and reduce sustainment costs. In FY 2017, Lifecycle Prototyping activities were performed under Project 645350, Experimentation (called Transition Prioritization in FY 2017), Experimentation and Prototyping and Sustainment Technology Transition efforts. ***FY 2019 Base Plans:*** Continue Spectral Halo Pod prototyping effort to enable multi-generation aircraft to employ multiple domain effects to disrupt, degrade, and collapse adversarial targets. Continue design and manufacturing of the low-cost attritable aircraft prototype with representative payloads and subsystems. Continue to develop product support	0.000	152.186	50.457	0.000	50.457

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645351 / *Prototyping*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
and sustainment technologies to support the warfighter and reduce sustainment costs. Initiate space internet prototyping effort to enable broad connectivity across multiple platforms. May add additional prototyping activities for emerging technologies based on Department guidance. For FY 2019 and beyond, Hypersonics Prototyping work in this effort will be performed under Project 645345, Hypersonics Prototyping, to provide increased transparency to Congress. ***FY 2019 OCO Plans:*** Not applicable. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $101.729 million. Justification for this decrease is due to Hypersonics Prototyping activities being transferred to Project 645345, Hypersonics Prototyping.					
Accomplishments/Planned Programs Subtotals	287.679	745.037	50.457	0.000	50.457

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

For the Adaptive Engine Transition Program, the Air Force has awarded two limited source, cost plus incentive fee contracts to General Electric and Pratt & Whitney due to their unique qualifications to design a high performance, flight-weight adaptive turbine engine in the thrust class for AETP. Incentive categories include engine weight, performance factors, and maintainability and supportability, with specific metrics for each area incentivized. The government agency responsible for managing this program is the Air Force Life Cycle Management Center, Propulsion Directorate, Wright-Patterson Air Force Base, Ohio.

For Spectral Halo, the Air Force will award funds fourth quarter FY 2018 to existing cost plus type contracts with Herrick Technology Laboratories, Inc (MD), Northeast Information Discovery, Inc (NY), Advanced Geolocation Solutions, Inc (VA), and Mitre, (MA).

For Low Cost Attritable Aircraft Technology, the Air Force will leverage the Defense Innovation Unit Experimental Other Transactional Authority to award a Firm Fixed Price Contract to a to-be-determined contractor, awarding funds in the fourth quarter of FY 2018.

For Lifecycle Prototyping efforts such Space Internet Prototyping beginning in FY 2019, the acquisition strategies are under development.

Miscellaneous emerging prototyping will be based on guidance from Department leadership.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645351 / *Prototyping*

Hypersonic Prototyping ARRW - The Air Force applied funding to an existing DARPA other transaction authority contract to Lockheed Martin in order to leverage the synergistic efforts ongoing in the Tactical Boost Glide technology demonstration. The cost type contract incentives schedule through milestone payments. The government agency responsible for managing this program is the Air Force Life Cycle Management Center, Armament Directorate, Eglin AFB FL.

Hypersonic Prototyping HCSW - The Air Force is conducting a limited source competition for the rapid development of a hypersonic, conventional air-launched, stand-off weapon. An IDIQ contract will be awarded to a single offeror to develop/test all elements of the end-to-end system, integration with existing bomber/fighter Aircraft, all respective operations/mission planning and sustainment efforts, to include operational safety, suitability, and effectiveness. Contract award is anticipated in second quarter FY 2018. The government agency responsible for managing this program is the Air Force Life Cycle Management Center, Armament Directorate, Eglin AFB FL.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645351 / *Prototyping*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Adaptive Engine Transition Program - GE	C/CPIF	GE : Evendale, OH	-	138.622	Oct 2016	314.425	Oct 2017	0.000		-		0.000	Continuing	Continuing	-
Adaptive Engine Transition Program - PW	C/CPIF	PW : East Hartford, CT	-	148.000	Oct 2016	277.426	Oct 2017	0.000		-		0.000	Continuing	Continuing	-
Hypersonics Prototyping - ARRW DARPA OTA	SS/FFP	Lockheed Martin : Various	-	0.000		35.000	Jan 2018	0.000		-		0.000	Continuing	Continuing	-
Hypersonics Prototyping - ARRW Mission Planning	MIPR	Various : TBD	-	0.000		1.300	Mar 2018	0.000		-		0.000	Continuing	Continuing	-
Hypersonics Prototyping - HCSW Hypersonic program office support, analysis, technical risk reduction, development and integration	Various	TBD : TBD	-	0.000		41.489	Apr 2018	0.000		-		0.000	Continuing	Continuing	-
Spectral Halo Pod Prototyping	TBD	TBD : TBD	-	0.000		50.000	Jan 2018	26.000	Jan 2019	-		26.000	Continuing	Continuing	-
Low-Cost Attritable Aircraft Technology Prototyping	TBD	TBD : TBD	-	0.000		12.186	Jan 2018	12.319	Jan 2019	-		12.319	Continuing	Continuing	-
Space Internet Prototyping	TBD	TBD : TBD	-	0.000		0.000		12.138	Dec 2019	-		12.138	Continuing	Continuing	-
		Subtotal	-	286.622		731.826		50.457		-		50.457	Continuing	Continuing	N/A

Remarks

In FY 2017, Hypersonics Prototyping (ARRW and HCSW) data is reported under Project 645350, Experimentation (called Transition Prioritization in FY 2017). For FY 2019 and beyond, Hypersonics Prototyping data will be reported under Project 645345, Hypersonics Prototyping.

For FY 2019 and beyond, Adaptive Engine Transition Program data is reported under Project 643608, Advanced Engine Development.

Hypersonic Prototyping - ARRW This effort is part of the DARPA Other Transaction Authority contract.
Hypersonic Prototyping - HCSW IDIQ, Estimated Award Date March 2018

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645351 / *Prototyping*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Hypersonics Prototyping - ARRW Government Test	C/Various	Multiple : TBD	-	0.000		6.060	Dec 2018	0.000		-		0.000	Continuing	Continuing	-
Hypersonics Prototyping - HCSW Government test support . Includes flight test equipment, targets, 96 Test Wing and range support, and aircraft integration test.	Various	96 TW, Eglin AFB, FL : TBD	-	0.000		1.110	Mar 2018	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	0.000		7.170		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

In FY 2017, Hypersonics Prototyping (ARRW and HCSW) data is reported under Project 645350, Experimentation (called Transition Prioritization in FY 2017). For FY 2019 and beyond, Hypersonics Prototyping data will be reported under Project 645345, Hypersonics Prototyping.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Adaptive Engine Program Management Support	Various	Various : TBD	-	1.057	Dec 2016	1.000	Dec 2017	0.000		-		0.000	Continuing	Continuing	-
Hypersonics Prototyping - ARRW Program Management Administration	C/Various	Not specified. : TBD	-	0.000		2.640	Nov 2018	0.000		-		0.000	Continuing	Continuing	-
Hypersonics Prototyping - HCSW Program Management Administration	Various	Various : TBD	-	0.000		2.401	May 2018	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	1.057		6.041		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Program Management Support for the Adaptive Engine Transition Program for FY 2019 and beyond is reported under Project 643608, Advanced Engine Development.

Hypersonics Prototyping - Includes A&AS support requirements plus TDY, office and office supplies. FY 2017 and FY 2018 are not full support staffs. FY 2019 is full staffing.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645351 / *Prototyping*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
In FY 2017, Hypersonics Prototyping (ARRW and HCSW) data is reported under Project 645350, Experimentation (called Transition Prioritization in FY 2017). For FY 2019 and beyond, Hypersonics Prototyping data will be reported under Project 645345, Hypersonics Prototyping.															

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	287.679		745.037		50.457		-		50.457	Continuing	Continuing	N/A

Remarks

Additional details, including Adaptive Engine, Spectral Halo, low-cost attritable aircraft technology, space internet prototyping, Hypersonics, and other emerging prototyping efforts, can be provided in the appropriate forum.

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645351 / *Prototyping*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0604858F / *Tech Transition Program*	**Project (Number/Name)** 645351 / *Prototyping*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Lifecycle Prototyping				
Spectral Halo Pod	1	2018	4	2022
Low-Cost Attritable Aircraft Technology (LCAAT)	1	2018	4	2020
Space Internet	1	2019	4	2023
Emerging Prototypes as directed	1	2018	4	2023
Hypersonic Prototyping				
ARRW - DARPA OTA Option 1	1	2018	3	2018
ARRW - DARPA OTA Option 2	4	2018	2	2019
HCSW - Mission Planning/Program Office Support	1	2018	2	2019
Adaptive Engine Transition Program				
Detailed Design, Engine Fabrication, Engine Assessment	1	2017	4	2018

Note

In FY 2017, Hypersonics Prototyping schedules for ARRW and HCSW are reported under Project 645350, Experimentation (called Transition Prioritization in FY 2017). For FY 2019 and beyond, the schedules are reported under Project 645345, Hypersonics Prototyping.

For FY 2019 and beyond, Adaptive Engine Transition Program schedule is reported under Project 643608, Advanced Engine Development.

The Adaptive Engine Transition Program consists of three phases: detailed design, engine fabrication, and engine assessments. Program deliverables include: military adaptive engine detailed design parameters and models, multiple engine sets of hardware (plus spare parts), matured technologies, major rig assessment data (controls, combustor, etc.), program reviews, and technology, affordability and sustainability studies.

Additional details, including Adaptive Engine, Spectral Halo, low-cost attritable aircraft technology, space internet prototyping, Hypersonics, and other emerging prototyping efforts, can be provided in the appropriate forum.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0605230F / *Ground Based Strategic Deterrent*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	46.966	109.260	215.721	345.041	0.000	345.041	570.373	1,527.545	2,539.060	3,018.653	13,376.000	21,748.619
641025: *GROUND BASED STRATEGIC DETERRENT (GBSD)*	46.966	109.260	215.721	345.041	0.000	345.041	570.373	1,527.545	2,539.060	3,018.653	13,376.000	21,748.619
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 493

A. Mission Description and Budget Item Justification

The Ground Based Strategic Deterrent (GBSD) will design, develop, produce and deploy a replacement for the current Intercontinental Ballistic Missile (ICBM) Minuteman III (MM III) weapon system. The GBSD program is scoped to deliver a fully integrated weapon system beginning in FY29 timeframe to close key capability gaps and vulnerabilities identified in the GBSD Capabilities Based Assessment, GBSD Initial Capabilities Document, and the GBSD Analysis of Alternatives; and to mitigate ground-based deterrent degradation due to MM III component age-out and attrition.

The GBSD program will include Prime contractor development of applicable support equipment, data, flight test hardware and infrastructure, and training material while examining and mitigating risk during the MM III to GBSD transition. This program includes any needed nuclear surety and certification and system vulnerability assessments. The major activities in the GBSD program include 1) Government system engineering (SE), analytics, and test capability development; 2) Flight System (FS) Risk Reduction; 3) Weapon System Command and Control (WSC2) Risk Reduction; 4) Launch Systems (LS) Risk Reduction; 5) Weapon System Integration (WSI) Risk Reduction. Government SE investments include development of an organic, computer-aided, model based systems engineering (MBSE), integration, test software, product life-cycle management (PLM) framework, and modernization of existing SE labs and infrastructure. FS is an integrated missile stack which includes the propulsion, post-boost, guidance, and re-entry systems (RS) sub-components. WSC2 encompasses all command and control components and interfaces, associated ground hardware, ground control equipment and associated software directly related to the survivability, monitoring and launch of the replacement flight system. LS include Launch Control Center (LCC), Launch Facility (LF) restoration, modernization of real property and structures and associated ground mechanical systems. WSI risk reduction includes non-proprietary open systems architecture with well defined interfaces and a modular design at the weapon system level to allow future modification and technology insertion.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver GBSD weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605833F, and 0605898F.

BA4 - This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0605230F / *Ground Based Strategic Deterrent*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	113.919	215.721	347.638	0.000	347.638
Current President's Budget	109.260	215.721	345.041	0.000	345.041
Total Adjustments	-4.659	0.000	-2.597	0.000	-2.597
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.161	0.000			
• Other Adjustments	-2.498	0.000	-2.597	0.000	-2.597

Change Summary Explanation

FY 2017 funding reflects a $2.161M adjustment for Small Business Innovative Research/Small Business Transfer Technology (SBIR/STTR).
FY 2017 funding reflects a $2.498M adjustment for Federally Funded Research and Development Centers (FFRDC).

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Technology Maturation Risk Reduction	109.260	215.721	345.041

Description: The objectives of TMRR for GBSD are as follows: 1) advance GBSD major activities, systems engineering activities, trade-studies, information technology, data management, analytical capabilities and deliver a modular, integrated weapon system preliminary design and 2) mature technologies related to the major activities and demonstrate performance of sub-system capabilities through prototyping, modeling, and simulation.

FY 2018 Plans:
• Continue to examine and mature FS, WSC2, cybersecurity, and associated ground system technologies, define requirements and modular architectures through trade studies, prototyping, demonstration and analysis.
• Continue to mature and refine software integration and modular system architecture requirements.
• Continue to mature the assessment of the current MM III LS to determine, through onsite assessments and analysis, the extent of degradation and evaluate for future upgrade, replacement, preparation, and modernization of operational and test facilities.
• Continue to mature the weapon system preliminary design and reduce integration risk by conducting trade studies, system engineering, test activities, and systems modeling and simulation.
• Continue to further develop analytical, information technology, and data management capabilities to ensure weapon system design information is properly secured and information dissemination between contractors.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0605230F / *Ground Based Strategic Deterrent*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
• Continue to assess fielding requirements for FS, WSC2 and LS and appropriate timelines to transition from MM III to GBSD solution. • Complete System Requirements Review, cost-capability trade studies, and validate draft Capability Development Document. • Expand and develop analytical, information technology, test, and data management capabilities to ensure access to weapon system design information is properly controlled and information is securely transmitted between the government and each contractor. ***FY 2019 Plans:*** • Expand the TMRR analytic environment and labs to enable full execution of the program's capability to own the technical baseline throughout the program life cycle. • Continue to examine and mature FS, WSC2, cybersecurity, and associated ground technologies, define requirements and modular architectures through trade studies, prototyping, demonstration, and analysis. • Prototyping will include guidance navigational control, sensors, post boost propulsion system, and Hardened Intersite Cable System communications protocols. • Continue to mature and refine software integration and modular system architecture requirements. • Continue to mature the assessment of the current MM III LS to determine, through onsite assessments and analysis, the extent of degradation and evaluate for future upgrade, replacement, preparation, and modernization of operational and test facilities. • Continue to mature the weapon system preliminary design and reduce integration risk by conducting trade studies, SE, test activities, and system modeling and simulation. • Continue to further develop analytical, information technology, and data management capabilities to ensure weapon system design information dissemination between contractors. • Continue to assess fielding requirements for FS, WSC2, and LS and appropriate timelines to transition from MM III to GBSD solution. • Complete System Functional Review, cost capability trade studies, and validate Capability Development Document. • Expand and develop analytical, information technology, test, and data management capabilities to ensure access to weapon system design information is properly controlled, and information is securely transmitted between government and each contractor. • Plan for EMD, which will refine the acquisition strategy based on TMRR assessments to prepare for Request for Proposal Decision Point and increase FFRDC support to maintain the ability to own the technical baseline in EMD. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increases due to TMRR contractor Preliminary Design Review preparation.			
Accomplishments/Planned Programs Subtotals	109.260	215.721	345.041

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0605230F / *Ground Based Strategic Deterrent*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 PE 0603851F: *Intercontinental Ballistic Missile - Dem/Val*	99.949	10.736	41.856	-	41.856	44.109	65.582	66.944	68.165	Continuing	Continuing
• MILCON PE 0605230F: *Ground Based Strategic Deterrent (GBSD)*	-	-	-	-	-	108.000	151.000	135.700	105.000	201.700	701.400

Remarks

E. Acquisition Strategy

The objective of the GBSD program strategy is to deliver a full, integrated weapon system capability that meets Air Force Global Strike Command's CDD requirements beginning in FY29. For the TMRR phase of this strategy, the Program Office competitively awarded two contracts in FY17. The objectives of TMRR for GBSD are as follows: 1) to deliver low-risk, technologically mature, integrated weapon system preliminary design; 2) incorporate a modular open systems architecture; 3) perform cost-capability analysis to aid with validation of user requirements; 4) demonstrate performance of sub-system capabilities through prototyping, modeling, and simulation. The TMRR phase will include a System Requirements Review (SRR), System Functional Review (SFR), System Software Review (SSR), and will culminate in a system Preliminary Design Review (PDR). The contractor may elect to perform additional risk reduction testing on select components to further evolve the PDR design during TMRR in order to lower component integration risk during Engineering and Manufacturing Development (EMD). The period of performance for the TMRR contracts is 4QFY17 to 4QFY20. After MS B approval, EMD contract will be competitively awarded as early as FY20.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0605230F / *Ground Based Strategic Deterrent*	**Project (Number/Name)** 641025 / *GROUND BASED STRATEGIC DETERRENT (GBSD)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBSD TMRR Contractor #1	C/CPFF	Boeing Def, Space, & Sec : Huntsville, AL	0.000	11.706	Aug 2017	58.346	Nov 2017	103.534	Nov 2018	-		103.534	175.174	348.760	349.160
GBSD TMRR Contractor #2	C/CPFF	Northrup Grumman Sys Corp : El Segundo, CA	0.000	12.806	Aug 2017	58.346	Nov 2017	103.600	Oct 2018	-		103.600	153.433	328.185	328.585
GBSD EMD Contracts	C/Various	TBD : TBD	0.000	-		-		-		-		-	17,587.640	17,587.640	-
		Subtotal	0.000	24.512		116.692		207.134		-		207.134	17,916.247	18,264.585	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBSD Integration Support Contract (TMRR)	C/FFP	BAE : Hill AFB, UT	29.144	39.214	Oct 2016	41.205	Oct 2017	25.249	Oct 2018	-		25.249	87.074	221.886	-
GBSD Electronic Parts Strategy and Commonality (TMRR)	MIPR	Naval Surface Warfare Center (NSWC) Crane : Crane, IN	3.779	6.359	Dec 2016	4.802	Dec 2017	6.946	Nov 2018	-		6.946	0.000	21.886	-
GBSD Federally Funded Research and Development Center (FFRDC) (TMRR)	MIPR	Aerospace Corporation : El Segundo, CA	2.630	5.404	Nov 2016	5.610	Oct 2017	2.295	Nov 2018	-		2.295	13.260	29.199	-
GBSD MITRE (TMRR)	MIPR	MITRE : Bedford, MA	1.964	2.642	Dec 2016	3.492	Oct 2017	5.100	Nov 2018	-		5.100	5.272	18.470	-
GBSD Technical Area Task Support (TMRR)	MIPR	Air Force Global Strike Command : Barksdale AFB, LA	1.731	1.218	Feb 2017	-		-		-		-	0.000	2.949	-
GBSD Software Engineering Institute (TMRR)	MIPR	Carnegie Mellon : Pittsburgh, PA	0.360	1.979	Feb 2017	2.569	Oct 2017	1.400	Nov 2018	-		1.400	7.006	13.314	-
GBSD Reentry Systems (RS) FFRDC Support and Analysis (TMRR)	MIPR	Sandia National Laboratories : Various	0.000	8.443	Mar 2017	6.510	Nov 2017	6.250	Oct 2018	-		6.250	0.000	21.203	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0605230F / *Ground Based Strategic Deterrent*	**Project (Number/Name)** 641025 / *GROUND BASED STRATEGIC DETERRENT (GBSD)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBSD RS FFRDC Analysis and Acquisition Intelligence Support (TMRR)	MIPR	MIT Lincoln Labs : Lexington, MA	0.000	0.580	Apr 2017	6.426	Oct 2017	0.456	Oct 2018	-		0.456	24.892	32.354	-
GBSD EMD Support	C/Various	TBD : TBD	0.000	-		-		-		-		-	1,702.011	1,702.011	-
		Subtotal	39.608	65.839		70.614		47.696		-		47.696	1,839.515	2,063.272	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBSD Test and Assessments (TMRR)	Various	Various : Various	2.196	3.370	Jan 2017	4.715	Nov 2017	18.948	Jan 2019	-		18.948	0.000	29.229	-
GBSD Cybersecurity, Test and Evaluation Framework, Codes/Crypto (TMRR)	MIPR	Johns Hopkins University-Applied Physics Lab : Laurel, MD	1.934	2.750	May 2017	2.179	Jan 2018	8.205	Oct 2018	-		8.205	1.912	16.980	-
GBSD Integrated Test Team (TMRR)	PO	Arnold engineering Development Complex : Arnold AFB, TN	0.549	1.791	Nov 2016	3.269	Oct 2017	4.300	Oct 2018	-		4.300	14.480	24.389	-
GBSD Independent Operational Test Agency (TMRR)	PO	Air Force Operational and Evaluation Center : Hill AFB, UT	0.000	0.773	Mar 2017	1.518	Jan 2018	1.466	Oct 2018	-		1.466	215.583	219.340	-
GBSD Integrated Threat Analysis and Simulation Environment (ITASE) I (TMRR)	MIPR	DIA-Missile and Space Intelligence Center : Redstone Arsenal, AL	0.000	2.402	Jan 2017	2.283	Jan 2018	3.978	Oct 2018	-		3.978	5.997	14.660	-
GBSD ITASE II (TMRR)	MIPR	DIA-National Air and Space Intelligence Center : Fairborn, OH	0.000	0.241	Aug 2017	2.313	Nov 2017	-		-		-	3.496	6.050	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0605230F / *Ground Based Strategic Deterrent*	**Project (Number/Name)** 641025 / *GROUND BASED STRATEGIC DETERRENT (GBSD)*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBSD Nuclear Dust and Debris Environments Study (TMRR)	MIPR	Air Force Research Lab : Wright Patterson AFB, OH	0.000	0.629	Aug 2017	0.809	Dec 2017	1.000	Oct 2018	-		1.000	1.352	3.790	-
GBSD RS Test and Advanced Technology Interface (TMRR)	MIPR	SNL - Sandia Nat'l Labs : Various	0.000	3.095	Jan 2017	6.077	Jan 2017	17.900	Oct 2018	-		17.900	15.000	42.072	-
GBSD Data Tools & Infrastructure (TMRR)	Various	Various : Various	-	0.354	Aug 2017	-		9.300	Oct 2018	-		9.300	53.245	62.899	-
GBSD Defense Accelerator (TMRR)	MIPR	Army Research Lab : Adelphi, MD	-	1.500	Apr 2017	-		-		-		-	0.000	1.500	-
GBSD Launch Systems LF-26 (TMRR)	TBD	TBD : TBD	-	-		-		3.010	Jan 2019	-		3.010	0.000	3.010	-
GBSD Launch Systems Inspection (TMRR)	Various	Various : Various	-	0.941	Jul 2017	-		-		-		-	0.079	1.020	-
GBSD Software Support (TMRR)	PO	309th SMXG : Hill AFB, UT	-	0.444	Jul 2017	1.416	Jan 2018	1.220	Oct 2018	-		1.220	3.587	6.667	-
GBSD EMD Test Support	C/Various	TBD : TBD	0.000	-		-		-		-		-	844.954	844.954	-
		Subtotal	4.679	18.290		24.579		69.327		-		69.327	1,159.685	1,276.560	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBSD PMA	Various	Various : Various	2.679	0.619	Oct 2016	3.836	Oct 2017	2.535	Oct 2018	-		2.535	88.020	97.689	-
GBSD Integration Support Contract (TMRR)	C/FFP	BAE : Hill AFB, UT	-	-		-		13.007	Oct 2018	-		13.007	24.964	37.971	-
GBSD Electronics Parts Strategy and Commonality (TMRR)	C/Various	Naval Surface War Ctr : Crane, IN	0.000	-		-		1.737	Nov 2018	-		1.737	0.000	1.737	-
GBSD Federally Funded Research and	C/Various	Aerospace Corporation : El Segundo, CA	-	-		-		2.805	Nov 2018	-		2.805	0.000	2.805	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0605230F / *Ground Based Strategic Deterrent*	**Project (Number/Name)** 641025 / *GROUND BASED STRATEGIC DETERRENT (GBSD)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Center (FFRDC) (TMRR)															
EMD Acquisition Strategy Support	TBD	Oasis : Hill AFB, UT	0.000	-		-		0.800		-		0.800	3.200	4.000	-
		Subtotal	2.679	0.619		3.836		20.884		-		20.884	116.184	144.202	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	46.966	109.260		215.721		345.041		-		345.041	21,031.631	21,748.619	N/A

Remarks

For FY19 costs, the SPO revised its PMA determination strategy, which resulted in additional line items for the management services section of the R-3.

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0605230F / *Ground Based Strategic Deterrent*	**Project (Number/Name)** 641025 / *GROUND BASED STRATEGIC DETERRENT (GBSD)*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0605230F / *Ground Based Strategic Deterrent*	**Project (Number/Name)** 641025 / *GROUND BASED STRATEGIC DETERRENT (GBSD)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Ground Based Strategic Deterrent (GBSD)				
TMRR Phase	1	2017	4	2020
PDR (Jun 2020)	3	2020	3	2020
Milestone B (Sep 2020)	4	2020	4	2020
EMD Phase	1	2021	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	22.272	294.746	503.997	0.000	503.997	1,356.491	2,013.294	3,149.204	2,866.847	Continuing	Continuing
646007: *2030+ AIR DOMINANCE AOS*	-	22.272	293.743	492.850	0.000	492.850	1,336.491	1,993.294	3,129.204	2,846.847	Continuing	Continuing
646203: *Air Dominance Air-to-Air Weapon*	-	0.000	1.003	11.147	0.000	11.147	20.000	20.000	20.000	20.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Next Generation Air Dominance enables future execution of Air Force air superiority doctrine within the Air Superiority core mission area, as directed in Joint Requirements Oversight Council Memorandum (JROCM) 043-13 and by the CSAF approved Air Superiority 2030 Enterprise Capability Collaboration Team (AS2030 ECCT) Flight Plan. Program efforts mitigate critical capability gaps identified in the March 2011 Air Force Next Generation Tactical Air (TACAIR) Capabilities Based Assessment and revalidated in 2016 by the AS2030 ECCT. This program will provide air superiority capability improvements in the areas of persistence, survivability, lethality, connectivity, interoperability, and affordability. Program activities will also include the pursuit of open architecture solutions including OMS and UCI standards management and preplanned product improvements. Funding provides program management support; operational concept exploration; technology studies, assessments and development; operational and system architecture development; maturation and risk reduction of air superiority related technologies, which includes weapons systems; and integrated system concept development and demonstration. This program element may include necessary civilian pay expenses required to manage, execute, and deliver NGAD system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

BA-04 - This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	167.595	294.746	507.705	0.000	507.705
Current President's Budget	22.272	294.746	503.997	0.000	503.997
Total Adjustments	-145.323	0.000	-3.708	0.000	-3.708
• Congressional General Reductions	-0.434	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-144.151	0.000			
• SBIR/STTR Transfer	-0.738	0.000			
• Other Adjustments	0.000	0.000	-3.708	0.000	-3.708

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*

Change Summary Explanation

FY17 - -$147M Correction to actual FY17 budget (denied RAA reprogramming) along with $2.849M Below Threshold reprogramming (BTR) for SACM and Small Business Innovative Research and FFRDC reductions

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646007 / *2030+ AIR DOMINANCE AOS*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
646007: *2030+ AIR DOMINANCE AOS*	-	22.272	293.743	492.850	0.000	492.850	1,336.491	1,993.294	3,129.204	2,846.847	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Next Generation Air Dominance enables future execution of Air Force air superiority doctrine within the Air Superiority core mission area, as directed in Joint Requirements Oversight Council Memorandum (JROCM) 043-13 and by the CSAF approved Air Superiority 2030 Enterprise Capability Collaboration Team (AS2030 ECCT) Flight Plan. Program efforts mitigate critical capability gaps identified in the March 2011 Air Force Next Generation Tactical Air (TACAIR) Capabilities Based Assessment and revalidated in 2016 by the AS2030 ECCT. This program will provide air superiority capability improvements in the areas of persistence, survivability, lethality, connectivity, interoperability, and affordability. Program activities will also include the pursuit of open architecture solutions including OMS and UCI standards management and preplanned product improvements. Funding provides program management support; operational concept exploration; technology studies, assessments and development; operational and system architecture development; maturation and risk reduction of air superiority related technologies, which includes weapons systems; and integrated system concept development and demonstration. This program element may include necessary civilian pay expenses required to manage, execute, and deliver NGAD system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

BA-04 - This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: 2030+ Air Dominance	22.272	293.743	492.850
Description: The 2030+ Air Dominance (AD) candidate concepts consist of operational analyses, threat studies and technology candidate assessments to identify operational concepts and technologies that improve persistence, survivability, lethality, connectivity, interoperability and affordability in 2030 and beyond. These efforts will provide for contractors to conduct analyses, identify technology candidates and perform concept refinement. Furthermore, studies are required to develop operational/system architectures to include family of systems and system of systems. In addition, technical risk reduction activities will be performed to include experimentation, integration and building demonstrative prototypes. FY17 Accomplishments: The 2030+ AD working groups methodically assessed candidate concepts using USAF directives and guidance. Resulting concepts continue to inform the on-going Analysis of Alternatives (AoA), which remains on schedule. Furthermore, the AoA			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646007 / *2030+ AIR DOMINANCE AOS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
continues to integrate technologies into evolving threat environments and scenarios. Ongoing studies are conducted to refine system concepts and operational/system architectures incorporating family of systems and system of systems that may be required to inform and support strategic choices. In addition, technical risk reduction studies concerning technology integration, operational and system trade space utilizing preliminary data from AD concept development have resulted in multiple activities and engagements to inform strategic USAF experimentation and prototyping efforts. Finally, technical overviews were presented to the Air Force - Scientific Advisory Board (AF-SAB) and other senior leaders. ***FY 2018 Plans:*** The 2030+ Air Dominance candidate concepts consist of operational analyses, threat studies and technology candidate assessments to identify operational concepts and technologies that improve persistence, survivability, lethality, connectivity, interoperability and affordability in 2030 and beyond. These efforts will provide for contractors to conduct analyses, identify technology candidates and perform concept refinement. Furthermore, studies are required to develop operational/system architectures to include family of systems and system of systems. In addition, technical risk reduction activities will be performed to include experimentation, integration and building demonstrative prototypes. ***FY 2019 Plans:*** The 2030+ Air Dominance candidate concepts consist of operational analyses, threat studies and technology candidate assessments to identify operational concepts and technologies that improve persistence, survivability, lethality, connectivity, interoperability and affordability in 2030 and beyond. These efforts will provide for contractors to conduct analyses, identify technology candidates and perform concept refinement. Furthermore, studies are required to develop operational/system architectures to include family of systems and system of systems. In addition, technical risk reduction activities will be performed to include experimentation, integration and building demonstrative prototypes. Program activities will also include the pursuit of open architecture solutions. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $199.107M increase, see above description			
Accomplishments/Planned Programs Subtotals	22.272	293.743	492.850

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 0207110F/646203: *Air Dominance Air-to-Air Weapon*	0.000	1.003	11.147	-	11.147	20.000	20.000	20.000	20.000	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646007 / *2030+ AIR DOMINANCE AOS*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost

Remarks

N/A

D. Acquisition Strategy

The Next Generation Air Dominance acquisition strategy is based on top-down, multi-domain capabilities development planning and oversight framework. Cross-functional teams will conduct analysis, demonstrations, and experiments to quantify the operational value of alternative concepts and technologies to provide solutions to current and future air superiority capability gaps.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646007 / *2030+ AIR DOMINANCE AOS*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Research/Development Efforts	Various	Various : Various	-	19.840		276.298		465.505		-		465.505	Continuing	Continuing	-
		Subtotal	-	19.840		276.298		465.505		-		465.505	Continuing	Continuing	N/A

Remarks

Contractual specifics are not available at this level of security classification.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support	Various	Various : Various	-	2.432		17.445		27.345		-		27.345	Continuing	Continuing	-
		Subtotal	-	2.432		17.445		27.345		-		27.345	Continuing	Continuing	N/A

Remarks

May include civ pay for FY18+

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	22.272		293.743		492.850		-		492.850	Continuing	Continuing	N/A

Remarks

Details of contract data are not shown because of the level of security classification.

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646007 / *2030+ AIR DOMINANCE AOS*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646007 / *2030+ AIR DOMINANCE AOS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
2030+ AIR DOMINANCE AOS				
Concept Exploration	1	2017	4	2023
Integration Studies	1	2017	4	2023
Technology Risk Reduction	1	2017	4	2023
Analysis of Alternatives	2	2017	3	2018
FY19 Strategic Planning Choices Presented	1	2017	1	2017
FY20 Strategic Planning Choices Presented	1	2018	1	2018
FY21 Strategic Planning Choices Presented	1	2019	1	2019
FY22 Strategic Planning Choices Presented	1	2020	1	2020
FY23 Strategic Planning Choices Presented	1	2021	1	2021
FY24 Strategic Planning Choices Presented	1	2022	1	2022
FY25 Strategic Planning Choices Presented	1	2023	1	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646203 / *Air Dominance Air-to-Air Weapon*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
646203: *Air Dominance Air-to-Air Weapon*	-	0.000	1.003	11.147	0.000	11.147	20.000	20.000	20.000	20.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Next Generation Air Dominance enables future execution of Air Force air superiority doctrine within the Air Superiority core mission area, as directed in Joint Requirements Oversight Council Memorandum (JROCM) 043-13 and by the CSAF approved Air Superiority 2030 Enterprise Capability Collaboration Team (AS2030 ECCT) Flight Plan. Program efforts mitigate critical capability gaps identified in the March 2011 Air Force Next Generation Tactical Air (TACAIR) Capabilities Based Assessment and revalidated in 2016 by the AS2030 ECCT. This program will provide air superiority capability improvements in the areas of persistence, survivability, lethality, connectivity, interoperability, and affordability. Funding provides program management support; operational concept exploration; technology studies, assessments and development; operational and system architecture development; maturation and risk reduction of air superiority related technologies, which includes weapons systems; and integrated system concept development and demonstration. This program element may include necessary civilian pay expenses required to manage, execute, and deliver NGAD system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

BA-04 - This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: AS2030 Weapons	0.000	1.003	11.147
Description: The 2030+ Air Dominance Weapon Systems candidate concepts will develop, refine and integrate technologies into evolving threat scenarios and environments. Funding supports studies that refine system concepts and operational/system architectures to include family of systems and system of systems are required in support of the strategic choices and technical risk reduction activities that include but not limited to experimentation, integration and building demonstrative prototypes.			
FY 2018 Plans: The 2030+ Air Dominance candidate concepts consist of operational analyses, threat studies and technology assessments to identify operational concepts and technologies to improve persistence, survivability, lethality, connectivity, interoperability and affordability in 2030+ timeframe and beyond. These efforts will provide for contractors to conduct analyses and concept studies. Additional studies are required to develop operational/system architectures to include family of systems and system of systems. Includes A&AS, travel, supplies, other government costs, and program costs.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646203 / *Air Dominance Air-to-Air Weapon*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
The 2030+ Air Dominance candidate concepts consist of operational analyses, threat studies and technology assessments to identify operational concepts and technologies to improve persistence, survivability, lethality, connectivity, interoperability and affordability in 2030+ timeframe and beyond. These efforts will provide for contractors to conduct analyses and concept studies. Additional studies are required to develop operational/system architectures to include family of systems and system of systems. Includes A&AS, travel, supplies, other government costs, and program costs. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $10.144M increase, see above description			
Accomplishments/Planned Programs Subtotals	0.000	1.003	11.147

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 0207110F/646007: *2030+ AIR DOMINANCE AOS*	22.272	293.743	492.850	-	492.850	1,336.491	1,993.294	3,129.204	2,846.947	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Next Generation Air Dominance Air-to-Air Weapon acquisition strategy is based on top-down, multi-domain capabilities development planning and oversight framework. Cross-functional teams will conduct analysis, demonstrations, and experiments to quantify the operational value of alternative concepts and technologies to provide solutions to current and future air superiority capability gaps.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646203 / *Air Dominance Air-to-Air Weapon*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Research/Development Efforts	Various	Various : Various	-	0.000		1.003		11.147		-		11.147	Continuing	Continuing	-
		Subtotal	-	0.000		1.003		11.147		-		11.147	Continuing	Continuing	N/A

Remarks

Contractual specifics are not available at this level of security classification.
Includes PMA activities and may include program specific civilian pay expenses.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		1.003		11.147		-		11.147	Continuing	Continuing	N/A

Remarks

Contractual specifics are not available at this level of security classification.
Includes PMA activities and may include program specific civilian pay expenses.

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646203 / *Air Dominance Air-to-Air Weapon*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207110F / *Next Generation Air Dominance*	**Project (Number/Name)** 646203 / *Air Dominance Air-to-Air Weapon*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Air Dominance Air-to-Air Weapon				
Concept Exploration	1	2018	4	2022
Integration Studies	1	2018	4	2022
Technical Risk Reduction	1	2018	4	2022
Analysis of Alternatives	1	2018	3	2018
FY20 Strategic Planning Choices Presented	1	2018	1	2018
FY21 Strategic Planning Choices Presented	1	2019	1	2019
FY22 Strategic Planning Choices Presented	1	2020	1	2020
FY23 Strategic Planning Choices Presented	1	2021	1	2021
FY24 Strategic Planning Choices Presented	1	2022	1	2022
FY25 Strategic Planning Choices Presented	1	2023	1	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0207455F / *Three Dimensional Long-Range Radar (3DELRR)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	99.588	47.166	10.645	40.326	0.000	40.326	41.416	31.720	16.745	0.468	0.000	288.074
646002: *Three Dimensional Expeditionary Long Range Radar*	99.588	47.166	10.645	40.326	0.000	40.326	41.416	31.720	16.745	0.468	0.000	288.074
Quantity of RDT&E Articles	-	3	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 393

A. Mission Description and Budget Item Justification

Mission Description: The Three-Dimensional Expeditionary Long-Range Radar (3DELRR) will be the principal USAF long-range, ground-based sensor for detecting, identifying, tracking and reporting aerial tracks for the Joint Force Air Component Commander (JFACC) through the Theater Air Control System. The 3DELRR system will provide multiple benefits and increased capabilities to the USAF and to the Joint Services: 1) Replace the aging USAF AN/TPS-75 radar system, which is at the end of its service life and costly to maintain; 2) Detect and track highly maneuverable, small radar cross section air-breathing targets; 3) Mitigate reliability, operational availability, maintainability, transportability and sustainability issues, which plague the AN/TPS-75 radar system; 4) Enable greater battlefield and battlespace awareness through its precise, real-time air picture of sufficient quality to control individual aircraft under a wide range of environmental and operational conditions; 5) Serve as a pilot program for Defense Exportability Features (DEF) to maximize export potential early in the design phase while reducing 3DELRR life cycle costs through increased production; and 6) Provide exchange of information to the United States Marine Corps (Navy) and the United States Army via appropriate interfaces.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Three-Dimensional Expeditionary Long-Range Radar weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

Note: This program is in Budget Authority 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0207455F / *Three Dimensional Long-Range Radar (3DELRR)*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	49.491	10.645	13.729	0.000	13.729
Current President's Budget	47.166	10.645	40.326	0.000	40.326
Total Adjustments	-2.325	0.000	26.597	0.000	26.597
• Congressional General Reductions	-0.533	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.792	0.000			
• Other Adjustments	0.000	0.000	26.597	0.000	26.597

Change Summary Explanation

- FY19 $26.9M RDT&E increased to fund to the FY17 Service Cost Position (SCP)

The start of Engineering and Manufacturing Development (EMD) was delayed due to contractor protests and continued source selection activities. The Engineering and Manufacturing Development (EMD) prime contract was awarded 11 May 2017.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Contractor Engineering and Manufacturing Development (EMD)	38.042	0.000	29.017

Description: Contractor's portion of EMD efforts contribute to the overall development of 3DELRR capabilities.

FY 2018 Plans:
Conduct program management and systems engineering activities to continue execution of EMD Phase of 3DELRR. Activities will include but are not limited to the following:
- Mature system design through successful Critical Design Review (CDR)
- Conduct Integrated Baseline Review (IBR)
- Continue to support the Defense Exportability Features (DEF) effort
- Continue contractor developmental test planning and preparation
- Start build of three (3) EMD production ready units; fabricate components & subsystems
- Start contractor developmental testing of components & subsystems
- Support planning of Government Developmental Test & Evaluation (DT&E)
- Support studies and analysis to assess future capabilities
- Implement latest cyber security controls into system design and support accreditation

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0207455F / *Three Dimensional Long-Range Radar (3DELRR)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Support activities to develop the Modeling and Simulation (M&S) plan - Support activities to develop the Test and Evaluation Master Plan (TEMP) - Continue development of Technical Manuals ***FY 2019 Plans:*** Activities will include but are not limited to the following: - Will continue to conduct Test Readiness Review (TRR) prior to Contractor Developmental Test and Evaluation (CDT&E) - Complete build of three (3) Engineering & Manufacturing Development (EMD) units - Continue contractor developmental testing of components & subsystems - Start full system CDT&E - Continue support for planning of Government Developmental Test & Evaluation (DT&E) - Conduct physical configuration audit - Support studies and analyses to assess future capabilities - Update the Modeling and Simulation (M&S) plan as needed - Update the Test and Evaluation Master Plan (TEMP) as needed - Continue development of technical manuals - Will continue to engage with external customers regarding interoperability ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funds increase from FY18 to FY19 for ramp up to full system CDT&E.			
Title: Government Developmental Test and Evaluation (DT&E) Planning/Preparation ***Description:*** Early planning and preparation for Government DT&E. ***FY 2018 Plans:*** Activities include but are not limited to the following: - Provide test expertise and support at Critical Design Review (CDR) and Integrated Baseline Review (IBR) - Coordinate post-CDR TEMP for approval - Continue development and refinement of test planning documentation - Conduct site-surveys, prepare test sites and continue cyber-security planning - Integrate M&S into test plans - Monitor and evaluate contractor component and developmental testing; tailor lessons for Government DT&E - Contribute to technical interchanges and test-related working groups - Site infrastructure improvements to support Government DT&E ***FY 2019 Plans:***	0.676	1.681	3.374

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0207455F / *Three Dimensional Long-Range Radar (3DELRR)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Activities will include but are not limited to the following: - Will continue to monitor and evaluate CDT&E: tailor lessons for Government DT&E - Witness formal CDT&E events - Continue development and refinement of TEMP and other test planning documentation - Conduct site surveys and continue cybersecurity planning - Continue to integrate Modeling and Simulation (M&S) into test plans - Prepare for Test Readiness Review (TRR) to support Government Developmental Test & Evaluation (DT&E) - Will continue site infrastructure improvements to support Government DT&E - NOTE: Training and travel ramp up this FY in preparation for Government DT&E ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increase due to ramp up in contractor T&E activities.			
Title: Systems Engineering/Technical Support ***Description:*** Efforts provide management, engineering and technical support to the program office. ***FY 2018 Plans:*** Activities include but are not limited to the following: - Continue Engineering and Manufacturing Development (EMD) efforts to further mature technology readiness and manufacturing capabilities - Lead and manage program through daily interaction with contractor and key stakeholders - Oversee programmatic, design and technical reviews, program reviews, etc. - Monitor reliability growth during contractor component, subsystem and system level testing - Identify, monitor and mitigate program and technical risks; facilitate program office reporting - Support follow-on sustainment planning Business Case Analysis (BCA), various studies/analyses and planning activities ***FY 2019 Plans:*** Activities will include but are not limited to the following: - Will continue EMD efforts to further mature technology readiness and manufacturing capabilities - Lead and manage program through daily interaction with contractor and key stakeholders - Oversee programmatic design and technical reviews - Monitor reliability growth during contractor component, subsystem and system level testing - Identify, monitor and mitigate program and technical risks; facilitate program office reporting - Continue preparation of Milestone C documentation - Continue follow-on sustainment planning BCA, various studies/analyses and planning activities	8.448	8.964	7.935

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0207455F / *Three Dimensional Long-Range Radar (3DELRR)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Will continue to engage with external customers regarding interoperability ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to reduction in external Federally-Funded Research and Development Center (FFRDC) support.			
Accomplishments/Planned Programs Subtotals	47.166	10.645	40.326

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 03 Line Item 833060: *3D Expeditionary Long Range-Radar*	-	-	0.000	-	0.000	0.000	63.075	21.902	156.775	636.350	878.102

Remarks

E. Acquisition Strategy

The 3DELRR strategy is a single step acquisition approach for full capability to develop, produce and field a highly capable and sustainable, expeditionary long-range radar. A limited competition was conducted for the Engineering and Manufacturing Development (EMD) contract among the multiple contractors that participated in two Technology Maturation and Risk Reduction (TMRR) phases.

The EMD contract was awarded 11 May 2017 to a single developer to complete the final design, build, integration and test of the 3DELRR system; with options to produce Low Rate Initial Production (LRIP) units, conduct Interim Contractor Support (ICS), and produce Full Rate Production (FRP) units.

The primary contract type for EMD is a Fixed Price Incentive Firm (FPIF). The contract also includes a FPIF option to execute LRIP, Cost Plus Fixed Fee (CPFF) options for ICS and Firm Fixed Price (FFP) options for FRP. A CPFF option is planned for ICS due to the uncertainty of the quantity and the exact nature of the work. An FFP option is planned for FRP due to stable requirements and low risk of changes in scope. The program office will exercise the LRIP option upon Milestone Decision Authority (MDA) approval at MS C. The program office will also seek MDA approval to exercise ICS options (as necessary) and FRP options.

The EMD prime contractor will deliver three (3) EMD units, which will be the primary assets used for Contractor Developmental Test and Evaluation (CDT&E) and Government Developmental Test and Evaluation (DT&E). The LRIP option provides scope for the retrofit of these three (3) EMD units to production quality specifications, which will be used for Government operational testing. The LRIP option also enables the delivery of three (3) additional production quality units for a total of six (6) units at Initial Operational Capability (IOC). Program office will request MDA approval to use procurement funds prior to MS C to procure early Low Rate Initial Production (LRIP) materials to reduce schedule risk. The FRP options will deliver an additional twenty-nine (29) units for a total of thirty-five (35) units at Full Operational Capability (FOC).

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0207455F / *Three Dimensional Long-Range Radar (3DELRR)*	

The MDA for the 3DELRR program is the Assistant Secretary of the Air Force (Acquisition). The Air Force Program Executive Officer (PEO) for Battle Management (AFPEO BM) located at Hanscom AFB, MA is the PEO for 3DELRR. The Air Force Life Cycle Management Center (AFLCMC) located at Wright-Patterson AFB, OH is the contracting authority for the 3DELRR program, as AFLCMC provides contracting, legal, comptroller, programmatic, engineering, test and logistics support.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207455F / *Three Dimensional Long-Range Radar (3DELRR)*	**Project (Number/Name)** 646002 / *Three Dimensional Expeditionary Long Range Radar*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EMD Phase (Prime Contract)	C/FPIF	Raytheon, Woburn, MA : NV	72.659	38.042	May 2017	-		29.017	Oct 2018	-		29.017	64.548	204.266	56.640
		Subtotal	72.659	38.042		-		29.017		-		29.017	64.548	204.266	N/A

Remarks

- FINANCIAL PERFORMANCE: 3DELRR is evaluated against traditional Research and Development (R&D) program expenditure benchmarks. Unlike many traditional R&D programs, however, the 3DELRR EMD contract is a FPIF contract with progress payments. 20 percent of incurred costs are withheld until the end of the contract, when they are liquidated. Mandatory funding obligations and progress payment withholds will cause the program to lag traditional expenditure benchmarks, painting an inaccurate portrait of overall program health.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering - A	SS/CPFF	MIT/Lincoln Laboratory : Lexington, MA	4.987	1.900	Nov 2016	1.600	Nov 2017	1.006	Nov 2018	-		1.006	2.072	11.565	-
System Engineering - B	SS/CPFF	Carnegie Mellon University : Pittsburgh, PA	0.269	0.150	Oct 2016	0.150	Oct 2017	0.314	Oct 2018	-		0.314	0.648	1.531	-
System Engineering - C	SS/CPFF	GTRI : Atlanta, GA	0.725	0.725	Feb 2017	0.725	Feb 2018	0.725	Feb 2019	-		0.725	1.450	4.350	-
System Engineering - D	SS/CPFF	MITRE : Bedford, MA	2.758	1.867	Oct 2016	3.080	Oct 2017	3.094	Oct 2018	-		3.094	6.375	17.174	-
		Subtotal	8.739	4.642		5.555		5.139		-		5.139	10.545	34.620	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Developmental Test and Evaluation Planning and Preparation	PO	46 TS : Eglin AFB, FL	1.502	0.676	Oct 2016	1.681	Jan 2018	3.374	Jan 2019	-		3.374	9.168	16.401	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207455F / *Three Dimensional Long-Range Radar (3DELRR)*	**Project (Number/Name)** 646002 / *Three Dimensional Expeditionary Long Range Radar*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	1.502	0.676		1.681		3.374		-		3.374	9.168	16.401	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	Various	AFLCMC/HBDD : Hanscom AFB, MA	16.688	3.806	Oct 2016	3.409	Oct 2017	2.796	Oct 2018	-		2.796	6.088	32.787	-
		Subtotal	16.688	3.806		3.409		2.796		-		2.796	6.088	32.787	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	99.588	47.166		10.645		40.326		-		40.326	90.349	288.074	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207455F / *Three Dimensional Long-Range Radar (3DELRR)*	**Project (Number/Name)** 646002 / *Three Dimensional Expeditionary Long Range Radar*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0207455F / *Three Dimensional Long-Range Radar (3DELRR)*	**Project (Number/Name)** 646002 / *Three Dimensional Expeditionary Long Range Radar*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Three Dimensional Expeditionary Long Range Radar				
EMD Contract Award	3	2017	3	2017
EMD	3	2017	1	2022
Government DT&E Planning/Preparation	3	2017	3	2020
Critical Design Review (CDR) (June 2018)	3	2018	3	2018
Contractor Test	4	2019	1	2021
Developmental Test and Evaluation Test Readiness Review (April 2020)	3	2020	3	2020
Government Development Test	3	2020	1	2022
EMD Unit Delivery	1	2021	1	2021
Operational Test Readiness Review (OTRR) (January 2022)	2	2022	2	2022
Milestone C (December 2021)	1	2022	1	2022
Government Operational Test	2	2022	1	2023
Low Rate Initial Production (LRIP)	1	2022	4	2023
Full Rate Production (FRP) Decision (December 2022)	1	2023	1	2023
Full Rate Production	1	2023	4	2023

Note

LRIP phase ends 1QFY24
FRP phase ends 1QFY29

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	29.800	0.000	29.800	10.000	6.000	0.000	0.000	Continuing	Continuing
646504: *AF Prototyping*	-	0.000	0.000	19.800	0.000	19.800	5.000	3.000	0.000	0.000	Continuing	Continuing
646505: *USCYBERCOM Prototyping*	-	0.000	0.000	10.000	0.000	10.000	5.000	3.000	0.000	0.000	Continuing	Continuing

Note

In FY19, PE 0208099F, Unified Platform (UP) efforts were transferred from PE 0306250F, Cyber Operations Technology Development to enable Executive Agent oversight and management, and to provide transparency to Service stakeholders.

A. Mission Description and Budget Item Justification

Designated as the Executive Agent, the Secretary of the Air Force will lead the Unified Platform effort.

Unified Platform (UP) provides the Cyber Mission Forces (CMFs), USCYBERCOM, AF Major Commands (MAJCOMs) a Joint cyber operations platform capable of mission planning, data analytics, and decision support for the execution of full-spectrum cyberspace operations at the operational through tactical levels of warfare.

UP integrates existing, but disparate, Service-specific cyber capability, delivering a minimum viable product (MVP). Subsequent build iterations will continue to deliver a flexible, interoperable, and scalable warfighter capability. In order to match the speed-of-need of the highly dynamic cyberspace domain, the UP will implement a scaled agile development framework to facilitate the rapid development, integration, and fielding of capabilities. The UP program will execute the development requirements provided by Army, Navy, Marine Corps, and Air Force in conjunction with US Cyber Command (USCYBERCOM) stakeholders in accordance with the prioritization provided by UP governance. The UP program will exercise a comprehensive, Service agnostic, acquisition approach to include laboratory, industry, and academia.

UP directly supports the Joint Network Attack Initial Capabilities Document (ICD), the National Military Strategy for Cyberspace Operations (NMS-CO), USCYBERCOM operational directives, the latest AF Space Command (AFSPC) Offensive Cyberspace Operations System Flight Plan, and other formal requirements documents.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver JCC2 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

Prototyping efforts are executed in a operational development environment to rapidly develop and evaluate capability within relevant warfighter timelines. Prototyping efforts are transitioned to foundational efforts once included in the UP baseline.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because this budget activity includes efforts that are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	29.800	0.000	29.800
Total Adjustments	0.000	0.000	29.800	0.000	29.800
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	29.800	0.000	29.800

Change Summary Explanation

In FY19, PE 0208099F, Unified Platform (UP) efforts were transferred from PE 0306250F, Cyber Operations Technology Development to enable Executive Agent oversight and management, and to provide transparency to Service stakeholders.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*	**Project (Number/Name)** 646504 / *AF Prototyping*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
646504: *AF Prototyping*	-	0.000	0.000	19.800	0.000	19.800	5.000	3.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY19, PE 0208099F, Unified Platform (UP) efforts were transferred from PE 0306250F, Cyber Operations Technology Development to enable Executive Agent oversight and management, and to provide transparency to Service stakeholders.

A. Mission Description and Budget Item Justification

USAF within this budget item will focus on rapid research through prototype development, risk reduction, testing, and integration of cyber capabilities contributing to the Unified Platform (UP) program, while delivering enhanced cyber effects to the Combatant Commanders. USAF, in conjunction with the Services and National Agencies, execute operationally-focused research and developmental to expand infrastructure, architectures, and capabilities/tools to support Cyber Mission Forces (CMF); these efforts will be tailored for near-immediate integration into the UP baseline for delivery to cyber warfighters using scaled agile framework acquisition methodologies.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver JCC2 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: AF Prototyping	-	0.000	19.800
Description: AF prototyping efforts will initially develop the UP Minimum Viable Product (MVP) baseline from existing "best of breed" systems, completed prototyping efforts, existing Service-developed solutions, joint user-input, and other sources. Scaled The program will use a scaled agile framework to execute the MVP buildup and future increments to continuously deliver operational capability based on prioritized user requirements.			
FY 2018 Plans: Efforts reflected in PE 0306250F, Cyber Operations Technology Development.			
FY 2019 Plans: - Will develop incremental operational capability addressing the highest priority user requirements - Some aspects of the effort are classified and will be provided on a need-to-know basis. For further information, please contact AFLCMC/HNCP, 210-977-2683.			
FY 2018 to FY 2019 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*	**Project (Number/Name)** 646504 / *AF Prototyping*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
In FY19, PE 0208099F, Unified Platform (UP) efforts were transferred from PE 0306250F, Cyber Operations Technology Development to enable Executive Agent oversight and management, and to provide transparency to Service stakeholders.			
Accomplishments/Planned Programs Subtotals	-	0.000	19.800

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Unified Platform (UP) program office will utilize Concept, Development, Risk Management, Production, or Deployment Plans as part of a streamlined approach to agile acquisition planning. All plans will contain sufficient information to inform acquisition decisions (i.e., authorities to proceed), within the agile framework, to determine readiness to enter into the applicable phase of the acquisition process. UP will utilize both new and existing contractual vehicles, such as Government-Wide Acquisition Contract (GWAC) vehicles (Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV), and General Services Administration (GSA) Federal Supply Schedules and a new Cyber Indefinite Delivery Indefinite Quantity (IDIQ) contract. The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that should be able to meet many requirements related to UP. These multiple-award contractual vehicles have already met the statutory requirements of the Competition in Contracting Act (CICA), which requires a fair opportunity to all contract holders, in accordance with Federal Acquisition Regulation (FAR) 16.505, unless an exception to fair opportunity applies.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*	**Project (Number/Name)** 646504 / *AF Prototyping*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Service Oriented Architecture (SOA) Prototyping	C/T&M	TBD : TBD	-	-		-		7.000	Oct 2018	-		7.000	Continuing	Continuing	-
Minimum Viable Product (MVP) Build-Up	Various	Various : Various	-	-		-		12.000	Oct 2018	-		12.000	Continuing	Continuing	-
		Subtotal	-	-		-		19.000		-		19.000	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Support Costs	Various	Various : Various	-	-		-		0.800	Dec 2018	-		0.800	Continuing	Continuing	-
		Subtotal	-	-		-		0.800		-		0.800	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		19.800		-		19.800	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*	**Project (Number/Name)** 646504 / *AF Prototyping*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
AF Prototyping																												
SOA Prototyping																												
MVP Build-Up																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*	**Project (Number/Name)** 646504 / *AF Prototyping*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
AF Prototyping				
SOA Prototyping	1	2019	2	2019
MVP Build-Up	1	2019	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*	**Project (Number/Name)** 646505 / *USCYBERCOM Prototyping*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
646505: *USCYBERCOM Prototyping*	-	0.000	0.000	10.000	0.000	10.000	5.000	3.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY19, PE 0208099F, Unified Platform (UP) efforts were transferred from PE 0306250F, Cyber Operations Technology Development to enable Executive Agent oversight and management, and to provide transparency to Service stakeholders.

A. Mission Description and Budget Item Justification

US Cyber Command (USCYBERCOM) mission is to deter or defeat strategic cyber threats to US interests and infrastructure, provide mission assurance for the operations and defense of the Department of Defense information environment, and support the achievement of Joint Force Commander objectives.

USCYBERCOM within this budget item will focus on rapid research through prototype development, risk reduction, testing, and integration of cyber capabilities contributing to the Unified Platform (UP) program, while delivering enhanced cyber effects to the Combatant Commanders. USCYBERCOM, in conjunction with the Services and National Agencies, execute operationally-focused research and developmental to expand infrastructure, architectures, and capabilities/tools to support Cyber Mission Forces (CMF); these efforts will be tailored for near-immediate integration into the UP baseline for delivery to cyber warfighters using scaled agile framework acquisition methodologies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: USCYBERCOM Prototyping	-	0.000	10.000
Description: Funding supports USCYBERCOM prototyping efforts associated with the research, development, and integration of cyber technologies supporting the UP program. ***FY 2018 Plans:*** Efforts reflected in PE 0306250F, Cyber Operations Technology Development. ***FY 2019 Plans:*** Will conduct prototyping efforts in support of UP program. The origin, details, and specific aspects of these efforts are classified and will be provided on a need-to-know basis. Please contact USCYBERCOM,443-634-7769, for additional details. ***FY 2018 to FY 2019 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*	**Project (Number/Name)** 646505 / *USCYBERCOM Prototyping*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
In FY19, PE 0208099F, Unified Platform (UP) efforts were transferred from PE 0306250F, Cyber Operations Technology Development to enable Executive Agent oversight and management, and to provide transparency to Service stakeholders.			
Accomplishments/Planned Programs Subtotals	-	0.000	10.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Unified Platform (UP) program office will utilize Concept, Development, Risk Management, Production, or Deployment Plans as part of a streamlined approach to agile acquisition planning. All plans will contain sufficient information to inform acquisition decisions (i.e., authorities to proceed), within the agile framework, to determine readiness to enter into the applicable phase of the acquisition process. UP will utilize both new and existing contractual vehicles, such as Government-Wide Acquisition Contract (GWAC) vehicles (Alliant, Encore II, Solutions for Enterprise-Wide Procurement IV (SEWP IV), and General Services Administration (GSA) Federal Supply Schedules and a new Cyber Indefinite Delivery Indefinite Quantity (IDIQ) contract. The use of multiple-award contractual vehicles will provide a wide range of commercially-available products and services that should be able to meet many requirements related to UP. These multiple-award contractual vehicles have already met the statutory requirements of the Competition in Contracting Act (CICA), which requires a fair opportunity to all contract holders, in accordance with Federal Acquisition Regulation (FAR) 16.505, unless an exception to fair opportunity applies.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*	**Project (Number/Name)** 646505 / *USCYBERCOM Prototyping*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USCYBERCOM Prototyping	Various	Multiple Agencies : Various	-	-		-		9.600	Oct 2018	-		9.600	Continuing	Continuing	-
		Subtotal	-	-		-		9.600		-		9.600	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Support Costs	Various	Various : Various	-	-		-		0.400	Dec 2018	-		0.400	Continuing	Continuing	-
		Subtotal	-	-		-		0.400		-		0.400	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		10.000		-		10.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*	**Project (Number/Name)** 646505 / *USCYBERCOM Prototyping*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
USCYBERCOM Prototyping																												
USCYBERCOM Prototyping																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0208099F / *Unified Platform (UP)*	**Project (Number/Name)** 646505 / *USCYBERCOM Prototyping*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
USCYBERCOM Prototyping				
USCYBERCOM Prototyping	1	2019	4	2021

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	297.975	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
643833: *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*	-	297.975	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0305164F, NAVSTAR Global Positioning System (User Equipment) efforts were transferred to PE 1203164F, NAVSTAR Global Positioning System (User Equipment), due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1203164F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	278.147	0.000	0.000	0.000	0.000
Current President's Budget	297.975	0.000	0.000	0.000	0.000
Total Adjustments	19.828	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-4.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	34.900	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-11.072	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	40.293	41.509	41.880	0.000	41.880	42.708	43.537	44.438	45.249	Continuing	Continuing
641334: *Common Data Link (CDL)*	-	40.293	41.509	41.880	0.000	41.880	42.708	43.537	44.438	45.249	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Common Data Link Executive Agent (CDL EA) provides the DoD standard for interoperable, multi-service, multi-agency, Intelligence, Surveillance, and Reconnaissance (ISR) datalinks for 10,000+ DoD manned/unmanned airborne and ground platforms. As the DoD CDL EA, the Air Force is responsible for cross-service application of CDL RDT&E Military Intelligence Program (MIP) funds facilitating compliance to Congressional and DoD mandates. The CDL EA develops, modifies, distributes, and maintains specifications for the CDL waveform family; ensuring design configuration control, commonality, and interoperability among ISR platforms. Additionally, funds support managing resources allocated for development, maturation, and migration of CDL technologies.

CDL EA enables compliance with OSD and Congressional mandates to effectively utilize spectrum, use approved cryptographic equipment, and provide direct support to current operations. CDL is a vital link in DoD's existing and emerging communication architectures, providing flexibility to accommodate Command and Control (C2) data and myriad types of Signals Intelligence (SIGINT), Geospatial Intelligence (GEOINT), and Full-Motion Video (FMV) data. The CDL specifications permit current and future ISR asset operations worldwide by providing sensor data directly via point-to-point and broadcast to ground sites, airborne platforms and dismounted users. Also, CDL provides the capability to relay data via air-to-air or compatible satellite links when the asset and ground site are not in line-of-sight.

CDL EA's research and development activities support a broad array of tactical, operational, and strategic ISR users and include achieving higher data rates, open architecture development, multi- access and multi-node network management, cryptographic modernization, advancements needed to operate in contested environments, terminal and antenna design enhancements, operations in other spectral bands, and improving spectrum efficiency. Further, CDL development improves large area surveillance missions while supporting continuous improvements and implementation of line-of-sight platform and CDL terminal Command and Control (C2), plus increased ISR (C2ISR) capabilities. Activities also include studies and analysis to support current and future requirements documentation, program planning and execution. CDL prototype terminal designs provide for future technology insertion and reduce non-recurring engineering and life-cycle costs to the user.

In addition, the Cryptographic Core Modernization (CCM) thrust enables CDL to develop a miniaturized gigabit rate Communications Security (COMSEC) device capable of managing CDL data. The miniaturized COMSEC device will allow faster throughput while reducing Size, Weight, and Power (SWaP) requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CDL Executive Agent capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	42.338	41.509	42.196	0.000	42.196
Current President's Budget	40.293	41.509	41.880	0.000	41.880
Total Adjustments	-2.045	0.000	-0.316	0.000	-0.316
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.045	0.000			
• Other Adjustments	0.000	0.000	-0.316	0.000	-0.316

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Common Data Link (CDL) Technology Advancement	9.670	10.000	10.165	0.000	10.165

Description: CDL evolutionary concept development, exploratory prototyping, advanced technology demonstrations, and studies of emerging technologies and capability gaps.

FY 2018 Plans:
- Continue to research and evaluate technology developments for enhancing networking, as well as more effective ground and lightweight airborne terminal components
- Continue to develop multispectral operations flexibility, increased spectrum efficiency and integration of improved transmission components
- Continue development of a common development environment as it applies to CDL specification maintenance and update
- Continue development of enhanced, CDL-based intelligence, surveillance and reconnaissance (ISR) communication capabilities across multiple platforms and echelons
- Continue exploratory prototyping efforts and advanced technology demonstrations in support of emerging communication backbone architecture development across air, space and terrestrial layers; to include: agile high capacity data transport, assured communications and multi-mode access networks

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue to research and develop upgrades to support current and future specification employment profiles ***FY 2019 Base Plans:*** - Will continue to research and evaluate technology developments for enhancing networking, as well as more effective ground and lightweight airborne terminal components - Will continue to develop multispectral operations flexibility, increased spectrum efficiency and integration of improved transmission components - Will continue development of a common development environment as it applies to CDL specification maintenance and update - Will continue development of enhanced, CDL-based ISR communication capabilities across multiple platforms and echelons - Will continue exploratory prototyping efforts and advanced technology demonstrations in support of emerging communication backbone architecture development across air, space and terrestrial layers; to include: agile high capacity data transport, assured communications and multi-mode access networks - Will continue to research and develop upgrades to support current and future specification employment profiles ***FY 2019 OCO Plans:*** None ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase in FY19 funding due to inflation adjustment.					
Title: Common Data Link (CDL) Specification Development, Validation, Test and Maintenance	27.278	24.690	24.715	0.000	24.715
Description: Systems engineering lifecycle for CDL and NATO STANAG 7085 specification development: requirement decomposition, specification development (modeling, maturation, documentation), specification validation (and associated component prototyping), testing, configuration management, and process maintenance. ***FY 2018 Plans:*** - Continue development and testing of Higher Data Rates to existing and emerging terminals, while also prototyping terminal development that combines Size, Weight and Power (SWaP) improvements with higher data rate capability and integration of improved transmission components - Continue adding capabilities required to support the Joint Aerial Layer Network (JALN) High Capacity Backbone (HCB), Anti-Access Area-Denial (A2AD) requirements, and other emerging operational capabilities - Continue development of spectrally efficient CDL waveform specification					

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue to work with CDL industry partners and DoD Services to document, validate and implement common terminal control interfaces through use of commercially recognized standards - Continue configuration control of the CDL architecture, standards, specifications and modules - Continue development of CDL test equipment capable of compliance testing to the latest, validated version of CDL specifications ***FY 2019 Base Plans:*** - Will continue development and testing of Higher Data Rates to existing and emerging terminals, while also prototyping terminal development that combines Size, Weight and Power (SWaP) improvements with higher data rate capability and integration of improved transmission components - Will continue adding capabilities required to support the Joint Aerial Layer Network (JALN) High Capacity Backbone (HCB), Anti-Access Area-Denial (A2AD) requirements, and other emerging operational capabilities - Will continue development of spectrally efficient CDL waveform specification - Will continue to work with CDL industry partners and DoD Services to document, validate and implement common terminal control interfaces through use of commercially recognized standards - Will continue configuration control of the CDL architecture, standards, specifications and modules - Will continue development of CDL test equipment capable of compliance testing to the latest, validated version of CDL specifications ***FY 2019 OCO Plans:*** None ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase in FY19 funding due to inflation adjustment.					
Title: Common Data Link (CDL) Cryptographic Modernization ***Description:*** Phased development effort to modernize CDL Communications Security (COMSEC) devices and standards to maximize performance and reduce SWaP requirements while supporting interoperability, commonality, modularity, portability, remote management, multi-level security and releasability. ***FY 2018 Plans:*** - Continue development of generation two (Gen 2) Nano and Mini cryptographic core modernization (CCM) modules for US and NATO release - Continue follow-on Nano and Mini CCM Security Validation Testing (SVT) and subsequent National Security Agency (NSA) information assurance (IA) certification	3.345	6.819	7.000	0.000	7.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue development of multi-channel, gigabit data rate (Mega) cryptographic cores with Gen 2 advances and begin the CCM transition to over-the-air re-keying capabilities in Generation 3 - Begin development and design of common End Cryptographic Units (ECUs) for use with medium- and large-sized ISR terminals ***FY 2019 Base Plans:*** - Will continue development of generation two (Gen 2) Nano and Mini cryptographic core modernization (CCM) modules for US and NATO release - Will continue follow-on Nano and Mini CCM Security Validation Testing (SVT) and subsequent National Security Agency (NSA) information assurance (IA) certification - Will continue development of multi-channel, gigabit data rate (Mega) cryptographic cores with Gen 2 advances - Will continue development and design of common End Cryptographic Units (ECUs) for use with medium- and large-sized ISR terminals ***FY 2019 OCO Plans:*** None ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase in FY19 funding due to inflation adjustment.					
Accomplishments/Planned Programs Subtotals	40.293	41.509	41.880	0.000	41.880

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The Air Force serves as the DoD Common Data Link Executive Agent, with support from each Service's designated CDL lead and the Airborne Network Division (AFLCMC/HNA). The CDL EA develops interoperable ISR data links mandated for use by Assistant Secretary of Defense (Networks and Information Integration) (ASD(NII)) policy. Once CDL technology development matures and a specification is published, services are responsible for CDL compliant platform and terminal procurement; National Security Agency (NSA) and Joint Interoperability Test Command (JITC) ensure compliance certifications; integration; and installation. Acquisition strategy varies by contract. Whenever possible, contracts are awarded under full and open competition.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*	**Project (Number/Name)** 641334 / *Common Data Link (CDL)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Air Force Information Assurance Modernization / Network Management	MIPR	NSA : Ft Meade, MD	-	3.345	Nov 2016	7.000	Jan 2018	7.000	Jan 2019	-		7.000	Continuing	Continuing	-
Air Force Network Modernization	MIPR	Air Force : Various	-	-		7.000	Nov 2017	5.000	Nov 2018	-		5.000	Continuing	Continuing	-
Marine CDL for Tactical UAS	Various	Various : Various	-	7.750	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	-
Terminal Database	C/CPFF	Booze Allen : McClean, VA	-	0.700	May 2017	0.700	Nov 2017	0.700	Nov 2018	-		0.700	Continuing	Continuing	-
Compliance Test Tool	C/Various	Various : Various	-	2.991	Jun 2017	3.000	Mar 2018	3.000	Mar 2019	-		3.000	Continuing	Continuing	-
Under Threshold Combined	Various	Various : Various	-	7.045	Dec 2016	4.981	Nov 2017	5.131	Nov 2018	-		5.131	Continuing	Continuing	-
		Subtotal	-	21.831		22.681		20.831		-		20.831	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Service Tech Support & Spec Development	MIPR	Various : Various	-	7.800	Jan 2017	8.900	Dec 2017	9.000	Dec 2018	-		9.000	Continuing	Continuing	-
		Subtotal	-	7.800		8.900		9.000		-		9.000	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Interoperability Test Center (JITC)	MIPR	JITC : Ft Huachuca, AZ	-	0.550	Jun 2017	0.800	Mar 2018	1.000	Mar 2019	-		1.000	Continuing	Continuing	-
46 Test Squadron	PO	46 TS/OGEX : Eglin AFB, FL	-	0.369	Nov 2016	0.369	Nov 2017	0.369	Nov 2018	-		0.369	Continuing	Continuing	-
		Subtotal	-	0.919		1.169		1.369		-		1.369	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*	**Project (Number/Name)** 641334 / *Common Data Link (CDL)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA-MITRE Engineering Support (FFRDC)	SS/T&M	MITRE Corp : Bedford, MA	-	0.050	Nov 2016	0.000		0.000		-		0.000	Continuing	Continuing	-
PMO/Service- MITRE Engineering Direct Mission Support (FFRDC)	SS/T&M	MITRE Corp. : Bedford, MA	-	6.078	Nov 2016	5.650	Nov 2017	5.650	Nov 2018	-		5.650	Continuing	Continuing	-
PMA - PMO Support (A&AS)	C/CPFF	PE Systems : Littleton, MA	-	0.766	Mar 2017	0.860	Jul 2018	0.860	Jul 2019	-		0.860	Continuing	Continuing	-
PMA - Under Threshold Program Mgmt/Tech Support	Various	Various : Various	-	2.849	Jun 2017	2.249	Dec 2017	4.170	Dec 2018	-		4.170	Continuing	Continuing	-
		Subtotal	-	9.743		8.759		10.680		-		10.680	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	40.293		41.509		41.880		-		41.880	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*	**Project (Number/Name)** 641334 / *Common Data Link (CDL)*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0305236F / *Common Data Link Executive Agent (CDL EA)*	**Project (Number/Name)** 641334 / *Common Data Link (CDL)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Common Data LInk				
CDL Technology Advancement	1	2017	4	2023
- Spectrum efficient/Frequency agile CDL	1	2017	2	2018
- Capability Gap Analysis / Roadmap Update	1	2017	3	2018
- Multi-access / Mesh Network Advancements	1	2017	4	2020
CDL Specification Development, Validation, Test and Maintenance	1	2017	4	2023
- SUAS SWAP Constrained Rev B Terminals	1	2017	4	2018
- CDL Compliance Test Set	1	2017	2	2020
CDL Crytpographic Modernization	1	2017	2	2021
- Multi-algorithm US/Coalition crypto core modules (Generation 2)	1	2017	3	2018
- End Cryptographic Unit (ECUs) design	3	2017	2	2020

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305601F / *Mission Partner Environments*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	10.074	0.000	10.074	8.550	9.076	9.593	10.582	Continuing	Continuing
643783: *CENTRIXs Networks*	-	0.000	0.000	10.074	0.000	10.074	8.550	9.076	9.593	10.582	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 4, PE 0305601F, project 643783, Mission Partner Environment, is a new start.

Program transitioned from Defense Information Systems Agency (DISA) to USAF in FY19.
PE 0305601F (Mission Partner Environment), changed from PE 0301144K, (Joint/Allied Coalition Information Sharing).
Project 643783 (CENTRIXs Networks), changed from Project NND (Multinational Information Sharing).

A. Mission Description and Budget Item Justification

Mission Partner Environment (MPE) enables secure sharing of operational information for collaboration between and among the U.S. and mission partners to include federal, State, local, and tribal agencies, allies, coalition members, host nations, and other nations, United States and international Non-Governmental Organizations, multinational treaty organizations, and private sector organizations. The MPE program enables the United States (US) Department of Defense (DoD) to execute its assigned missions with mission partners across the complete ranges and phases of military operations to assist combined command and control (C2) of coalition forces while meeting the information sharing requirements within existing bi-lateral and multi-lateral agreements. Also, it promotes effective information exchange and provides applications to enable effective use of the United States and Partner nation military power. MPE provides the warfighter mission with technology to improve mission effectiveness and cyber security.

In response to program decision memorandum, funding for Mission Partner Environment transferred the capabilities the Combined Enterprise Regional Information Exchange System (CENTRIXS), Pegasus, the Multinational Information Sharing (MNIS) program, the All Partners Access Network (APAN), and the Combined Federal Battle Labs Network (CBFLNet) to the Mission Partner Environment Program. MPE enables secure sharing of operational information and enhances collaboration between the US forces, and trusted allies and other multinational partners. This effort also increases overall combat effectiveness by leveraging capabilities and information from all partners. FY2019 funding procures hardware and software to support the consolidation of a common mission network capability that supports operations with the Mission Partners environment.

This funding will deliver procedures, workstations, switches, servers, cross-domain solutions, communications infrastructure, video teleconference suites, network equipment, storage and backup, encryption equipment, software licenses, infrastructure, deployable suites and software communications. Variations in quantity and unit price reflect planned capital investment.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305601F / *Mission Partner Environments*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	10.074	0.000	10.074
Total Adjustments	0.000	0.000	10.074	0.000	10.074
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	10.074	0.000	10.074

Change Summary Explanation

Program transitioned from Defense Information Systems Agency (DISA) to USAF in FY19.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Mission Partner Environment	0.000	0.000	10.074	0.000	10.074

Description: Program also initiated a capability to support enhancements for the UISS-All Partners Access (APAN). UISS-APAN migrated existing systems supporting coalition sharing to an enterprise solution hosted on a DISA Defense Enterprise Computing Center. UISS-APAN capability will satisfy COCOM needs for tools and technology to support collaboration with non-traditional partners for humanitarian missions.

FY 2018 Plans:

N/A

FY 2019 Base Plans:

Funds will support development, integration and testing of core C2 mission capabilities, capacities and integration into the cross national, cross organizational, and cross domain accreditation for C2 mission capabilities, and continuity of operations for enterprise services.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305601F / *Mission Partner Environments*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Work will include the development, integration and testing of an enterprise architectural engineering solution to combine multiple coalition information sharing capabilities into a single Mission Partner Environment, to include modifications necessary to absorb legacy systems capabilities and capacities. ***FY 2019 OCO Plans:*** No OCO funds ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Program transitioning from Defense Information Systems Agency (DISA) to USAF					
Accomplishments/Planned Programs Subtotals	0.000	0.000	10.074	0.000	10.074

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• O&M 0305601F: *Mission Partner Environment*	0.000	0.000	95.103	-	95.103	80.910	85.795	90.576	99.981	Continuing	Continuing
• OPAF 03 0305601F: *Mission Partner Environment*	0.000	0.000	1.873	-	1.873	1.585	1.680	1.775	1.958	Continuing	Continuing

Remarks

Other Procurement funding will:
- Procure the hardware and software needed to establish capabilities as a core infrastructure and enterprise for the Command and Control component of the MPE.
- Procure work stations, enterprise hardware and software, security accreditation, and network connections supporting strategic, operational and forward deployed warfighting forces in multiple theaters.
- Provide enhanced capabilities for coalition information sharing capabilities.

Program transitioned from Defense Information Systems Agency (DISA) to USAF in FY19.

E. Acquisition Strategy

Performance-based contracts are primarily used for this support. MNIS maximizes the use of competitive awards and uses various contract types, employs large and small contractors, and is focused to achieve agency socio-economic goals and incorporate DoD acquisition reform initiatives. MNIS evaluates performance by conducting thorough Post-award Contract Reviews, monthly Contract Performance Reviews, and monthly In-Process Reviews.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0305601F / *Mission Partner Environments*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0305601F / *Mission Partner Environments*	**Project (Number/Name)** 643783 / *CENTRIXs Networks*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cross Doman Solution Ops Capabiliites	C/CPFF	TBD : TBD, VA	-	-		-		10.074	Mar 2018	-		10.074	Continuing	Continuing	-
		Subtotal	-	-		-		10.074		-		10.074	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		10.074		-		10.074	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0305601F / *Mission Partner Environments*	**Project (Number/Name)** 643783 / *CENTRIXs Networks*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Development, testing of capabilities, and integration of capacities into mission capabilities with continuity of operations for enterprise services																												
Mission Partner Environmnet																												
Development, integration & testing of an architectural engineering solution to combine coalition sharing capabilities into a single environment, to modify legacy systems capabilities and capacities																												
Mission Partner Environmnet																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0305601F / *Mission Partner Environments*	**Project (Number/Name)** 643783 / *CENTRIXs Networks*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Development, testing of capabilities, and integration of capacities into mission capabilities with continuity of operations for enterprise services				
Mission Partner Environmnet	1	2019	3	2023
Development, integration & testing of an architectural engineering solution to combine coalition sharing capabilities into a single environment, to modify legacy systems capabilities and capacities				
Mission Partner Environmnet	1	2019	3	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	205.048	322.187	253.825	0.000	253.825	248.661	237.211	232.660	236.630	Continuing	Continuing
646008: *US Cyber Command Technology Development*	-	205.048	322.187	253.825	0.000	253.825	248.661	237.211	232.660	236.630	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2019, elements of PE 0306250F, Cyber Operations Technology Development, Project Joint Common Services efforts were transferred to PE 0208097F, Joint Cyber Command and Control, in order to increase clarity and delineation from other activities.

In FY2019, elements of PE 0306250F, Cyber Operations Technology Development, Project Joint Common Services efforts were transferred to PE 0208099F, Unified Platform, in order to increase clarity and delineation from other activities.

A. Mission Description and Budget Item Justification

US Cyber Command's (USCYBERCOM) mission is to deter or defeat strategic threats to US interests and infrastructure, provide mission assurance for the operations and defense of the Department of Defense information environment, and support the achievement of Joint Force Commander objectives.

USCYBERCOM in conjunction with the Services and Defense Agencies will develop and expand infrastructure architectures and cyber tools and capabilities to support Cyber Mission Forces (CMF) to "fight tonight" with lethality, resiliency, and innovative deterrence against key threats in the strategic environment. Focus is on four broad program areas: Joint Common Services, Joint Access Platforms, Joint Tools, and Joint Analytics.

The specific details and aspects of these cyber activities are classified and will be provided on a need-to-know basis. Please contact USCYBERCOM, 443-634-7725.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	162.644	322.187	203.833	0.000	203.833
Current President's Budget	205.048	322.187	253.825	0.000	253.825
Total Adjustments	42.404	0.000	49.992	0.000	49.992
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	48.000	0.000			
• SBIR/STTR Transfer	-5.596	0.000			
• Other Adjustments	0.000	0.000	49.992	0.000	49.992

Change Summary Explanation

In FY2017, PE 0306250F, Cyber Operations Technology Development, Project Joint Tools, was increased by $48.0M to address Missile Defeat and Defense Enhancement efforts. Additional details are classified.

In FY2019, PE 0306250F, Cyber Operations Technology Development, Project Joint Tools, was increased by $49.992M to address Missile Defeat and Defense Enhancement efforts. Additional details are classified.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Combatant Command Support	79.108	0.000	0.000

Description: Supports the development and testing of various cyber tools critical to achieving Combatant Command mission requirements and military objectives. Activities include research, studies, integration, analysis, access development, and operational assessment of cyberspace capabilities, methodologies, and tactics in support of Combatant Command objectives and requirements.

Further details are held at higher classification levels.

FY 2018 Plans:
N/A

FY 2019 Plans:
N/A

FY 2018 to FY 2019 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
N/A			
Title: Defend the Nation ***Description:*** Funding supports the prototype development of a diverse cyber capability portfolio to enable efforts to defeat a wide variety of cyber attacks. Efforts include research, integration, analysis, access development, training, testing, and assessments for defensive cyber capabilities. Further details are held at higher classification levels. ***FY 2018 Plans:*** N/A ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	71.297	0.000	0.000
Title: Operate and Defend the DoDIN / Cyber Situational Awareness / Unified Platform ***Description:*** Supports engineering and development of tools, data strategy, and management of a common operating picture. Support operations focused on cyber key terrain at the global and national level and for cyber situational awareness for the Services and CCMDs. Further details are held at higher classification levels. ***FY 2018 Plans:*** N/A ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	54.643	0.000	0.000
Title: Joint Common Services ***Description:*** Funding supports capabilities used in CMF to conduct cyber operations. The origin, details, and specific aspects of these efforts are classified and will be provided on a need-to-know basis. Please contact USCYBERCOM, 443-634-7725. ***FY 2018 Plans:***	-	82.374	52.443

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Establish and evolve the Military Cyberspace Operations Platform (MCOP) to enable split-based offensive and defensive operations. Continue to advance the Unified Platform's Mission Essential Support Infrastructure (MESI) capabilities and integration of Service infrastructure to the MCOP. Fully deploy CENTROPY for an initial set of use cases. CENTROPY is a Cyber C2 system that provides oversight and management of operational readiness. Continue to support Phase 2 build-out for the Cyber Situation Awareness Evaluation of Alternatives. Continue to support delivery of the Unified Cyber Analysis Portal (UCAP) to a full operational capability (FOC) that provides a comprehensive solution for malware triage. Continue employment of USCYBERCOM cross domain solutions that enable automated data flow from access platform to data repository. Continue development of the Unclassified Amazon Web Services (AWS) GovCloud and Big Data Platform (BDP) that enables the Service CMF teams to identify anomalous behavior on the DODIN network. Continue development of technologies, policies, and processes needed to enable Intelligence and "indicator" sharing across the DODIN tiers and domains. ***FY 2019 Plans:*** Will continue the development of the MCOP as the common joint capability to enable split-based, offensive and defensive operations. Will deploy CENTROPY on three domains. Will continue to develop and expand the malware analysis capabilities of the UCAP. Will continue development of USCYBERCOM cross domain solutions that enable automated data flow from access platform to data repository.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Will continue development of the Unclassified Amazon Web Services (AWS) GovCloud and Big Data Platform (BDP) that enables the Service CMF teams to identify anomalous behavior on the DODIN network. Will continue development of technologies, policies, and processes needed to enable Intelligence and "indicator" sharing across the DODIN tiers and domains. Will continue development and employment of technologies, policies, and processes needed to enable Intelligence and "indicator" sharing across the DODIN tiers and domains. OSD designated the Air Force as Executive Agent for the Unified Platform and Joint Cyber Command and Control. Will transition the Unified Platform and Joint Cyber Command and Control activities to USAF. Some aspects of the efforts are classified and will be provided on a need-to-know basis. For further information, please contact USCYBERCOM, 443-634-7725. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due the OSD designation of the US Air Force as Executive Agent for the Unified Platform (UP) and Joint Cyber Command and Control (JCC2) program. No FY19 funds are being applied to UP or JCC2 in this Program Element (PE) code.			
Title: Joint Access Platforms ***Description:*** Funding supports capabilities used in Cyber Mission Force (CMF) operations to access targets and retrieve data. The origin, details, and specific aspects of these efforts are classified and will be provided on a need-to-know basis. Please contact USCYBERCOM, 443-634-7725. ***FY 2018 Plans:*** Continue employment of the on-net operations infrastructure used to conduct Title 10 cyberspace operations. Support continued employment and deliver to reach Full Operational Capability (FOC), a system that provides a client/server platform to deliver multiple mission-based cyber effects. Continue development of operational system that delivers distributed denial of service (DDoS) capabilities on the Department of Defense Information Network (DODIN).	-	58.735	83.730

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Continue extension and sustainment of the text classifier machine learning capabilities. ***FY 2019 Plans:*** Will continue development and deployment of on-net operations infrastructure. Will continue to develop improvements for client/server platforms that delivers multiple mission-based cyber effects. Will continue development of operational system that delivers DDoS capabilities on the DODIN. Some aspects of the efforts are classified and will be provided on a need-to-know basis. For further information, please contact USCYBERCOM, 443-634-7725. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to a planned expansion in Strategic Cyber Deterrence efforts in response to evolving targets.			
Title: Joint Tools ***Description:*** Funding supports capabilities used by the CMF to exploit targets during operations. The origin, details, and specific aspects of these efforts are classified and will be provided on a need-to-know basis. Please contact USCYBERCOM, 443-634-7725. ***FY 2018 Plans:*** Continue development of the deployed exploitation framework for USCYBERCOM. Continue the tool repository and signature management study on each spiral of delivered tools that enables tool measurement and repository as well as a means to manipulate tool code to minimize risk of discovery. Continue to develop and deliver additional foundational tools suites and continue to populate existing tool suites with the full complement of required capabilities. The foundational tool suites will provide operational agility for CMF cyberspace operations. Continue spiral development process of cyberspace operations basic tools that provide operational agility during CMF effects operations. Continue to support development and employment of the results from the signature diversity study. Support Joint Task Force ARES OCO requirements.	-	170.516	107.400

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Continue to support a classified research and development effort in support of combatant command requirements. All aspects of this effort are classified and will be provided on a need know basis. This is a congressional special interest item. ***FY 2019 Plans:*** Will continue development of the USCYBERCOM exploitation frameworks. Will complete implementation of signature diversity capability which will have the effect of force multiplication. This capability will enable manipulation of tools code such that a single tool can look like multiple tools and provides a means to minimize risk of discovery. Will continue to develop and deliver additional foundational tools suites and continue to populate existing tool suites with the full complement of required capabilities. The foundational tool suites will provide operational agility for CMF cyberspace operations. Will continue to grow the tool repository and measure signatures on each spiral of delivered tools to verify uniqueness of tools considered to be diverse. Will continue to develop and deliver specialized tools and exploits to CMF. Tools are targeted to specific adversary targets and technologies to enable specific cyber operations. Will continue to support Joint Task Force ARES. Will continue to support a classified research and development effort in support of combatant command requirements. All aspects of this effort are classified and will be provided on a need know basis. This is a congressional special interest item. Some aspects of the efforts are classified and will be provided on a need to know basis. For further information, please contact USCYBERCOM, 443-634-7725. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to reduction of effort on classified project.			
Title: Joint Analytics ***Description:*** Funding in Analytics supports capabilities used in CMF operations to correlate data collected from multiple sources to garner unique insight to enable decision making.	-	10.562	10.252

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
The origin, details and specific aspects of these efforts are classified and will be provided on a need-to-know basis. Please contact USCYBERCOM, 443-634-7725. ***FY 2018 Plans:*** Support creation and development of Advanced Data Analytics that provide big data analysis tools and techniques, assist with developing target folders (to include target analysis, target system analysis, and network analysis), provide technical expertise on data query strategies, provide technical continuity for development efforts. ***FY 2019 Plans:*** Will continue development and sustainment of Advanced Data Analytics for cyber operations. Many aspects of the effort are classified and will be provided on a need-to-know basis. For further information, please contact USCYBERCOM at 443-634-7725. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decrease due to rate adjustments.			
Accomplishments/Planned Programs Subtotals	205.048	322.187	253.825

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Facilitate the delivery of technology capabilities to the Cyber Mission Forces, by applying innovative solutions for existing and emerging technologies. Contracts are awarded under full and open completion whenever possible. Variations of both Fixed Price (FP) and Cost Plus (CP) contracting vehicles will be used and managed by USCYBERCOM Acquisition authority, various Service Component contracting offices, Combatant Command Contracting offices and National Security Agency contracting offices.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*	**Project (Number/Name)** 646008 / *US Cyber Command Technology Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Combatant Command Support	Various	Multiple Agencies : Various	-	79.108	Jul 2017	-		-		-		-	Continuing	Continuing	-
Defend the Nation	Various	Multiple Agencies : Various	-	71.297	Nov 2016	-		-		-		-	Continuing	Continuing	-
Operate and Defend the DoDIN / Cyber Situational Awareness / Unified Platform	Various	Multiple Agencies : Various	-	54.643	Nov 2016	-		-		-		-	Continuing	Continuing	-
Joint Common Services	Various	Multiple Agencies : Various	-	-		81.724	Feb 2018	51.609	Apr 2019	-		51.609	Continuing	Continuing	-
Joint Access Platforms	Various	Multiple Agencies : Various	-	-		58.085	Feb 2018	82.896	Apr 2019	-		82.896	Continuing	Continuing	-
Joint Tools	Various	Multiple Agencies : Various	-	-		169.866	Feb 2018	106.566	Apr 2019	-		106.566	Continuing	Continuing	-
Joint Analytics	Various	Multiple Agencies : Various	-	-		9.912	Feb 2018	9.418	Apr 2019	-		9.418	Continuing	Continuing	-
		Subtotal	-	205.048		319.587		250.489		-		250.489	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA	Various	Various : Various	-	-		2.600	Feb 2018	3.336	Apr 2019	-		3.336	Continuing	Continuing	-
		Subtotal	-	-		2.600		3.336		-		3.336	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	205.048		322.187		253.825		-		253.825	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*	**Project (Number/Name)** 646008 / *US Cyber Command Technology Development*

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*	**Project (Number/Name)** 646008 / *US Cyber Command Technology Development*

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*	**Project (Number/Name)** 646008 / *US Cyber Command Technology Development*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
22. Analytics tools development (Joint Analytic, formerly Combatant Command Support and Operate and Defend the DODIN)																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*	**Project (Number/Name)** 646008 / *US Cyber Command Technology Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Cyber Operations Technology Development				
1. UP AoA (Joint Common Services, formerly Defend the Nation)	1	2017	4	2018
2. UP RR (Joint Common Services, formerly Defend the Nation)	1	2017	4	2018
3. Cyber C2 Pilot (Joint Common Services, formerly Defend the Nation)	1	2017	4	2017
4. Cyber C2 FOC (Joint Common Services)	1	2018	4	2019
5. Cyber C2 Spiral Development (Joint Common Services)	1	2020	4	2023
6. Cyber SA Prototype (Joint Common Services, formerly Defend the Nation)	1	2017	4	2018
7. Data analytics platform next GEN (Joint Common Services)	2	2018	2	2020
8. Cyber UCAP FOC (Joint Common Services, formerly Defend the Nation)	1	2017	2	2018
9. Cyber UCAP Spiral Development - 1 (Joint Common Services)	3	2019	1	2021
10. Cyber UCAP Spiral Development - 2 (Joint Common Services)	4	2023	4	2023
11. CYBERCOM access platform IOC (Joint Access Platforms, formerly Combatant Command Support and Operate and Defend the DODIN)	1	2017	4	2019
12. CYBERCOM access platform build out capacity (Joint Access Platforms, formerly Combatant Command Support and Operate and Defend the DODIN)	3	2017	4	2023
13. Cyber data flow cross domain solution (Joint Access Platforms, formerly Combatant Command Support and Operate and Defend the DODIN)	1	2017	4	2019
14. Mission-based platform IOC (Combatant Command Support and Operate and Defend the DODIN)	1	2017	3	2017
15. Mission-based platform FOC (Joint Access Platforms, formerly Combatant Command Support and Operate and Defend the DODIN)	4	2017	3	2022
16. DDoS for DODIN sustain (Joint Access Platforms, formerly Combatant Command Support and Operate and Defend the DODIN)	1	2017	4	2019
17. DDoS for DODIN spiral development (Joint Access Platforms)	1	2018	4	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0306250F / *Cyber Operations Technology Development*	**Project (Number/Name)** 646008 / *US Cyber Command Technology Development*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
18. Exploitation framework spiral development (annual) - (Joint Tools, formerly Combatant Command Support and Operate and Defend the DODIN)	2	2017	4	2023
19. Foundational tool suites (spirals annual) - (Joint Tools, formerly Combatant Command Support and Operate and Defend the DODIN)	2	2017	4	2023
20. Tool signature management study (Joint Tools, formerly Combatant Command and Support and Operate and Defend the DODIN)	2	2017	4	2018
21. Data analytics platform IOC (Joint Analytics, formerly Combatant Command Support and Operate and Defend the DODIN)	1	2017	4	2018
22. Analytics tools development (Joint Analytic, formerly Combatant Command Support and Operate and Defend the DODIN)	1	2017	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0306415F / *Enabled Cyber Activities*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	15.842	16.687	16.325	0.000	16.325	16.632	16.917	17.268	17.582	Continuing	Continuing
646008: *US Cyber Command Technology Development*	-	15.842	16.687	16.325	0.000	16.325	16.632	16.917	17.268	17.582	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

US Cyber Command's (USCYBERCOM) mission is to deter or defeat strategic threats to US interests and infrastructure, provide mission assurance for the operations and defense of the Department of Defense information environment, and support the achievement of joint force commander objectives.

USCYBERCOM develops or procures capabilities to enable Electronic Warfare and cyber-peculiar technologies for use by the Cyber Mission Forces (CMF).

The specific details and aspects of these cyber activities are classified and will be provided on a need-to-know basis. Please contact USCYBERCOM at 443-634-7725.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	15.842	16.687	16.448	0.000	16.448
Current President's Budget	15.842	16.687	16.325	0.000	16.325
Total Adjustments	0.000	0.000	-0.123	0.000	-0.123
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.123	0.000	-0.123

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Cyber Technology Development	15.842	16.687	16.325
Description: Demonstrate, develop, and evaluate prototype electronic warfare (EW) and cyber capabilities.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0306415F / *Enabled Cyber Activities*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
The origin, details and specific aspects of these efforts are classified. ***FY 2018 Plans:*** Continue to adapt Electronic Warfare (EW) technology to facilitate the development and delivery of EW and cyber-peculiar capabilities. The origin, details, and specific aspects of these efforts are classified and will be provided on a need-to-know basis. For further information please contact USCYBERCOM at 443-634-7725. ***FY 2019 Plans:*** Will continue to adapt EW technology and cyber-peculiar capabilities to gain access to targeted enemy forces. Many aspects of the effort are classified and will be provided on a need-to-know basis. For further information, please contact USCYBERCOM at 443-634-7725. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to Inflation Rate Adjustment.			
Accomplishments/Planned Programs Subtotals	15.842	16.687	16.325

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Facilitate the delivery of new Electronic Warfare (EW) Cyber capability, by applying innovative solutions for existing and emerging technologies. Contracts are awarded under full and open competition whenever possible. Variations of both Fixed Price (FP) and Cost Plus (CP) contracting vehicles will be used and managed by various Service Component contracting offices, Combatant Command contracting offices and National Security Agency contracting offices.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0306415F / *Enabled Cyber Activities*	**Project (Number/Name)** 646008 / *US Cyber Command Technology Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Cyber Technology Development	Various	Multiple Agencies : Various	-	15.842	Jul 2017	16.687	Mar 2018	16.325	May 2019	-		16.325	Continuing	Continuing	-
		Subtotal	-	15.842		16.687		16.325		-		16.325	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	15.842		16.687		16.325		-		16.325	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0306415F / *Enabled Cyber Activities*	**Project (Number/Name)** 646008 / *US Cyber Command Technology Development*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Electronic Warfare (EW) Capabilities																												
EW Tech IOC																												
EW Capability Spiral (annual)																												
SATCOM Capability Spiral (annual)																												
Communications Capabiliy Spiral (annual)																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0306415F / *Enabled Cyber Activities*	**Project (Number/Name)** 646008 / *US Cyber Command Technology Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Electronic Warfare (EW) Capabilities				
EW Tech IOC	1	2017	3	2017
EW Capability Spiral (annual)	1	2017	4	2023
SATCOM Capability Spiral (annual)	1	2017	4	2023
Communications Capabiliy Spiral (annual)	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0408011F / *Special Tactics / Combat Control*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	4.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
646221: *Ground-based Counter-IADS (C-IADS) Capability*	-	0.000	4.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2019 Project 646221, A2AD (Anti-access and area denial) Threat Defeat was terminated

A. Mission Description and Budget Item Justification

Develop and field capabilities used to in identify, develop, modify, demonstrate, and integrate technical solutions that utilize coordinated effects in the avoidance and defeat of modern threat systems. Research existing and projected threats to systems as well as self-protection strategies and technologies, to develop counter-threat systems that deliver coordinated effects against threat systems.

In 2018 A2AD (Anti-access and area denial) Threat Defeat was a new start.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver nuclear weapon support capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0408011F / *Special Tactics / Combat Control*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	4.500	0.000	0.000	0.000
Current President's Budget	0.000	4.500	0.000	0.000	0.000
Total Adjustments	0.000	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: A2AD (Anti-access and area denial) Threat Defeat	0.000	4.500	0.000	0.000	0.000
Description: Develop and field capabilities used to in identify, develop, modify, demonstrate, and integrate technical solutions that utilize coordinated effects in the avoidance and defeat of modern threat systems. Research existing and projected threats to systems as well as self-protection strategies and technologies, to develop counter-threat systems that deliver coordinated effects against threat systems. ***FY 2018 Plans:*** - Completed successful proof of concept demonstration against advanced threat systems. ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Program Complete					
Accomplishments/Planned Programs Subtotals	0.000	4.500	0.000	0.000	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0408011F / *Special Tactics / Combat Control*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 03 Line item 837100: *Tactical C-E Equipment*	43.833	15.524	36.389	25.000	61.389	52.094	44.269	66.330	19.315	Continuing	Continuing

Remarks

E. Acquisition Strategy

BAO Kit is executing initial prototype research and development for this effort. Development will include system engineering, design, integration and fielding for C-IADS and Indefinite Quantity system upgrades. Wright Patterson AFB, OH manages the contract effort

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0408011F / *Special Tactics / Combat Control*	**Project (Number/Name)** 646221 / *Ground-based Counter-IADS (C-IADS) Capability*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A2AD Threat Defeat	TBD	Various : TBD	-	-		4.500		-		-		-	Continuing	Continuing	-
		Subtotal	-	-		4.500		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		4.500		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0408011F / *Special Tactics / Combat Control*	**Project (Number/Name)** 646221 / *Ground-based Counter-IADS (C-IADS) Capability*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
N/A																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0408011F / *Special Tactics / Combat Control*	**Project (Number/Name)** 646221 / *Ground-based Counter-IADS (C-IADS) Capability*

Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
N/A	1	2018	4	2018

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0901410F / *Contracting Information Technology System*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	6.938	15.867	17.577	0.000	17.577	20.830	5.672	17.485	8.274	Continuing	Continuing
643483: *CON-IT*	-	6.938	15.867	17.577	0.000	17.577	20.830	5.672	17.485	8.274	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Contracting Information Technology System (CON-IT) provides a single contract writing system for the Air Force contracting community to support all contracting needs including base operations, logistics, contingency and weapons system contracting world-wide. CON-IT will enable strategic sourcing and other acquisition efficiencies by standardizing data, business rules, and milestone tracking. Furthermore, CON-IT will allow for a standardized and integrated method of anticipating, reacting, and responding to the current pace and changes in process, regulation, and technology across the contract domain. CON-IT is the replacement for Standard Procurement System (SPS). When fully implemented, CON-IT will enable business process changes necessary to converge on a common contract writing/management capability within the Air Force.

CON-IT capabilities will be developed in accordance with the agile software development methodology. The CON-IT Integrated Program Office (IPO) will configure upon the Defense Information Systems Agency's (DISA's) government off-the-shelf (GOTS) product called Integrated Defense Enterprise Acquisition System (IDEAS) contract writing system, which provided a 75% solution that serves as a baseline for CON-IT. CON-IT will utilize a non-traditional acquisition approach by leveraging DISA IDEAS as well as partnering with the United States Department of Agriculture's (USDA) Enterprise Application Services (EAS) team via an inter-agency agreement to develop, test, validate, train end users, deploy, and maintain CON-IT. USDA's National Information Technology Center (NITC) will provide and maintain the hosting environment.

Gap requirements will be addressed through an iterative process of sprint development cycles, where usable capability is produced and made available to operational users after every sprint. The IPO construct along with application of agile principles allows the program to properly plan system requirements, deliver early capability to the end users, achieve early return on investment of taxpayer dollars, division of risk, reduce waste, effectively respond to change, and continuously improve our processes.

Through agile software development CON-IT will address the current inefficiencies in the contracting domain, given there are multiple contract writing systems that continue to challenge the ability to operate responsively, consistently, and cost-effectively to award, administer, and close out mission critical contracts in a timely fashion. CON-IT will allow the contracting community to fully support compliance with financial auditability and Financial Improvement Audit Readiness (FIAR) goals that depend on the integrity of the data flow through the Procure to Pay (P2P) process.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CON-IT weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F and 0605833F.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0901410F / *Contracting Information Technology System*

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	5.782	15.867	22.709	0.000	22.709
Current President's Budget	6.938	15.867	17.577	0.000	17.577
Total Adjustments	1.156	0.000	-5.132	0.000	-5.132
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	1.156	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-5.132	0.000	-5.132

Change Summary Explanation

FY17 $1.156M increase due to BTR approved Sep 2017.
FY19 -$5.132M decrease due to higher Air force priorities.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: CON-IT	6.938	15.867	17.577	0.000	17.577
Description: Initiated in FY17 and continuing in FY18 CON-IT's agile development execution is resulting in delivery of contracting capability to operational contracting officers (COs). CON-IT system capabilities continue to be developed and enhanced through completion of development sprint cycles in accordance with our agile software development strategy. Furthermore, the CON-IT Integrated Program Office (IPO) has established early user engagement through a series of SME Familiarization (FAM) Events, in which system capabilities produced from each sprint cycle are tested by operational COs and valuable user feedback is collected and incorporated into our requirements backlog. Early Operational Capability (EOC) was achieved in Oct 17 with the deployment of current CON-IT capabilities to 12AF (AFSOUTH) users in which the users were successfully able to execute contracting actions and produce procurement instruments in support of SOUTHCOM/AFSOUTH mission requirements. In addition, the CON-IT IPO has integrated the AETC Contracting Schoolhouses into our training activities; provided initial training to the instructors; ensured the schoolhouses develop and incorporate CON-IT into their training curriculum for new CO accessions. The successfulness of these events greatly aids in					

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0901410F / *Contracting Information Technology System*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
our risk reduction and organizational change management (OCM) efforts. Future system development continues to be planned through an iterative process of sprint/release planning and backlog grooming activities between all our stakeholder partners which ensures that the capabilities developed meet our end users' needs and increase mission success. ***FY 2018 Plans:*** - Update inter-agency agreement with System Integrator - Continue development and deployment activities for Sprints 25-36 - Continue CON-IT acquisition planning, reporting, and execution activities for future capabilities - Continue development of plans for design, development, test, and training - Continue planning activities, prototyping, and risk reduction for future capabilities - Plan and conduct SME FAM events of future CON-IT capabilities - Stand up production and schoolhouse training environments - Connect to NIPR, secure Authority to Proceed (ATO) authorization, and stand up help desk support ***FY 2019 Base Plans:*** - Will update inter-agency agreement with System Integrator - Will continue development and deployment activities - Will complete Government Furnished Equipment (GFE) requirements and development and test plans - Will continue IT infrastructure services - Will continue CON-IT acquisition planning, reporting, and execution activities for future capabilities ***FY 2019 OCO Plans:*** Not applicable - CON-IT has no OCO funding ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to ramp-up of concurrent Increment Development activities					
Accomplishments/Planned Programs Subtotals	6.938	15.867	17.577	0.000	17.577

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 03 Line Item #834010: *General Information Technology*	-	-	5.443	-	5.443	0.000	0.000	0.000	0.000	Continuing	Continuing

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0901410F / *Contracting Information Technology System*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost

Remarks

Other Procurement Air Force (OPAF) funding is for the purchase of software licenses required for the CON-IT System. In FY17, CON-IT OPAF ($5.9M) was a new start. New Start notification letters were sent to all four committees on 12 Sep 17 with intent to purchase end user licenses for the system.

E. Acquisition Strategy

CON-IT will be developed using an incremental approach following the Business Capability Acquisition Cycle (BCAC). An interagency agreement with US Department of Agriculture (USDA) for risk reduction, prototyping and subsequent development activities has been signed and is currently in effect. This agreement requires annual renewal. Re-use of an existing fielded GOTS (Government-Off-The-Shelf) product from DISA (Defense Information Systems Agency) is the preferred approach/Course of Action.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0901410F / *Contracting Information Technology System*	**Project (Number/Name)** 643483 / *CON-IT*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CON IT: Prime Developer/ Systems Integrator	MIPR	Contracting Information : Wright Patterson AFB, OH	-	1.156	Oct 2016	8.000	Oct 2017	10.087	Oct 2018	-		10.087	Continuing	Continuing	-
		Subtotal	-	1.156		8.000		10.087		-		10.087	Continuing	Continuing	N/A

Remarks

Interagency agreement with USDA (United States Department of Agriculture)

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CON IT: Prototype, risk reduction, test and staging environment from USDA	MIPR	Various : Various	-	1.000	Oct 2016	3.085	Oct 2017	2.115	Oct 2018	-		2.115	Continuing	Continuing	-
		Subtotal	-	1.000		3.085		2.115		-		2.115	Continuing	Continuing	N/A

Remarks

USDA: United States Department of Agriculture

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CON IT: Program Management Administration	C/CPAF	AFLCMC/HI : Wright Patterson AFB, OH	-	0.934	Dec 2016	0.934	Oct 2017	1.850	Oct 2018	-		1.850	Continuing	Continuing	-
CON IT: Program Management Administration, Cost Estimating Support, Travel, Supplies, Equipment, Program Office Network	Various	AFLCMC/HIBB : WPAFB, OH	-	3.848	Dec 2016	3.848	Oct 2017	3.525	Oct 2018	-		3.525	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0901410F / *Contracting Information Technology System*	**Project (Number/Name)** 643483 / *CON-IT*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support, Engineering Services, etc.															
		Subtotal	-	4.782		4.782		5.375		-		5.375	Continuing	Continuing	N/A

Remarks

A&AS: Advisory & Assistance Services
Multiple contract awards for less than $1M per award

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	6.938		15.867		17.577		-		17.577	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0901410F / *Contracting Information Technology System*	**Project (Number/Name)** 643483 / *CON-IT*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 0901410F / *Contracting Information Technology System*	**Project (Number/Name)** 643483 / *CON-IT*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CON-IT Incremental Development Activities				
Requirements, Development, Test Planning for CON-IT Increments 1 - 5	1	2017	4	2023
Inc 1 Milestone B (April 2017)	3	2017	3	2017
Development, Production, Test Planning for CON-IT Increment 1	3	2017	2	2019
Early Operational Capability (Inc 1)	1	2018	2	2018
Limited Deployment Decision (Inc 1)	1	2018	3	2018
Full Deployment Decision (Inc 1)	4	2018	2	2019
Inc 1 Ops & Support (Continuing)	1	2019	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	497.190	297.975	253.939	286.629	0.000	286.629	240.748	155.139	82.178	71.686	90.965	1,976.449
643833: *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*	497.190	297.975	253.939	286.629	0.000	286.629	240.748	155.139	82.178	71.686	90.965	1,976.449
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 447

A. Mission Description and Budget Item Justification

The Global Positioning System (GPS) is a space-based radio Positioning, Navigation, and Timing (PNT) distribution system. GPS User Equipment (UE) consists of standardized receivers, antennas, antenna electronics, and other related equipment, grouped together in sets to derive navigation and time information transmitted from GPS satellites. These receiver sets are used by the Department of Defense (DoD). Research, Development, Test and Evaluation (RDT&E) funds UE development, integration, test, and analysis for new PNT receiver capabilities in Navigation Warfare (NAVWAR) across all military platforms using GPS services.

The Military Global Positioning System User Equipment (MGUE) Increment 1 program is responsible for the development of standard modernized receiver form factors for the Service-nominated lead platforms. The MGUE Capability Development Document (CDD) was approved by the Joint Requirements Oversight Council (JROC) on 24 Jul 2014. MGUE Increment 1 is initiating a new family of modernized GPS receivers that will deliver significantly improved capability to counter current and emerging PNT threats and enable military operations in a NAVWAR environment where current legacy receiver performance would be compromised. MGUE Increment 1 received a Milestone A decision in April 2012. The program received direction in February 2014 from the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) to execute a new acquisition strategy, accelerating the program to provide test units faster to facilitate military end users. The MGUE program received a Milestone B decision in January 2017 and is in the Engineering and Manufacturing phase.

The MGUE Increment 2 effort will continue to employ Military Code (M-Code) receiver technology into additional applications (space receiver, precision guided munitions, and handheld receiver) to meet Service requirements. This effort leverages the MGUE Increment 1 technology to the maximum extent while addressing producibility of M-Code integrated circuits far into the future.

Joint Service System Management Office (JSSMO)
GPS receivers enable precision navigation solutions for warfighters across the spectrum of land, sea and air domains. In 2006, Assistant Secretary of Defense for Networks and Information Integration (ASD (NII)) directed the Air Force to develop production ready M-Code components to meet Service needs. Public Law 111-383 913, effective 7 Jan 2011, prohibits procurement of GPS equipment unless it is M-Code capable after FY2017. The completion of card level compatibility and security certification will enable integration of M-Code capability into military GPS Receivers. Additionally, in 2010, the Federal Aviation Administration (FAA) published new Automatic Dependent Surveillance Broadcast (ADS-B) rules effective January 1, 2020.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*

The ADS-B rule requires platform operators to have ADS-B avionics installed and operating in order to fly Mode S Identification Friend or Foe (IFF) Transponder equipped aircraft into FAA and/or International Civil Aviation Organization (ICAO) Mode S enabled Air-to-Air and Air-to-Ground, Surveillance airspace. DoD aircraft are not exempt from the FAA mandate.

In FY 2018, JSSMO efforts transferred to Program Element (PE) 0604201F.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This PE may include necessary civilian pay expenses required to manage, execute, and deliver MGUE capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in PEs 1206392F and 1206398F.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	278.147	253.939	195.528	0.000	195.528
Current President's Budget	297.975	253.939	286.629	0.000	286.629
Total Adjustments	19.828	0.000	91.101	0.000	91.101
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-4.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	34.900	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-11.072	0.000			
• Other Adjustments	0.000	0.000	91.101	0.000	91.101

Change Summary Explanation

FY2017: -$ 4.000M Early to Need for MGUE Program

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*

FY2017: +$34.900M Increase for JSSMO requirement

FY2019: -$17.000M Inc 1 improve funds management
FY2019: -$ 2.156M Inflation
FY2019: +$13.615M Fund MGUE Inc 2
FY2019: +$83.442M Fund MGUE Inc 1 to 2017 Independent Cost Estimate (ICE)
FY2019: +$13.200M Fund impact to MGUE from GPSIII Regional Military Protection (RMP)

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: MGUE Increment 1	122.989	114.861	89.723
Description: The MGUE Increment 1 program will develop standard modernized receiver form factors for the Service-nominated lead platforms in accordance with the MGUE Inc 1 CDD. ***FY 2018 Plans:*** Continue developmental test. Complete environmental and electromagnetic interface testing. Continue security certification efforts. Assist each lead platform office to integrate and test M-Code receivers in their respective platforms. Continue M-Code Application Specific Integrated Circuit (ASIC) producibility analysis, risk reduction, and early engineering. Continue to evaluate functional and performance capabilities. Continue Program Office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Complete developmental test in 4Q FY2019. Complete security certification efforts. Continue to assist each lead platform office to integrate and test M-Code receivers in their respective platforms. Continue M-Code ASIC producibility analysis, risk reduction and early engineering, and integrate Regional Military Protection (RMP) capabilities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $25.138M. Justification for this decrease is described in plans above.			
Title: MGUE Increment 2	5.200	1.500	89.647
Description: The MGUE Increment 2 effort will continue to develop M-Code receiver technology for additional applications (space receiver, precision guided munitions, and handheld receiver) to meet Service requirements. This effort leverages MGUE Increment 1 technology to the maximum extent while ensuring producibility of M-Code integrated circuits far into the future to support DoD PNT requirements. ***FY 2018 Plans:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Complete Increment 2 acquisition strategy. Complete Increment 2 ASIC and receiver requirement analysis and perform verification planning. Evaluate next generation ASIC and receiver design, engineering, and architecture with vendors, to include ASIC modeling and prototyping at new foundry. Conduct security certification planning activities. Begin preparations for ASIC fabrication and manufacturing. Start targeted risk reduction efforts by contractor(s) for M-Code Handheld. Continue Program Office and other related support activities that may include, but are not limited to studies, technical analysis, requirements analysis, contract documentation development, risk reduction activities, etc. ***FY 2019 Plans:*** Continue evaluation of next generation ASIC and receiver design, engineering, architecture and requirements review with vendors to include ASIC modeling, identify needed core ASIC technology (including but limited to: ASIC components, tools, design libraries and building blocks, etc.), characterize them for military purposes (e.g., temperatures, environments), design and prototype next generation ASIC at new foundry. Continue security certification planning activities and contract documentation preparation. Continue targeted risk reduction efforts by contractor(s) for M-Code Handheld. Begin preparations for ASIC fabrication and manufacturing. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $88.147M. Justification for this increase is described in plans above.			
Title: Advanced Technology ***Description:*** Advanced Technology includes efforts to mature technology for future GPS receivers called out in the MGUE CDD. These efforts aim to find innovative solutions to increase resiliency in GPS performance and improve on size, weight, power, and cost of military receivers. ***FY 2018 Plans:*** Develop new technologies to augment U.S. military GPS receiver development. Continue initiative to standardize the GPS Modernized UE advanced cryptography. Develop new receiver capability and cryptography to take advantage of all available satellite navigation systems and signals. Investigate integrity of other Global Navigation Satellite Systems (GNSS) signals for delivering assured PNT. Continue development of key technologies for advanced modernization GPS simulators and clocks, advanced antennas and antenna electronics as part of targeted risk reduction efforts, and navigation warfare capabilities. ***FY 2019 Plans:*** Develop antenna technologies to protect receiver against jamming in the GNSS area of operation. Continue developing new technologies to augment U.S. military GPS receiver development. Continue initiative to standardize the GPS Modernized UE advanced cryptography. Continue developing receiver capability and cryptography to take advantage of all available satellite navigation systems and signals. Investigate integrity of other GNSS signals for delivering assured PNT. Continue development of	7.940	8.150	9.270

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
key technologies for advanced modernization GPS simulators and clocks, advanced antennas and antenna electronics as part of targeted risk reduction efforts, and navigation warfare capabilities. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $1.120M. Justification for this increase is described in plans above.			
Title: System/Platform Integration and Performance Certification ***Description:*** Integration of MGUE Increment 1 receiver form factors into the Service-nominated lead platforms in support of developmental and operational test events. Conduct technical and operational modernization impact analysis for MGUE Service lead platform integration. ***FY 2018 Plans:*** Continue lead platform integration efforts in support of developmental and operational test events. Continue to assist DoD integration of M-Code GPS receivers for Joint Service non-lead platforms. Assist DoD Integration of M-Code GPS receivers for Joint Service non-lead platforms. ***FY 2019 Plans:*** Complete developmental test in support of lead platform integration. Continue lead platform integration efforts in support of operational test events. Continue to assist DoD integration of M-Code GPS receivers for Joint Service non-lead platforms. Assist DoD Integration of M-Code GPS receivers for joint Service non-lead platforms. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $9.327M. Justification for this decrease is described in plans above.	72.249	114.162	89.679
Title: Information Assurance, Security/Compatibility Certification, and Test/Evaluation ***Description:*** Develop, implement and maintain GPS security certification programs. Development of DoD Policy, Strategy & Resource Requirements for MGUE security certification and compatibility certification. Security certification, compatibility certification, and security approval ensures future military GPS receivers protect critical program information and continue working in all environments and concepts of operations called for by U.S. Strategic Command. ***FY 2018 Plans:*** Support lead platform integration and test activities. Continue Modernized Security Evaluations/Tests for Selective Availability Anti-Spoofing Module (SAASM) and other legacy GPS receiver equipment. Review, approve, and track SAASM, M-Code receivers, and legacy receiver certified platforms and integrated applications for all of DoD. Continue MGUE security planning activities to include security approval for non-lead platforms. Continue to enforce policy and other requirements related to receiver	17.417	15.266	8.310

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
compatibility accreditation with the GPS signal in space. Continue verification and validation required for security certification for all contractor's MGUE design. Continue security certification efforts for MGUE receivers. ***FY 2019 Plans:*** Complete security certification efforts for MGUE receivers. Support lead platform integration and test activities. Continue Modernized Security Evaluations/Tests for SAASM and other legacy GPS receiver equipment. Review, approve, and track SAASM, M-Code receivers, and legacy receiver certified platforms and integrated applications for all of DoD. Continue MGUE security planning activities to include security approval for non-lead platforms. Continue to enforce policy and other requirements related to receiver compatibility accreditation with the GPS signal in space. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $6.956M. Justification for this decrease is described in plans above.			
Title: JSSMO Embedded GPS/Inertial Navigation System(INS) (EGI) - Modernized (EGI-M) ***Description:*** Incorporates M-Code and ADS-B capability into EGI receivers while addressing parts obsolescence. ***FY 2018 Plans:*** Funds were transferred into JSSMO PE 1204201F ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	49.594	0.000	0.000
Title: JSSMO Miniaturized Airborne GPS Receiver (MAGR) 2K-M ***Description:*** Incorporates M-Code capability into MAGR 2K receivers while addressing parts obsolescence and providing a pathway to ADS-B Out implementation. ***FY 2018 Plans:*** Funds were transferred into JSSMO PE 1204201F ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	7.500	0.000	0.000
Title: JSSMO Government Reference Architecture (GRA)	4.000	0.000	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: Establish a GRA embodying open systems architecture concepts enabling robust, resilient GPS receiver designs which support future modifications at an accelerated pace and at lower cost than the current contractor proprietary architecture. ***FY 2018 Plans:*** Funds were transferred into JSSMO PE 1204201F ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A			
Title: JSSMO Strategic Planning ***Description:*** Conduct strategic planning for GPS receiver modernization. ***FY 2018 Plans:*** Funds were transferred into JSSMO PE 1204201F ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	11.086	0.000	0.000
Accomplishments/Planned Programs Subtotals	297.975	253.939	286.629

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 GPSSPC: *Navstar GPS Space*	2.082	2.198	2.181	-	2.181	2.221	2.259	2.305	2.349	Continuing	Continuing

Remarks

SPAF funding in this PE supports legacy SAASM efforts.

E. Acquisition Strategy

The MGUE program has developed a comprehensive acquisition strategy to provide modernized GPS capabilities to U.S. and Allied Forces by developing a competitive market driven approach. This strategy establishes the signal compatibility and security criteria along with a process for evaluating components to enable rapid movement

from development to fielding. The pillars of this effort are: (a) establishing time certain and low risk development; (b) bounding requirements to leverage mature technology to the maximum extent possible; (c) focusing on the development of form factors based on well-defined standards to support lead platform integration; and (d) implementing a proactive, collaborative MGUE platform integration activity to mitigate risk and reduce cost for DoD force structure modernization.
The MGUE program awarded three sole source contracts for the Increment 1 Technology Development Phase effort in September 2012, as follow-on efforts to the competitively awarded Modernized User Equipment (MUE) contracts awarded in June 2006. The effort spans the Technology Maturation and Risk Reduction Phase through design and includes integration and test of M-Code receivers into Service-nominated lead platforms. This effort also includes the security and compatibility certification of GPS receiver cards as a part of the Integration effort. The Service lead platforms will select from the available vendors to integrate and perform operational testing with funding from the MGUE program. This supports compliance with Public Law 111-383, section 913.

----------JSSMO----------
Modifications to existing receivers designs will occur via Engineering Change Proposals (ECPs)/Task Orders on existing USAF contracts. There is associated procurement funding by aircraft platforms tied to this development activity.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	**Project (Number/Name)** 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MGUE Increment 1 Technology Development (Rockwell)	C/CPIF	Rockwell Collins : Cedar Rapids, IA	88.996	29.200	Jan 2017	35.500	Nov 2017	21.849	Nov 2018	-		21.849	26.320	201.865	-
MGUE Increment 1 Technology Development (Raytheon)	C/CPIF	Raytheon : El Segundo, CA	93.591	30.035	Jan 2017	18.600	Nov 2017	12.455	Nov 2018	-		12.455	13.950	168.631	-
MGUE Increment 1 Technology Development (L3)	C/CPIF	L3 : Anaheim, CA	57.352	20.391	Jan 2017	27.400	Nov 2017	8.636	Nov 2018	-		8.636	9.326	123.105	-
MGUE Increment 1 Pre-Tech Development	C/CPAF	Various : Various	19.340	7.940	Jan 2017	8.150	Jan 2018	9.270	Jan 2019	-		9.270	14.900	59.600	-
MGUE Increment 1 MGUE Demonstrations	C/CPFF	Various : Various	24.000	-		-		-		-		-	0.000	24.000	-
MGUE Increment 1 Platform Integration	C/CPAF	Various : Various	71.826	67.067	Jan 2017	96.622	Nov 2017	71.709	Nov 2018	-		71.709	85.633	392.857	-
MGUE Increment 1 Compatibility Certification	C/CPAF	Various : Various	12.548	-		-		-		-		-	0.000	12.548	-
MGUE Increment 1 Information Assurance	C/CPAF	Various : Various	12.955	4.270	Jan 2017	4.370	Jan 2018	2.650	Jan 2019	-		2.650	8.350	32.595	-
MGUE Increment 1 Security Certification	C/CPAF	Various : Various	26.014	2.946	Jan 2017	3.026	Jan 2018	1.740	Jan 2019	-		1.740	6.152	39.878	-
MGUE Increment 2	C/TBD	Various : Various	-	5.200	Jul 2017	1.500	Jan 2018	89.647	Jan 2019	-		89.647	297.522	393.869	-
MGUE Technical Mission Analysis	MIPR	Various : El Segundo, CA	12.117	12.890	Oct 2016	13.000	Oct 2017	13.340	Oct 2018	-		13.340	29.430	80.777	-
MGUE Increment 1 Enterprise SE&I	C/CPAF	TASC : El Segundo, CA	14.382	17.110	Nov 2016	17.540	Nov 2017	17.970	Nov 2018	-		17.970	37.270	104.272	-
MGUE RMP	C/CPIF	Various : Various	-	-		-		13.200	Jan 2019	-		13.200	81.000	94.200	-
JSSMO EGI-M 1	SS/CPFF	Honeywell : Clearwater, FL	-	21.956	Dec 2016	-		-		-		-	0.000	21.956	-
JSSMO EGI-M 2	SS/CPFF	Northrop Grumman : Woodland Hills, CA	-	27.638	Dec 2016	-		-		-		-	0.000	27.638	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	**Project (Number/Name)** 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
JSSMO MAGR 2K-M	SS/CPFF	Raytheon : El Segundo, CA	-	7.500	Dec 2016	-		-		-		-	0.000	7.500	-
JSSMO GRA	TBD	Not specified. : TBD	-	4.000	Dec 2016	-		-		-		-	0.000	4.000	-
JSSMO Strat Planning	TBD	Not specified. : TBD	-	-		-		-		-		-	0.000	0.000	-
		Subtotal	433.121	258.143		225.708		262.466		-		262.466	609.853	1,789.291	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MGUE Increment 1 Test and Evaluation	Various	Various : San Diego, CA	10.133	7.450	Jan 2017	7.870	Jan 2018	3.920	Jan 2019	-		3.920	2.410	31.783	-
JSSMO Strategic Planning - Test	Various	Various : TBD	-	1.986		-		-		-		-	0.000	1.986	-
		Subtotal	10.133	9.436		7.870		3.920		-		3.920	2.410	33.769	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MGUE Increment 1 and FFRDC	Various	Aerospace : El Segundo, CA	27.583	6.420	Oct 2016	5.867	Dec 2017	4.450	Dec 2018	-		4.450	12.883	57.203	-
MGUE Increment 1 and FFRDC 2	Various	MITRE : El Segundo, CA	7.455	1.460	Dec 2016	1.360	Dec 2017	1.390	Dec 2018	-		1.390	2.890	14.555	-
MGUE Increment 1 and A&AS	Various	Various : Various	18.239	13.076	Dec 2016	12.815	Dec 2017	14.087	Dec 2018	-		14.087	12.016	70.233	-
MGUE Increment 1 and Other Support	Various	Various : Various	0.659	0.340	Dec 2016	0.319	Dec 2017	0.316	Dec 2018	-		0.316	0.664	2.298	-
JSSMO Management Services	Various	Various : Various	-	9.100	Dec 2016	-		-		-		-	0.000	9.100	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	Project (Number/Name) 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	53.936	30.396		20.361		20.243		-		20.243	28.453	153.389	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	497.190	297.975		253.939		286.629		-		286.629	640.716	1,976.449	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	**Project (Number/Name)** 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1203164F / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	**Project (Number/Name)** 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MGUE Increment 1				
MGUE Increment 1 Security Certification	1	2017	1	2019
MGUE Increment 1 Developmental Test	3	2017	2	2020
MGUE Increment 1 Milestone B	2	2017	2	2017
MGUE Increment 1 All Lead Platforms Operational Test	2	2019	1	2022
MGUE Increment 2				
MGUE Increment 2 Next Gen ASIC Studies up to PDR	1	2017	2	2020

Note

JSSMO efforts transfer to PE 0604201F beginning in FY2018.
MGUE Increment 2 is a Pre-Major Defense Acquisition Program (MDAP). A draft acquisition strategy is in coordination.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203710F / *EO/IR Weather Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	10.000	7.940	0.000	7.940	101.222	156.819	106.231	42.700	Continuing	Continuing
643730: *EO/IR Weather System Dev*	-	0.000	10.000	7.940	0.000	7.940	101.222	156.819	106.231	42.700	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Based on completion of the Space-Based Environmental Monitoring (SBEM) Joint Requirements Oversight Council (JROC) Memo 092-14, capabilities will be developed to satisfy weather Gap 1 (Cloud Characterization) and Gap 2 (Theater Weather Imagery). Electro-Optical/Infrared (EO/IR) Weather Systems is a component of SBEM efforts to develop capabilities to satisfy weather Gap 1 (Cloud Characterization) and Gap 2 (Theater Weather Imagery). The earliest possible launch options are being integrated in the design for critical gaps.

Based on the SBEM Analysis of Alternatives (AoA) results, the EO/IR Weather Systems initial thrusts will enable:
1) DoD use of data collected by civil, international and other DoD space systems;
2) Weather System Follow-on Geostationary (WSF-G) efforts to include residual Geostationary Operational Environmental Satellite (GOES) relocation planning and engineering assessment;
3) Timely weather collection of WSF EO/IR (WSF-E) Program of Record;
4) Explore and/or utilize the use of commercially available data.

Secondary investments may be supported to address weather gaps identified in the SBEM AoA and validated by the JROC.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver EO/IR Weather Systems weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203710F / *EO/IR Weather Systems*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	10.000	0.000	0.000	0.000
Current President's Budget	0.000	10.000	7.940	0.000	7.940
Total Adjustments	0.000	0.000	7.940	0.000	7.940
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	7.940	0.000	7.940

Change Summary Explanation

FY2019: +$8.000M WSF-E; -$0.060M Inflation.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Weather System Follow-On Electro-Optical/Infrared (WSF-E)	0.000	9.500	7.940

Description: WSF-E acquisition will follow standard SMC satellite acquisition processes. The Air Force intends to pursue a full and open competition with industry aimed at procuring the most affordable and capable WSF-E system to meet both capability gaps 1 (cloud characterization) & 2 (theater weather imagery). Includes program office and other related support activities that may include, but are not limited to studies, technical analysis, and risk reduction activities etc.

FY 2018 Plans:

Risk reduction, pre-acquisition activities and Request for Proposal (RFP) for WSF-E. Continue to address secondary weather gaps identified in the Meteorological and Oceanographic (METOC) Initial Capabilities Document (ICD).

FY 2019 Plans:

Receive proposals and conduct source selection. Continue to address secondary weather gaps identified in the Meteorological and Oceanographic (METOC) Initial Capabilities Document (ICD). Continue Enterprise Systems Engineering & Integration and Management Services. Risk reduction and pre-acquisition activities leading up to contract award in FY 2020 for WSF-E. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc.

FY 2018 to FY 2019 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203710F / *EO/IR Weather Systems*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2019 decreased compared to FY 2018 by $1.560M. Justification for this decrease is described in plans above.			
Title: Weather System Follow-On Geostationary (WSF-G)	0.000	0.500	-
Description: Residual Geostationary Operational Environmental Satellite (GOES) Relocation is a Department of Defense (DoD) weather mitigation plan to address Space-based Environmental Monitoring (SBEM) Weather Gaps 1 (Cloud Characterization) and Gap 2 (Theater Weather Imagery) requirements over the Indian Ocean region. The requirements have been validated by the JROC Memo 033-16. The program will leverage a spare National Oceanic and Atmospheric Agency (NOAA) on-orbit geostationary asset for the DoD use, in order to provide timely and reliable high-quality electro-optical/infrared (EO/IR) remote sensing capability that will address the critical weather data needs over the Central Command (CENTCOM) Area of Responsibility (AoR). Includes program office and other related support activities that may include, but are not limited to studies, technical analysis, and risk reduction activities etc. Continue to address secondary weather gaps identified in the Meteorological and Oceanographic (METOC) Initial Capabilities Document (ICD). ***FY 2018 Plans:*** Risk reduction, pre-acquisition activities and Request for Proposal (RFP) release for WSF-G. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decrease compared to FY 2018 by $0.500M. Justification for this decreased is described in plans above.			
Accomplishments/Planned Programs Subtotals	0.000	10.000	7.940

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 SPCMOD: *Space Mods*	-	18.620	63.737	-	63.737	-	-	-	-	0.000	82.357

Remarks

Reflects PE 1203710F EO/IR Weather Systems portion of shared P-1 line SPCMOD.

E. Acquisition Strategy

The acquisition strategy for WSF-E and WSF-G is based on validated SBEM AoA and JROC Memo 033-16 and subsequent acquisition strategy development activities that will be conducted in FY 2018. The program office successfully completed a Materiel Development Decision with the Air Force Program Executive Officer of Space (AFPEO/SP), 3 May 17; and WSF-E Milestone A event with the Milestone Decision Authority (AFPEO/SP) and signed Acquisition Decision Memorandum, 19 May 17.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203710F / *EO/IR Weather Systems*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1203710F / *EO/IR Weather Systems*	**Project (Number/Name)** 643730 / *EO/IR Weather System Dev*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Pre-Acquisition Activities	Various	Various : Various	-	0.000		9.000	Feb 2018	7.940	Feb 2019	-		7.940	Continuing	Continuing	-
		Subtotal	-	0.000		9.000		7.940		-		7.940	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Other Support	Various	Various : Various	-	0.000		1.000	Oct 2017	-		-		-	Continuing	Continuing	-
		Subtotal	-	0.000		1.000		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		10.000		7.940		-		7.940	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1203710F / *EO/IR Weather Systems*	**Project (Number/Name)** 643730 / *EO/IR Weather System Dev*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1203710F / *EO/IR Weather Systems*	**Project (Number/Name)** 643730 / *EO/IR Weather System Dev*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
EO/IR Weather Systems				
WSF EO/IR System Pre-Acquisition Activities	1	2018	4	2018
WSF EO/IR System Development RFP Release	1	2019	1	2019
WSF EO/IR System Source Selection	1	2019	1	2020
WSF EO/IR System Contract Award	1	2020	1	2020
WSF EO/IR System Preliminary Design Review	1	2020	1	2021
WSF EO/IR System Milestone B	1	2021	1	2022
WSF EO/IR System Critical Design Review	1	2022	2	2022
WSF EO/IR System Production and Fielding	2	2022	1	2023
WSF EO/IR System Integration and Testing	2	2023	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206422F / *Weather System Follow-on*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	193.238	82.506	112.088	138.052	0.000	138.052	122.897	57.275	37.392	38.073	297.300	1,078.821
644289: *Weather Satellite Follow-On*	193.238	82.506	112.088	138.052	0.000	138.052	122.897	57.275	37.392	38.073	297.300	1,078.821
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	1		

Program MDAP/MAIS Code: 488

Note

This program, BA 4, PE 1206422F, project 644289, Military Application of the Space Environment (MASE), is a new start.

A. Mission Description and Budget Item Justification

Based on completion of the Space-Based Environmental Monitoring (SBEM) JROC Memo 092-14, capabilities will be developed to satisfy weather gaps for which no known mitigation exists. Weather System Follow-on (WSF) is a component of SBEM efforts to develop capabilities to satisfy weather Gap 3 Ocean Surface Vector Winds (OSVW), Gap 8 Tropical Cyclone Intensity (TCI), and Gap 11 Low Earth Orbit (LEO) Energetic Charged Particles (LEO ECP). Gap 3 OSVW and Gap 8 TCI require a space-based microwave sensor to provide polarimetric ocean surface wind direction and speed required for naval sea operations, as well as fighter sortie generations and marine amphibious operations. Gap 11 LEO ECP requires in situ ECP sensor for space situational awareness. The earliest possible launch options are being integrated in the design for critical gaps.

DoD established WSF as a Pre-Major Defense Acquisition Program (MDAP) with the Air force as the lead component. Based on the SBEM AoA results, the WSF initial thrusts will be to enable:
1) DoD use of data collected by civil, international and other DoD space systems;
2) Timely weather collection over broad oceans in support of maneuvering forces;
3) Space weather capabilities to characterize operational orbits, space situational awareness, and the ionosphere.

Secondary investments may be supported to address weather gaps identified in the Meteorological and Oceanographic (METOC) Initial Capability Document (ICD).

The Military Application of the Space Environment (MASE) is a program to demonstrate mature space environment technology to improve combat operations. MASE will enhance regional ionospheric specification (nowcasts) and predictions (forecasts) affecting signal propagation paths. MASE uses traditional and non-traditional ionospheric measurements in advanced space environment models to forecast and predict impacts to weapon systems. Contributes to satisfying Gaps 4 and 7 of the SBEM AoA results as supplemented by the AFRDM 02-17-02 (SBEM JDCR).

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise,

to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver WSF weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

The FY2019 funding request was reduced by $42.70 million to account for the availability of prior year execution balances.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	118.953	112.088	153.391	0.000	153.391
Current President's Budget	82.506	112.088	138.052	0.000	138.052
Total Adjustments	-36.447	0.000	-15.339	0.000	-15.339
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-30.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-3.111	0.000			
• SBIR/STTR Transfer	-3.336	0.000			
• Other Adjustments	0.000	0.000	-15.339	0.000	-15.339

Change Summary Explanation

FY2017: -$30.00M Appropriations Congressional Mark; -$3.111 Reprogrammed for higher Air Force priority.
FY2019: -$42.70M Reduction for under execution; +$10.000 ECP, +$18.400M MASE; -$1.039M Inflation

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: WSF Microwave Satellite (SV1-2)	55.457	83.520	100.654
Description: WSF Microwave Satellite (SV1-2): The Air Force awarded a contract to Ball Aerospace and Technologies Corp. to develop the WSF - Microwave (WSF-M) Space Vehicle (SV) to meet all three capability gaps. WSF-M SV-2 will be an option to exercise, should AF wish to replenish WSF constellation post-SV-1. SV-2 will be functionally equivalent to SV-1. The WSF-M SV-1			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206422F / *Weather System Follow-on*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
projected Initial Launch Capability (ILC) is FY2023. Secondary investments may also be considered to address weather gaps identified in the Meteorological and Oceanographic (METOC) Initial Capabilities Document (ICD). ***FY 2018 Plans:*** Complete WSF-M system Preliminary Design Review (PDR) and enter WSF-M Milestone B with all required acquisition documentation. Complete WSF-M ground system Telemetry, Tracking & Commanding (TT&C) development. Fund program support activities. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Will complete WSF-M System PDR, WSF-M Milestone B required acquisition documentation, Microwave Imager (MWI) Critical Design Review (CDR), and Spacecraft CDR. Will initiate work on WSF-M System CDR. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $17.134M. Justification for this increase is described in plans above.			
Title: COWVR Tech Demo ***Description:*** Air Force priority is to deliver an interim materiel solution to mitigate projected WindSat mission End of Life (EOL). In order to achieve this goal, Space and Missile Systems Center/Remote Sensing Systems Directorate (SMC/RS) is working with the Operationally Responsive Space (ORS) office to launch Compact Ocean Surface Wind Vector Radiometer (COWVR) technical demonstration payload, which would provide residual operational capability to address the immediate Gap 3 requirements, once on-orbit checkout is successfully completed. ***FY 2018 Plans:*** Will complete COWVR calibration/validation and initiate steps to transition sensor to Navy operation. ***FY 2019 Plans:*** Continue to conduct calibration/validation and transition to Navy operation. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $17.500M. Justification for this decrease is described in plans above.	21.966	25.200	7.700
Title: WSF ECP ***Description:*** WSF Energetic Charged Particles (ECP) will fulfill the Space-based Environmental Monitoring (SBEM) Weather Gap 11 and address the Secretary of the Air Force (SECAF) policy which directs each USAF Satellite Office to plan for and integrate	5.083	3.368	11.298

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206422F / *Weather System Follow-on*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
ECP sensors on all pre-Milestone B new satellite acquisitions. To accomplish this requirement, the ECP sensor will be integrated on the WSF-M satellite. ***FY 2018 Plans:*** Will complete source selection and award contract. Will stand up contractor personnel, purchase long-lead items for WSF-M and start development/procurement effort for payload algorithms. Will compete launch service contract. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Complete ECP sensor and put in storage. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $7.930M. Justification for this increase is described in plans above.			
Title: Military Application of the Space Environment (MASE) ***Description:*** MASE demonstrates a sensor-to-shooter solution to improve mission effectiveness by providing commanders an operational risk assessment tool. MASE will deliver a capability comprised of weapon system tailored visualizations/decision aids to allow warfighter integration into operational plans and tactics, techniques, and procedures. MASE products and services will be evaluated using quantitative standard measures of performance, effectiveness, and outcome against theater operational requirements. ***FY 2019 Plans:*** Transition prototype capability into operations and continue the R&D effort for future phases. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** This is a new start for FY19.	-	-	18.400
Accomplishments/Planned Programs Subtotals	82.506	112.088	138.052

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

DoD established WSF as a pre-MDAP. The acquisition strategy for WSF is based on validated SBEM AoA results from FY2014 and subsequent acquisition strategy development activities that were conducted in FY2015. The WSF acquisition strategy focuses on streamlined acquisition process for providing materiel solutions to OSVW, TCI & LEO ECP, as validated by the JROC; deliver microwave sensing solution to address DoD needs for OSVW and TCI capabilities and deliver space

environment sensing solution to address LEO ECP capabilities for on-orbit attributions and anomaly resolutions. Impending WindSat mission EOL required WSF to approach the program acquisition in two phases; Phase I to address imminent OSVW/TCI needs via COWVR tech demo option, while Phase II involves a more robust set of capabilities for WSF-M.

In Phase I, the AF intends to deliver an interim materiel solution to address the immediate OSVW and TCI needs to mitigate WindSat EOL. In order to achieve this goal in a timely manner, WSF program plans on utilizing Jet Propulsion Lab (JPL)-developed COWVR sensor for integration with ORS office's Modular Space Vehicle (MSV) spacecraft as the ORS-6 mission. ORS office will lead contractual actions to procure the space vehicle, the launch service and reserve commercial ride-share spot for projected FY2018 ILC. Once COWVR sensor is launched and completes on-orbit checkout, the payload is expected to provide partial residual operational capabilities until WSF-M satellite is implemented.

In Phase II, the program intends to procure a more robust WSF-M Satellite, capable of meeting all three weather capability gaps, in a full and open competition environment, in order to reduce overall program cost. There will be one WSF-M to be procured, with option for a second satellite. WSF-M first satellite (SV-1) ILC is FY2023 to mitigate any potential weather coverage gaps. WSF-M SV-2 ILC is currently projected for FY2028. The WSF-M SV-2 will be functionally equivalent to SV-1.

The WSF ECP sensor development will leverage current AFRL sensor and hazard assessment technology to accelerate availability of ECP sensor for integration on WSF-M and other planned AF satellite acquisitions. The AF intends to transition AFRL's technology to industry for production via competitive award. Two Tech Demo ECP sensors are projected to be delivered and ready for satellite integration by FY2020. Post-Tech Demo ECP phase, each respective program offices will be responsible for the procurement/integration and sustainment of the sensors required to meet the SecAF's Space Situational Awareness (SSA) policy.

Completed Broad Agency Announcement (BAA) proposal evaluation and negotiations for SBEM EO/IR.

The program intends to develop the MASE leave-behind capability at AFRL while optimizing, making RMF compliant, and operationalizing current AFRL MASE related prototypes/models. Award contracts to conduct studies and perform technical analysis for external data sources and optimal sensor laydown, system development and external system integration. Conduct field campaigns to validate scientific algorithms. Provision cloud services, deploy ionospheric ground sensors and provide program office support.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206422F / *Weather System Follow-on*	**Project (Number/Name)** 644289 / *Weather Satellite Follow-On*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ORS COWVR Technology Demonstration	Various	Various : Various	30.210	21.966	Jan 2017	25.200	Jan 2018	7.700	Jan 2019	-		7.700	0.000	85.076	-
WSF Microwave System (SV1-2)	Various	Ball Aerospace : Boulder, CO	-	46.100	Nov 2017	61.603	Feb 2018	57.979	Nov 2018	-		57.979	Continuing	Continuing	-
WSF ECP (Gap 11)	MIPR	Kirtland AFB : Albuquerque, NM	1.216	3.303	Apr 2017	3.368	Apr 2018	11.298	Apr 2019	-		11.298	Continuing	Continuing	-
MASE	Various	Various : Various	-	-		-		18.400	Dec 2018	-		18.400	Continuing	Continuing	-
Enterprise Systems Engineering & Integration	C/CPAF	The Analytical Science Corp : El Segundo, CA	0.535	1.411	Dec 2016	2.735	Dec 2017	9.604	Dec 2018	-		9.604	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA	6.574	0.000	Oct 2016	6.659	Oct 2017	7.946	Oct 2018	-		7.946	Continuing	Continuing	-
BAA	Various	Various : Various	-	1.960	Mar 2017	-		-		-		-	0.000	1.960	-
EGS Ground	TBD	TBD : TBD	-	-		1.670	Dec 2017	6.911	Dec 2018	-		6.911	0.000	8.581	-
Pre-Acquisition Activities	Various	Various : Various	121.704	-		-		-		-		-	0.000	121.704	-
		Subtotal	160.239	74.740		101.235		119.838		-		119.838	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Concepts and Planning	TBD	TBD : TBD	-	-		-		-		-		-	8.000	8.000	-
Requirements/Engineering Analysis Support	RO	Defense Information Technical Center : El Segundo, CA	1.543	-		-		-		-		-	0.000	1.543	-
Engineering Risk Reduction Studies	Various	Various : Various	1.171	-		-		-		-		-	0.000	1.171	-
		Subtotal	2.714	-		-		-		-		-	8.000	10.714	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206422F / *Weather System Follow-on*	**Project (Number/Name)** 644289 / *Weather Satellite Follow-On*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp : El Segundo, CA	15.853	5.459	Oct 2016	5.771	Oct 2017	5.297	Oct 2018	-		5.297	Continuing	Continuing	-
Other Support	Various	Various : Various	4.612	0.200	Nov 2016	2.200	Nov 2017	3.500	Nov 2018	-		3.500	Continuing	Continuing	-
A&AS	Various	Various : Various	9.820	2.107	Nov 2016	2.882	Nov 2017	9.417	Nov 2018	-		9.417	Continuing	Continuing	-
		Subtotal	30.285	7.766		10.853		18.214		-		18.214	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	193.238	82.506		112.088		138.052		-		138.052	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206422F / *Weather System Follow-on*	**Project (Number/Name)** 644289 / *Weather Satellite Follow-On*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206422F / *Weather System Follow-on*	**Project (Number/Name)** 644289 / *Weather Satellite Follow-On*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Weather System Follow-On				
ORS COWVR Technology Demonstration Integration	2	2017	1	2018
ORS COWVR Technology Demonstration Launch	4	2018	4	2018
ORS COWVR Technology Demonstration Operations	4	2018	2	2020
WSF Microwave System Development RFP Release	2	2017	2	2017
WSF Microwave System Contract Award	1	2018	1	2018
WSF Microwave System Preliminary Design Review	1	2019	1	2019
WSF Microwave System Milestone B	2	2019	2	2019
WSF Microwave System CDR	4	2019	4	2019
WSF Microwave System Integration and Test	3	2022	3	2022
WSF ECP RFP Release	1	2017	1	2017
WSF ECP CDR	4	2018	4	2018
WSF ECP ATP	4	2018	4	2018
WSF Delta PDR	2	2019	2	2019
WSF CDR	1	2020	1	2020
MASE				
MASE leave behind capability	2	2019	4	2019
MASE RFP release	4	2018	4	2018
MASE MSB	1	2019	1	2019
MASE Award contracts	1	2019	1	2019
MASE capability drops	2	2019	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	9.901	34.764	39.338	0.000	39.338	29.776	43.770	97.296	158.684	Continuing	Continuing
640290: *Deep Space Advanced Radar Concept*	-	9.901	34.764	39.338	0.000	39.338	29.776	43.770	97.296	158.684	Continuing	Continuing

A. Mission Description and Budget Item Justification

Deep Space Advanced Radar Concept (DARC) will leverage ongoing defense science and technology efforts to mature radar concepts and technologies to develop and evaluate prototypes that demonstrate increased sensitivity, capacity, search rates, and scalability to detect, track and maintain custody of objects in deep space orbit. This effort will analyze and select the most promising technologies to move forward into system development and /or operations; eventually creating a program of record (PoR). DARC will augment the Space Surveillance Network (SSN) as an additional sensor with increased capacity and capability for deep space object custody at Geosynchronous Earth Orbit (GEO).

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the DARC weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

The FY2019 funding request was reduced by $10.000M to account for the availability of prior year execution balances.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	10.901	34.764	39.634	0.000	39.634
Current President's Budget	9.901	34.764	39.338	0.000	39.338
Total Adjustments	-1.000	0.000	-0.296	0.000	-0.296
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-1.000	0.000	-0.296	0.000	-0.296

Change Summary Explanation

FY 2017: -$1.000M Request for Additional Appropriation (RAA) back-out

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 640290 / *Deep Space Advanced Radar Concept*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
640290: *Deep Space Advanced Radar Concept*	-	9.901	34.764	39.338	0.000	39.338	29.776	43.770	97.296	158.684	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Deep Space Advanced Radar Concept (DARC) will leverage ongoing defense science and technology efforts to mature radar concepts and technologies to develop and evaluate prototypes that demonstrate increased sensitivity, capacity, search rates, and scalability to detect, track and maintain custody of objects in deep space orbit. This effort will analyze and select the most promising technologies to move forward into system development and operations and a program of record (PoR). DARC will augment the Space Surveillance Network (SSN) as an additional sensor with increased capacity and capability for deep space object custody at Geosynchronous Earth Orbit (GEO).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: DARC Technology Maturation and Prototype Development	9.901	34.764	39.338

Description: Leverage ongoing defense science and technology efforts to mature radar concepts and technologies, develop and evaluate prototypes that demonstrate increased sensitivity, capacity, search rates, and scalability to detect, track and maintain custody of objects in deep space orbit. Provide technical support to oversee the design, development and demonstration of the DARC Prototype radar. Initiate program of record (PoR) for the DARC global radar capability. Current FY18-FY23 funding supports completion of the DARC Prototype and demonstration effort, standup of the DARC System Program Office (SPO), award of contract for the DARC global radar capability, and completion of the engineering, manufacturing, and development (EMD) of the first site through critical design review (CDR).

FY 2018 Plans:
Award DARC Prototype design contracts to three developers. Conduct design through critical design review (CDR). Post CDR, use a pre-established set of down-select criteria and select one Developer to build the DARC Prototype radar. Award DARC Prototype build contract. Purchase antennas, prepare to bed down receivers and transmitters assets at the DARC Prototype site on White Sands Missile Range (WSMR). Award Integrated Systems Engineering Team (ISET) contracts to industry based on FY17 Broad Agency Announcement (BAA) competition conducted by Air Force Research Laboratory (AFRL). Continue AFRL oversight of the DARC Prototype build and initial infrastructure at the WSMR site. Develop software phase/timing software for the DARC receive and transmit subsystems. Continue program office support and other activities that may include, but are not limited to studies, technical analysis, etc.

FY 2019 Plans:

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 640290 / *Deep Space Advanced Radar Concept*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Continue DARC Prototype build and testing. Conduct demonstrations with the DARC Prototype radar. Prepare for and complete Material Development Decision (MDD) milestone for the program of record (PoR) to develop and deploy the DARC global radar capability. Stand up DARC System Program Office (SPO), prepare milestone documentation, draft Request for Proposal (RFP). Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to 2018 by $4.592M. Justification for this increase is described in plans above.			
Accomplishments/Planned Programs Subtotals	9.901	34.764	39.338

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Project utilizes existing DoD engineering and study contracts and activities to conduct science and technology development and data analysis activities. Preliminary/ critical design effort commenced in FY 2017. Broad agency announcement forms DARC Integrated Systems Engineering Team (ISET). Following CDR down-selects, DARC prototype build, test & determination will occur. DARC PoR will be a full and open industry competition.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 640290 / *Deep Space Advanced Radar Concept*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DARC Concept Definition, Prototype Development and Analysis	Various	Various : Various	-	7.096	Sep 2017	26.467	Jan 2018	31.933	Oct 2019	-		31.933	Continuing	Continuing	-
		Subtotal	-	7.096		26.467		31.933		-		31.933	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Prototype System and Sustainment Analyses	MIPR	AFRL : Albuquerque, NM	-	2.450	Aug 2017	4.000	Jan 2018	3.000	Jan 2019	-		3.000	Continuing	Continuing	-
		Subtotal	-	2.450		4.000		3.000		-		3.000	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	0.000		1.480	Dec 2017	1.200	Dec 2018	-		1.200	Continuing	Continuing	-
FFRDC	SS/FP	MITRE Corp : Colorado Springs, CO	-	0.347		2.757	Oct 2017	3.155	Oct 2018	-		3.155	Continuing	Continuing	-
Other Support	Various	SMC/SYG : Colorado Springs, CO	-	0.008	Sep 2017	0.060	Oct 2017	0.050	Oct 2018	-		0.050	Continuing	Continuing	-
		Subtotal	-	0.355		4.297		4.405		-		4.405	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	9.901		34.764		39.338		-		39.338	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 640290 / *Deep Space Advanced Radar Concept*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 640290 / *Deep Space Advanced Radar Concept*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
DARC				
Prototype Design	1	2018	3	2018
Prototype Build and Test	4	2018	3	2020
Operational Demonstrations	4	2020	4	2020
Material Development Decision	2	2019	2	2019
Program of Record Stand Up	3	2019	4	2019
Develop Documentation and Request for Proposal	1	2020	2	2020
Milestone B	3	2020	3	2020
Request for Proposal Release	4	2020	4	2020
Source Selection	1	2021	3	2021
Contract Award	4	2021	4	2021
Site 1	4	2021	4	2023

Note

Site 1 estimated completion date and IOC is FY2025; IDECS will not allow for date outside of FYDP range (FY18-23)

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206434F / *Midterm Polar MILSATCOM System*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	63.092	383.113	0.000	383.113	446.461	294.383	147.632	35.550	Continuing	Continuing
643720: *EPS Recapitalization*	-	0.000	63.092	383.113	0.000	383.113	446.461	294.383	147.632	35.550	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Enhanced Polar System Recapitalization (EPS-R) program will provide continuous, protected, Low Probability of Intercept/Low Probability of Detection communications to tactical and strategic warfighters in the North Polar Region in benign and contested environments. EPS-R will develop and acquire 1) two Extremely High Frequency (EHF) payloads, using Advanced EHF's eXtended Data Rate (XDR) waveform, on hosted spacecraft, 2) upgrades/modifications to the existing Enhanced Polar System (EPS) Control and Planning Segment (CAPS) to provide command and control and XDR mission planning capability, and 3) upgrades/ modifications to the existing EPS gateway to provide connectivity between polar and midlatitude users through the Global Information Grid.

The EPS-R program is timed to prevent a gap in Arctic Military Satellite Communications (MILSATCOM) coverage after EPS end of life. To ensure polar MILSATCOM continuity beyond FY 2025, the DoD will begin funding activities to bridge the gap between the current EPS program and future protected systems being planned for the late 2020s. The EPS-R program has examined performance, mission needs, schedules, and costs to avoid a mission gap. EPS-R intends to host the payloads on a Space Norway bus, which is scheduled to launch in CY 2022. EPS-R will reuse EPS Gateway and ground control elements to the greatest extent feasible.

To meet the warfighter requirements for protected tactical and strategic polar MILSATCOM, RDT&E funding is required to continue program office and other related support activities that may include, but are not limited to studies, technical analysis, architectural development, acquisition strategy development, system requirements and system trades analysis, risk reduction activities, technology maturation, System Engineering, Integration and Test of all polar MILSATCOM segments and hosted payloads.
The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver EPS-R capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206434F / *Midterm Polar MILSATCOM System*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	63.092	189.075	0.000	189.075
Current President's Budget	0.000	63.092	383.113	0.000	383.113
Total Adjustments	0.000	0.000	194.038	0.000	194.038
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	194.038	0.000	194.038

Change Summary Explanation

FY 2019: +$194.038: +$196.921M to accelerate payload development in order to meet the Norway rideshare schedule, -$2.883M inflation adjustment.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Acquisition Strategy Development and Source Selection	0.000	35.931	0.000
Description: Conduct market research to inform the development of an acquisition strategy. Develop acquisition strategy and Request for Proposal. Release RFP to industry, conduct source selection, and award the development contract. ***FY 2018 Plans:*** Develop acquisition strategy and associated documentation required for EPS-R milestone decisions to comply with statutory and regulatory requirements. Develop Request for Proposal (RFP). Release EPS-R RFP to industry and conduct source selection. Award development contract and provide design and development oversight. Begin program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** This Major Thrust has changed since the FY 2018 PB submission. Three new Major Thrusts (Payload, Ground Upgrades, and Gateway Upgrades) were created to describe the accelerated system development/upgrades to meet the Space Norway launch scheduled in CY 2022.			
Title: Technical Baseline and Architectural Engineering	0.000	27.161	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206434F / *Midterm Polar MILSATCOM System*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: Develop EPS-R technical baseline and architectural engineering. ***FY 2018 Plans:*** Develop technical baseline and system requirements. Conduct studies to identify necessary upgrades/modifications to the EPS CAPS and EPS Gateway segment; execute risk reduction efforts and upgrades/modifications to sustain/modify these segments for MPS. Purchase long lead parts to drive down schedule risk. Conduct system architecture and trade analyses. Begin program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** This Major Thrust has changed since the FY 2018 PB submission. Three new Major Thrusts (Payload, Ground Upgrades, and Gateway Upgrades) were created to describe the accelerated system development/upgrades to meet the Space Norway launch scheduled in CY 2022.			
Title: Payload ***Description:*** Develop and acquire two Extremely High Frequency (EHF) payloads, using Advanced EHF's eXtended Data Rate (XDR) waveform, for integration on host spacecraft. ***FY 2018 Plans:*** Payload effort was previously included in Major Thrusts "Acquisition Strategy Development and Source Selection" and "Develop Midterm Polar technical baseline and architectural engineering." ***FY 2019 Plans:*** Continue development, production, and testing of the two payloads that were initiated in FY 2018. Conduct payload Critical Design Review. Develop interface documentation and integration plans with Space Norway. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** In FY 2019 additional funds were added to the program to accelerate Payload development to meet the Space Norway launch.	0.000	0.000	333.667
Title: Ground Upgrades ***Description:*** Modify and upgrade to the existing EPS Control and Planning Segment (CAPS) to provide command and control and XDR mission planning capability for the two new payloads.	0.000	0.000	29.163

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206434F / *Midterm Polar MILSATCOM System*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2018 Plans: Ground Upgrades effort was previously included in Major Thrusts "Acquisition Strategy Development and Source Selection" and "Develop Midterm Polar technical baseline and architectural engineering." ***FY 2019 Plans:*** Continue studies/risk reduction efforts on EPS CAPS Segment, issue Request For Proposal for tactical ground modifications, and award contract. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** In FY 2019 additional funds were added to the program to accelerate Ground Upgrades to meet the Space Norway launch and to support strategic requirements.			
Title: Gateway Upgrades ***Description:*** Modify and upgrade to the existing EPS Gateway Segment to support the two new payloads. ***FY 2018 Plans:*** Gateway Upgrades effort was previously included in Major Thrusts "Acquisition Strategy Development and Source Selection" and "Develop Midterm Polar technical baseline and architectural engineering." ***FY 2019 Plans:*** Continue studies/risk reduction efforts, and begin EPS Gateway Segment upgrades. Make preparations for installing a second telemetry and control terminal. Purchase additional telemetry and control terminals to recapitalize fleet that is becoming obsolete. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** In FY 2019 additional funds were added to the program to accelerate Gateway Upgrades to meet the Space Norway launch.	0.000	0.000	20.283
Accomplishments/Planned Programs Subtotals	0.000	63.092	383.113

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 05 PE 1206432F: *Polar MILSATCOM (Space)*	44.306	33.644	27.337	-	27.337	-	-	-	-	0.000	105.287

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206434F / *Midterm Polar MILSATCOM System*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost

Remarks

E. Acquisition Strategy

Award payloads contract to Northrop Grumman Aerospace Systems (NGAS) and initiate production of two EPS functional equivalent payloads in FY 2018. Conduct market research to identify industry capabilities and acquisition concepts. Award CAPS contract to Northrop Grumman Mission Systems (NGMS) for EPS ground upgrade. Gateway updates will be accomplished by Space and Naval Warfare Systems Command-Pacific, the EPS Gateway developer. The program office will initiate the procurement of a replacement terminal for the Telemetry and Command Terminal. This acquisition strategy updates the EPS Ground Segment to accommodate the EPS functional equivalent payloads and extend operations and sustainment beyond 2028. The U.S. Government will retain the system integrator role, as it was for EPS program of record.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206434F / *Midterm Polar MILSATCOM System*	**Project (Number/Name)** 643720 / *EPS Recapitalization*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EPS-R Tactical Payloads 1-2	SS/ Various	NGAS : Redondo Beach, CA	-	-		22.968	Jul 2018	295.768	Nov 2018	-		295.768	Continuing	Continuing	-
Long Lead Parts	SS/FFP	NGAS : Redondo Beach, CA	-	-		10.000	Jan 2018	-		-		-	Continuing	Continuing	-
Control and Planning Segment Upgrades	TBD	NGMS : Redondo Beach, CA	-	-		10.000	Apr 2018	25.851	Nov 2018	-		25.851	Continuing	Continuing	-
Gateway Upgrades	Various	Various : CA	-	-		5.000	Apr 2018	17.979	Nov 2018	-		17.979	Continuing	Continuing	-
Technical Mission Analysis	MIPR	Aerospace : El Segundo, CA	-	-		2.161	Jan 2018	6.256	Nov 2018	-		6.256	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	LinQuest : Los Angeles, CA	-	-		5.704	Jan 2018	27.384	Nov 2018	-		27.384	Continuing	Continuing	-
		Subtotal	-	-		55.833		373.238		-		373.238	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : TBD	-	-		2.162	Jan 2018	1.564	Oct 2018	-		1.564	Continuing	Continuing	-
A&AS	Various	Various : TBD	-	-		5.047	Jan 2018	8.151	Oct 2018	-		8.151	Continuing	Continuing	-
Other Support	Various	Various : TBD	-	-		0.050	Jan 2018	0.160	Oct 2018	-		0.160	Continuing	Continuing	-
		Subtotal	-	-		7.259		9.875		-		9.875	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		63.092		383.113		-		383.113	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206434F / *Midterm Polar MILSATCOM System*	**Project (Number/Name)** 643720 / *EPS Recapitalization*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206434F / *Midterm Polar MILSATCOM System*	**Project (Number/Name)** 643720 / *EPS Recapitalization*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Payload				
Long Lead Parts	2	2018	4	2019
Contract Initiation/Definitization	2	2018	4	2018
Payload Segment Design/Build	2	2018	4	2021
Preliminary Design Review (PDR)	4	2018	4	2018
Critical Design Review (CDR)	3	2019	3	2019
Ground and Gateway Upgrades/Modifications				
Risk Reduction Activities/Studies	2	2018	1	2019
Upgrades/Modifications	3	2018	4	2021
Control and Planning Segment Upgrades, Contract Award	1	2019	1	2019
System Level Integration	2	2021	1	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	8.506	7.842	91.018	1.100	92.118	82.252	93.800	100.716	124.767	Continuing	Continuing
642611: *Technology Insertion Planning and Analysis*	-	8.506	7.842	91.018	1.100	92.118	82.252	93.800	100.716	124.767	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports a range of activities including systems engineering, technology planning, development, demonstrations and prototyping, and testing, as well as modeling, simulations and exercises to support development and maturation of tactics and procedures for a responsive and resilient Space Control mission area. This includes technology development and prototyping for Defensive Counterspace (DCS) and Offensive Counterspace (OCS) and the necessary systems engineering for the warfighter to effectively employ such systems.

Specifically supported are DCS and Space Situational Awareness (SSA) activities which include developing on-board and near-board threat warning payloads for monitoring, detecting, identifying, tracking, assessing, verifying, categorizing, and characterizing objects and events in space. Additionally, this activity supports the development of payload prototypes and space defense force packages for protecting U.S. space systems, resources, and operations from enemy attempts to negate, interfere, or destroy them.

Specific OCS activities include disruption, denial, or degradation (and associated Electronic Support) of adversary space systems which may be used for purposes hostile to U.S. national security interests. Rapid Reaction Capabilities in response to immediate warfighter needs in the Space Control mission area are developed within this program.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	7.534	7.842	7.988	0.000	7.988
Current President's Budget	8.506	7.842	91.018	1.100	92.118
Total Adjustments	0.972	0.000	83.030	1.100	84.130
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	1.190	0.000			
• SBIR/STTR Transfer	-0.218	0.000			
• Other Adjustments	0.000	0.000	83.030	1.100	84.130

Change Summary Explanation

FY 2017: $1.190M increase for Defense Force Packaging

FY 2019: $68.247M increase for Experimentation Platforms & Defense Force Packaging and $15.468M increase for BMC2 related development efforts

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Rapid Reaction Branch	8.506	7.842	23.456	1.100	24.556

Description: Develops advanced capabilities for rapid prototyping and integration into space control programs of record and, if requested, to warfighter Urgent Operational Needs (UONs) and Joint Urgent Operational Needs (JUONs). Conducts prototyping, demonstration, testing, and rapid transition of technology and techniques to space control systems.

FY 2018 Plans:
Develop and test advanced prototypes. Expand Signal Processing Lab integration to include industry outreach. Develop, test, train, field and transition advanced QRC capabilities based on COCOM requirements. Integrate relevant GRA Increment 3 technologies. Execute initial testing, to include CONUS and OCONUS activities. Accelerate Strategic Portfolio Review initiatives. As requested, develop, test, train, field and sustain quick reaction capabilities. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc.

FY 2019 Base Plans:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Develop, test, train, field, transition and sustain advanced QRC capabilities based on emergent requirements from multiple Combatant Commands. Conduct initial technical development and integration activities against relevant threat systems in preparation for operational requirements. Develop and test advanced prototypes in support of activities within the Space Control Technology portfolio. Integrate relevant GRA Increment 4 technologies. Integrate information assurance early in all developmental efforts. Execute field development & test activities, at CONUS & OCONUS locations, to verify system performance in the operational environment. FY 2019 increase supports mission area growth and required in-house expertise to meet advanced technology readiness objectives. It expands unit manpower, hardware and infrastructure and enables responsive support to multiple combatant command urgent and emergent operational needs. It increases the unit's developmental engineers and adds necessary functional resources (information assurance; configuration management; testing; prototype training; maintenance; logistics) to ensure unit's ability to rapidly develop, test, train, field, transition and sustain relevant warfighting capabilities in response to a significantly more volatile and adaptive threat environment. Continue program office support and other related support activities. Rapidly respond to implement space system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2019 OCO Plans:*** FY 2019 OCO supports pre-planned product improvements and version upgrades of advanced capabilities deployed to two locations in support of Operation Inherent Resolve ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $16.714M. Justification for this increase is described in plans above.					
Title: Experimentation Platforms & Defense Force Packaging ***Description:*** This effort will acquire, outfit and operate microsat busses with the primary purpose of demonstrating new technologies, flight testing payloads or subsystems, and validating Tactics, Techniques, and Procedures (TTPs) to ensure the delivery of critical space effects throughout all phases of a future space conflict against an adaptive and thinking adversary. It also supports a range of activities developing, prototyping, and fielding a family of on-board and near-board, modular resilience payloads supporting threat warning and protection options for National Security Space High-Value satellites. These payloads will be integrated with enterprise command and control capabilities for tasking, reporting, and response. On-orbit prototype demonstrations will be performed to demonstrate sensor/payload capabilities for high-value satellite force packaging requirements. Systems Engineering will enable the integration, interoperability and compatibility of	-	-	67.562	-	67.562

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
new space control technology systems and capabilities amongst each other and amongst these new systems and the existing space control enterprise. ***FY 2019 Base Plans:*** Acquire two non-developmental microsat satellites to be flown on a Long Duration Propulsive ESPA platform, available Space Test Program mission or other ridesharing opportunity. Procure and/or integrate experimental payloads or sensors on microsat busses and/or operational assets. Plan and execute microsat on-orbit flight experiments; collect, process, distribute and analyze payload/sensor data; and evaluate the military utility of coalition air, land, sea and space assets against known and projected threats/scenarios in order to prioritize current and future capability gaps and vulnerabilities. Initiate development of selected sensor/response payloads (from mod/sim and analysis efforts) for prototype demonstrations for threat warning and response payloads for high-value satellites. Initiate prototype and operations ground infrastructure design trades and build-out in support space control C2 and space range requirements. Perform risk reduction efforts to define high-value satellite bus requirements for force packaging on-ramps. Define enterprise interfaces and standards with System-of-Systems Model-Based Engineering, and modeling and simulation to determine critical paths and nodes, timing requirements, risks, and opportunities. Define developmental and operational test plans to ensure system performance in contested space and cyber domains. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $67.562M. Justification for this increase is described in plans above					
Accomplishments/Planned Programs Subtotals	8.506	7.842	91.018	1.100	92.118

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*	

E. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible. SCT program consists of numerous small projects. Space Defense Force Packaging and Experimentation Platforms initiative consists of several interrelated activities that require close coordination and integration, which may reduce the opportunities for independent competitive contracting actions.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SCT Counterspace Technology Prototyping/ Rapid Reaction Development	Various	Various : Various, NV	-	6.399	Jan 2017	6.605	Jan 2018	22.888	Jan 2019	-		22.888	Continuing	Continuing	-
SCT Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	1.684	Oct 2016	0.730	Oct 2017	-		-		-	Continuing	Continuing	-
SCT Foundational Architecture	C/FFP	TBD : El Segundo, CA	-	-		-		8.804	Feb 2019	-		8.804	Continuing	Continuing	-
SCT Experimentation Platforms Sensors	C/CPIF	Various : Various, CA	-	-		-		5.900	Jan 2019	-		5.900	Continuing	Continuing	-
SCT Experimentation Platforms Microsat Buses	C/FFP	Various : Various, CA	-	-		-		10.800	Jan 2019	-		10.800	Continuing	Continuing	-
SCT OCO Funding P3I	Various	Various : Various	-	-		-		0.000		1.100	Oct 2018	1.100	Continuing	Continuing	-
SCT Modeling & Sim; Payload Analysis and Alternatives	C/Various	Various : Various, CA	-	-		-		12.515	Oct 2018	-		12.515	Continuing	Continuing	-
SCT Sensor Prototype Development	C/Various	Various : Various, CA	-	-		-		16.500	Oct 2018	-		16.500	Continuing	Continuing	-
SCT Ground Infrastructure	Various	Various : Various, CA	-	-		-		0.500	Oct 2018	-		0.500	Continuing	Continuing	-
SCT High-Value Satellite Bus Requirements Definition	Various	Various : Various, CA	-	-		-		0.500	Oct 2018	-		0.500	Continuing	Continuing	-
SCT On-Orbit Test Range Build-out and Test	Various	Various : Various, CA	-	-		-		7.820	Jan 2019	-		7.820	Continuing	Continuing	-
		Subtotal	-	8.083		7.335		86.227		1.100		87.327	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Civilian Reimbursable Budget Authority	Various	Space and Missile Systems Center : El Segundo, CA	-	-		-		0.180	Oct 2018	-		0.180	Continuing	Continuing	-
		Subtotal	-	-		-		0.180		-		0.180	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	SMC : El Segundo, CA	-	0.423	Jan 2017	0.507	Jan 2018	3.311	Feb 2019	-		3.311	Continuing	Continuing	-
FFRDC	Various	Various : Various, CA	-	-		-		1.000	Oct 2018	-		1.000	Continuing	Continuing	-
Other Support	Various	Various : Various, CA	-	-		-		0.300	Oct 2018	-		0.300	Continuing	Continuing	-
		Subtotal	-	0.423		0.507		4.611		-		4.611	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	8.506		7.842		91.018		1.100		92.118	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
High-Value Satellite Bus Requirements Definition																												
On-orbit Test Range Build-out and Testing																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
RRB				
Rapid Prototyping	1	2017	4	2023
Signal Processing Lab Gov't Reference Architecture (GRA) Dev Inc 3	1	2017	2	2019
Signal Processing Lab GRA (dev) Increment 4	1	2019	4	2021
Signal Processing Lab GRA (dev) Increment 5	3	2021	4	2023
Counterspace Systems Developmental Test (plan/execute/report)	4	2017	3	2018
Capability Integration (Lab)	1	2017	4	2023
Capability tests (execute/report)	1	2017	4	2023
Ongoing capability DT planning/execution	1	2017	4	2023
Experimentation Platforms & Defense Force Packaging				
Award SE&I Contract	2	2019	2	2019
Microsat Satellite Bus Procurement	1	2019	3	2019
Sensor Procurement	1	2019	3	2019
Flight Experiments and Prototype Ops	2	2019	4	2019
Military Utility Assessment	1	2019	4	2019
Database of Architectural Elements	1	2019	4	2019
Modeling & Simulation; Payload Analysis and Alternatives	1	2019	4	2022
Sensor Prototype Development	2	2019	4	2022
Ground Infrastructure	2	2019	4	2023
High-Value Satellite Bus Requirements Definition	1	2019	4	2021
On-orbit Test Range Build-out and Testing	2	2019	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206730F / *Space Security and Defense Program*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	32.399	41.385	45.542	0.000	45.542	46.453	47.216	48.246	49.123	Continuing	Continuing
64A025: *Space Protection Program*	-	32.399	41.385	45.542	0.000	45.542	46.453	47.216	48.246	49.123	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element funds the Department of Defense (DoD)/Air Force component of the Space Security and Defense Program (SSDP). The SSDP is a Joint DoD and Office of the Director of National Intelligence (ODNI) organization established to function as the center of excellence for options and strategies (materiel, non-materiel, cross-Title, cross-domain) leading to a more resilient and enduring National Security Space (NSS) Enterprise. The SSDP Operates under the authority of the Deputy Secretary of Defense (DEPSECDEF) and Principal Deputy Director of National Intelligence (PDDNI) to lead and collaborate on space protection vulnerability, susceptibility, and mitigation assessments of NSS services for the purpose of identifying, assessing, validating and introducing protection solutions into existing requirements, budgeting, acquisition, technology development and operational development processes. This unique mission provides an ongoing and crucial core protection competency that advances specific projects/activities (including non-kinetic techniques) to deliver comprehensive, economical and actionable solutions for both programmatic and operational domains.

The SSDP scope spans multiple space missions and stakeholders including the DoD, Intelligence Community (IC), civil, commercial, and international space entities that support NSS missions in both peacetime and throughout all phases of conflict. It is focused on being responsive to NSS stakeholders in providing technical and operational assessments of emergent threat concepts, and developing near- and far-term plans to address strategies, threats, and vulnerabilities. Specific SSDP Projects are structured/designed to have an impact across all time horizons; near-term focused efforts to complicate adversary operations, mid-term focused efforts to improve system and enterprise survivability, and long-term focused efforts to render adversary capabilities ineffective.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver capability leading to a more resilient and enduring NSS enterprise. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206730F / *Space Security and Defense Program*

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	32.399	41.385	45.884	0.000	45.884
Current President's Budget	32.399	41.385	45.542	0.000	45.542
Total Adjustments	0.000	0.000	-0.342	0.000	-0.342
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.342	0.000	-0.342

C. Accomplishments/Planned Programs ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019**
Title: Space Protection and Survivability	32.399	41.385	45.542

Description: SSDP organizes, plans, and executes specific projects in three focus areas: Enterprise Capabilities & Solutions; Mission Area Protection Concepts & Architectures; and Operational Tactics, Experiments & Prototypes. Enterprise Capabilities & Solutions projects focus on identifying and advocating for NSS enterprise-level protection requirements and architecture updates/modifications, informing/assisting policy-makers and analyzing policy to enhance the space protection posture across the NSS Enterprise. Mission Area Protection Concepts & Architectures projects constitute Protect and Defend (P&D) efforts focused on specific mission areas and/or systems. These projects entail the specific technical efforts, activities and engagements supporting capability and architecture development in mission areas such as Space Control, Command and Control (C2), Satellite Communication (SATCOM), Position-Navigation and Timing (PNT), Missile Warning (MW), Space Situational Awareness (SSA), Indications and Warning (I&W), and Intelligence - Surveillance - Reconnaissance (ISR). Finally, Operational Tactics, Experiments & Prototypes projects leverage operations expertise, experimentation and prototyping to improve operational capabilities and develop, refine, document and demonstrate Tactics, Techniques and Procedures (TTPs), Concepts of Operation (CONOPS), and associated C2 functions. Some of these projects hold the potential to leave-behind residual operational prototypes/capabilities when partnered with the appropriate mission organization. Additionally, these projects will support development of TTPs and CONOPS for protection solutions developed by SSDP partners across the NSS Enterprise. Projects in all three areas will include non-kinetic solutions for protecting specific capabilities and the NSS Enterprise.

FY 2018 Plans:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206730F / *Space Security and Defense Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY2018 projects will focus on high-priority DoD & IC space Protect and Defend (P&D) considerations and DoD strategic evaluations on future space investments while remaining flexible and responsive to address evolving protection needs and priorities throughout the NSS Enterprise. SSDP will also further the integration of DoD & IC space protection efforts through the delivery and integration of targeted analysis, policy recommendations, and initiatives. Individual projects, both in house and in coordination with mission partners, will concentrate on validating candidate solutions through technical engineering-based analysis, modeling & simulation (M&S), and operator engagement. SSDP will pursue definitive protection solutions encompassing countermeasures, inherently resilient architectures, data fusion, and CONOPS; employing its tailored, organic M&S resources to mature and refine CONOPS, deliver conceptual protocols, evaluate architectures, assess the integration of commercial tools & services, and accomplish various Joint Space Warfighting Forum (JSWF) objectives. Results will inform system trades, programmatic decisions, experiment planning/design, prototyping proposals, and influence NSS Enterprise requirement and architecture choices. SSDP will additionally define and, where appropriate, execute distinctive Space Control prototypes and experiments to include the Space Situational Awareness (SSA) and Command & Control (C2) mission areas. The program will execute these projects, prototypes, and experiments in SSDP facilities and/or mission partner facilities; often in coordination with key space operational centers to ensure full applicability and integration with evolving operational environments and threats. Increased FY2018 funding will enable development of higher- fidelity M&S tools necessary to tie campaign level modeling to the physics-based models developed in FY2017 and earlier.			
FY 2019 Plans: FY2019 activities will rapidly engage and provide timely, validated solutions throughout the year to high-priority DOD & IC space initiatives and evolving NSS Enterprise needs while maintaining focus on planned projects to address evolving threat and protection priorities to advance the spectrum of space protection and defense solutions at both system and enterprise levels. The program will utilize in-depth technical analysis tailored modeling & simulation (M&S) and warfighter/operator engagement along with other means/methods as required to deliver actionable, timely and efficient protection solutions. This includes the use of expanded in-house analytical capabilities (tailored/adapted as necessary) and the fielding of high-fidelity M&S tools for additional space protection concepts, greater integration of physics-based tools into campaign-level models, and the employment of next-level analytical rigor essential for informing prototype selection and design to ensure the highest possible pay-off and mission impact. Specific to FY2019, Enterprise Capabilities & Solutions projects will utilize the broad and robust physics-based M&S, engineering-based analysis, and campaign/enterprise level rapid architecture analysis capabilities proved out during FY2018 to: 1) influence policy and guidance across the NSS enterprise and drive more resilient future architectures; 2) examine planned DoD & IC programs, experiments and demonstrations to provide program protection recommendations to preserve Blue capabilities; and 3) recommend architecture and policy solutions/changes to enable the necessary C2 and optimize the deployment of new capabilities to deliver critical warfighting effects. Finally, FY2019 Operational Tactics, Experiments & Prototypes projects will utilize in-house and mission-partner coordinated efforts to mature and shape CONPS for programed and anticipated systems. These projects will seek to incorporate C2, SSA and Space Control concepts, planned capabilities and TTPs into relevant/			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206730F / *Space Security and Defense Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
targeted prototyping and experimentation activities. Projects in this area will incorporate objectives to demonstrate Title 10/50 space protection coordination, explore data fusion and, potentially, include the integration of commercial tools and services. Continued expansion of SSDP concept development & visualization tools and prototypes into/throughout FY2019 will provide the space C2 community toolsets to build, evaluate and select operational-level COAs (Courses of Actions). SSDP will execute FY2019 projects with our mission partners both in-house and, when appropriate, in their facilities to ensure the best application and use of toolsets, expertise and technology. These FY2019 projects will have the combined impact of continuing to mature and enhance the protection-oriented tools, policies, requirements and programs necessary to maintain and accelerate progress towards achieving resilience across the NSS community. Increased FY2019 funding delivers the means to move forward with maturing the program's analysis and M&S capabilities to provide the fidelity and depth of analytic competency necessary to support the efficient and informed design, development and prototyping of protection-based alternatives and solutions. In the face of an increasingly complex and contested space environment this increased capacity and capability is central to national space protection efforts and is a critical advancement for staying abreast and ahead of both current and next-generation threats. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 increased compared to FY2018 by $4.157M. Justification for this increase is described in plans above.			
Accomplishments/Planned Programs Subtotals	32.399	41.385	45.542

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Note: The AF/DoD portion of the SSDP is funded entirely from this Program Element. Funding to support the complimentary/partnership National Reconnaissance Office (NRO) activities (as part of the joint/integrated program effort between AFSPC and the NRO) are programmed in the NRO classified funding request.

E. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible. The program consists of numerous small projects.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206730F / *Space Security and Defense Program*	**Project (Number/Name)** 64A025 / *Space Protection Program*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Protection and Survivability	Various	Various : Various	-	29.321	Nov 2016	37.057	Nov 2017	40.240	Nov 2018	-		40.240	Continuing	Continuing	-
		Subtotal	-	29.321		37.057		40.240		-		40.240	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Support and Infrastructure (Gov't PMA)	Various	Various : Various	-	1.062	Nov 2016	1.587	Nov 2017	1.738	Nov 2018	-		1.738	Continuing	Continuing	-
Oversight, Advisory and other Technical Support (Contractor PMA)	Various	Various : Various	-	2.016	Nov 2016	2.741	Nov 2017	3.564	Nov 2018	-		3.564	Continuing	Continuing	-
		Subtotal	-	3.078		4.328		5.302		-		5.302	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	32.399		41.385		45.542		-		45.542	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206730F / *Space Security and Defense Program*	**Project (Number/Name)** 64A025 / *Space Protection Program*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Space Protection and Survivability																												
Enterprise Capabilities Solutions																												
Mission Area Protection Concepts and Architectures																												
Operational Tactics, Experiments and Prototypes																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206730F / *Space Security and Defense Program*	**Project (Number/Name)** 64A025 / *Space Protection Program*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Protection and Survivability				
Enterprise Capabilities Solutions	1	2017	4	2023
Mission Area Protection Concepts and Architectures	1	2017	4	2023
Operational Tactics, Experiments and Prototypes	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206760F / *Protected Tactical Enterprise Service (PTES)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	18.150	51.419	0.000	51.419	105.003	123.841	112.720	56.806	Continuing	Continuing
643726: *PTES*	-	0.000	18.150	51.419	0.000	51.419	105.003	123.841	112.720	56.806	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Develop the Protected Tactical Enterprise Service (PTES) ground system to provide worldwide, anti-jam, Low Probability of Intercept (LPI) communications for tactical warfighters. PTES will utilize the Protected Tactical Waveform (PTW) to provide anti-jam communications via military and commercial satellite systems for tactical users in all Services. Initially, PTES will utilize the Wideband Global SATCOM (WGS) system and be expanded later to include commercial satellites.

The PTES program is developing a mission management system (MMS), a key management system (KMS) and hub system to enable PTW via transponded WGS satellites, with future extension to commercial SATCOM. PTW modems for user terminals are being developed by the Protected Tactical Service Field Demonstration (PTSFD) and will be separately acquired by each Service and by international partners.

PTES addresses the gap in protected communications capability identified in the Joint Space Communications Layer (JSCL) Initial Capabilities Document (ICD), the Protected Satellite Communications Services (PSCS) Analysis of Alternatives (AoA) and the PSCS AoA Follow-on for Resiliency (PAFR). The PSCS AoA confirmed the validity of tactical user requirements for protected communications. Specific gaps identified that are pertinent to PTES are: protection and connectivity to mobile users operating in a contested environment, and wideband coverage and capacity in concentrated theaters. There is a projected shortfall (i.e. 60-75%) in the needed capacity for protected tactical communications in a contested environment. This gap is especially acute for small, mobile terminals. Secondly, there is a projected shortfall (i.e. 25-40%) in wideband coverage and capacity.

To meet the warfighter requirements for protected tactical MILSATCOM and the capability gaps identified in these studies, RDT&E funding is required for architectural development, acquisition strategy development, system requirements and system trades analysis, and engineering, manufacturing, developing, testing and evaluating PTES systems and segments.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206760F / *Protected Tactical Enterprise Service (PTES)*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Protected Tactical Enterprise Services (PTES) weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	18.150	77.021	0.000	77.021
Current President's Budget	0.000	18.150	51.419	0.000	51.419
Total Adjustments	0.000	0.000	-25.602	0.000	-25.602
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-25.602	0.000	-25.602

Change Summary Explanation

FY 2019: -$25.602M: -$25.215M to align funding profile to the program office's latest Single Best Estimate, -$0.387M inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Acquisition Strategy Development	0.000	7.246	0.000

Description: The JSCL ICD and PSCS AoA defined the need for a more resilient, protected tactical architecture with increased capacity and bandwidth. In accordance with these requirements, the PTES program will develop an acquisition strategy to meet the required capabilities within an acceptable cost and schedule.

FY 2018 Plans:
Mature acquisition strategy. Develop documentation required for statutory and regulatory documentation to achieve DoD 5000.02 milestones. Evaluate results of PTSFD testing and incorporate lessons learned.

FY 2019 Plans:
FY2019 System Development is now broken out into a new thrust, PTES System Development

FY 2018 to FY 2019 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206760F / *Protected Tactical Enterprise Service (PTES)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY2019 decreased compared to FY2018 by $7.246M. Justification for this decrease is described in plans above.			
Title: Source Selection & Contract Award	0.000	10.904	0.000
Description: Competitively award a single contract to develop and field PTES, including declaration of Initial Operational Capability (IOC) and Final Operational Capability (FOC). The contractor will be responsible for developing all PTES segments and performing all system integration, including end-to-end tests of the complete PTES system. ***FY 2018 Plans:*** Conduct source selection and award contract for development of PTES. Plan for Integrated Baseline Review with PTES contractor. Continue program office and other related support activities that may include, but are not limited to, studies, technical analysis, etc. ***FY 2019 Plans:*** FY2019 System Development is now broken out into a new thrust, PTES System Development ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 decreased compared to FY2018 by $10.904M. Justification for this decrease is described in plans above.			
Title: PTES System Development	0.000	0.000	51.419
Description: After competitive contract award, the PTES team will develop a system consisting of three segments: a MMS, a KMS, and Joint Hubs integrated into existing SATCOM gateways. PTES will enable an anti-jam communications capability via PTW over WGS for tactical users in all Services and International Partners. The PTES team will be responsible for developing all PTES segments and performing all system integration, including end-to-end tests of the complete PTES system. ***FY 2018 Plans:*** "PTES System Development" effort was previously included in Major Thrust "Source Selection and Contract Award." ***FY 2019 Plans:*** Award and Execute the PTES contract. Purchase and Provide Government Furnished Equipment to PTES Contractor. Evaluate results of Protected Tactical Service Field Demonstration (PTSFD) testing and incorporate lessons learned. Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206760F / *Protected Tactical Enterprise Service (PTES)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY2019 increased compared to FY2018 by $51.419M. Justification for this increase is described in plans above.			
Accomplishments/Planned Programs Subtotals	0.000	18.150	51.419

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 05 PE 1206431F: *Advanced EHF MILSATCOM (SPACE)*	19.800	-	0.000	-	0.000	0.000	0.000	0.000	-	0.000	19.800

Remarks

E. Acquisition Strategy

The objective of the PTES ground system is to provide an operational anti-jam communications capability via WGS using PTW. The PTES acquisition approach is to competitively award a single contract to develop and field PTES, including declaration of IOC and FOC. The contractor will be responsible for developing all PTES segments (MMS, KMS, and Hub) and performing all system integration, including end-to-end tests of the complete PTES system. The 46th Test Squadron is planned to be the PTES Developmental Test organization and AFOTEC is planned to be the Operational Test organization.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 1206760F / *Protected Tactical Enterprise Service (PTES)*	Project (Number/Name) 643726 / *PTES*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Protected Tactical Enterprise Service System Development	TBD	TBD : TBD	-	-		3.142	Nov 2018	29.259	Dec 2018	-		29.259	Continuing	Continuing	-
Protected Tactical Enterprise Service Other Support	Various	Various : Various	-	-		2.404	Jan 2018	-		-		-	Continuing	Continuing	-
Technical Mission Analysis	MIPR	Aerospace : El Segundo, CA	-	-		3.467	Jan 2018	4.497	Nov 2018	-		4.497	Continuing	Continuing	-
Enterprise SE&I	Various	Various : Various	-	-		4.339	Jan 2018	8.328	Nov 2018	-		8.328	Continuing	Continuing	-
		Subtotal	-	-		13.352		42.084		-		42.084	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Planning & Execution DT/OT	Various	Various : Various	-	-		1.700	Jan 2018	2.150	Nov 2018	-		2.150	Continuing	Continuing	-
		Subtotal	-	-		1.700		2.150		-		2.150	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	MIPR	Aerospace : El Segundo, CA	-	-		1.546	Jan 2018	2.421	Nov 2018	-		2.421	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		1.452	Jan 2018	4.664	Nov 2018	-		4.664	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		0.100	Jan 2018	0.100	Oct 2018	-		0.100	Continuing	Continuing	-
		Subtotal	-	-		3.098		7.185		-		7.185	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206760F / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643726 / *PTES*

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		18.150		51.419		-		51.419	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206760F / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643726 / *PTES*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206760F / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643726 / *PTES*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
PTES				
Conduct Source Selection	2	2018	1	2019
Award Development Contract	1	2019	1	2019
PTES System Development	1	2019	4	2023
Milestone B Decision	1	2021	1	2021
Developmental/Operational Testing (to include Planning)	1	2018	4	2023
Milestone C Decision	1	2023	1	2023
IOC	4	2023	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	24.201	29.776	0.000	29.776	173.694	253.392	263.096	461.058	Continuing	Continuing
643728: *Protected Tactical SATCOM*	-	0.000	24.201	29.776	0.000	29.776	173.694	253.392	263.096	461.058	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The centerpiece of the Protected Tactical SATCOM (PTS) system is a new, more resilient Protected Tactical Waveform (PTW), designed to mitigate the effects of advanced jamming in Anti-Access/Area Denial environments. The DoD will be implementing PTW to ensure delivery of protected tactical SATCOM to the joint and coalition warfighters in contested, degraded environments. The Protected Tactical Service Field Demonstration (PTSFD) is paving the way for the operationalization of PTW by developing production-representative PTW modems that can be used by the Services to upgrade their currently fielded terminals. In conjunction, the Protected Tactical Enterprise Service (PTES) program is developing a mission management, key management and hub system to enable PTW via transponded Wideband Global SATCOM (WGS) satellites, with future extension to commercial SATCOM and PTS.

PTS will provide worldwide, fully processed, beyond line of sight, Anti-Jam (AJ), low probability of intercept communications to tactical warfighters in both benign and contested environments via space-based fully processed SATCOM payloads. PTS will leverage the mission management and key management systems developed under the PTES program for mission planning, and will deliver a PTS ground architecture capable of integrating with PTES ground. PTS, with its on-board payload processing and antenna design, will bring advanced anti-jam capability and increased capacity. The system will also employ interfaces consistent with AFSPC's ongoing resilience initiatives and Enterprise Ground Services; thereby enhancing mission assurance, resiliency, and interoperability.

PTS will address the protected tactical MILSATCOM capability gaps identified in the Joint Space Communications Layer Initial Capabilities Document (JSCL ICD), the Protected Satellite Communications Services (PSCS) Analysis of Alternatives (AoA), and in the PSCS AoA Follow-on for Resiliency (PAFR). To meet the warfighter requirements for protected tactical MILSATCOM and the capability gaps identified in these studies, PTS will carry out essential Technology Maturation and Risk Reduction (TMRR) activities requiring RDT&E funding to evaluate and develop system requirements, architectures, prototypes, development efforts, engineering efforts, and manufacturing efforts. Additionally, RDT&E funding is needed to mature technology, reduce risks, and conduct testing and evaluation of PTS systems and segments, to include space, ground, and terminal/user segments.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Protected Tactical Service (PTS) weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P) because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in as high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	24.201	176.070	0.000	176.070
Current President's Budget	0.000	24.201	29.776	0.000	29.776
Total Adjustments	0.000	0.000	-146.294	0.000	-146.294
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-146.294	0.000	-146.294

Change Summary Explanation

FY 2019: -$146.294M: -$146.070M to align funding profile to a program office estimate based on a one year PTS launch delay from 2027 to 2028, -$0.224M inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Acquisition Strategy Development & Source Selection	0.000	14.828	7.054
Description: The PSCS AoA, PAFR study, and Space Warfighting Construct further defined the need for a more resilient, protected tactical space architecture with increased capacity. In accordance with these system concept and architecture studies, the PTS program is developing its acquisition strategy to include hostable payloads, free-flyers, on-orbit pathfinders, and other options.			
FY 2018 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Mature competitive acquisition strategy. Develop documentation necessary to comply with statutory and regulatory requirements to achieve DoD 5000.02 milestones. Plan to finish acquisition strategy and complete DoD acquisition approval. Plan to conduct source selection for one or more contractors for risk reduction and prototyping of the PTS system. ***FY 2019 Plans:*** Continue to develop documentation necessary to comply with statutory and regulatory requirements to achieve DoD 5000.02 milestones and approval. Plan to complete acquisition strategy approval. Release TMRR RFP to industry. Conduct source selection for one or more contractors for competitive prototyping, technology maturation, and risk reduction efforts. Continue program office support and other related support activities. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 decreased compared to FY2018 by $7.774M. Justification for this is described in plans above.			
Title: Technical Baseline and Architectural Engineering ***Description:*** Conduct architectural engineering and associated trades required for the PTS space and ground segments. ***FY 2018 Plans:*** Develop technical baseline and system requirements. Conduct system architecture and trade analyses, conduct risk reduction activities. ***FY 2019 Plans:*** Continue studies for constellation architectural design. Continue to develop and mature system requirements. Continue analyses on system design/trade-offs and affordability trades. Continue to develop technical baseline products, including system engineering and integration plans. Prepare for award and execution of TMRR. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 increased compared to FY2018 by $13.349M. Justification for this is described in plans above.	0.000	9.373	22.722
Accomplishments/Planned Programs Subtotals	0.000	24.201	29.776

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 PE 1206855F: *PSCS Aggregated*	0.000	16.000	29.379	-	29.379	172.206	206.247	301.617	537.124	Continuing	Continuing

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost

Remarks

E. Acquisition Strategy

The PTS team is developing an acquisition strategy which will be informed by market research to identify industry capabilities and acquisition concepts. This strategy will have an early emphasis on payload development and hosting opportunities and will incorporate lessons learned from MILSTAR, AEHF, PTES and commercial SATCOM practices.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Protected Tactical SATCOM TMRR System Design/Tradeoff studies and analyses	Various	Various : Various	-	-		8.235	Jan 2018	12.545	Jan 2019	-		12.545	Continuing	Continuing	-
Technical Mission Analysis	MIPR	Aerospace : El Segundo, CA	-	-		4.891	Jan 2018	4.220	Nov 2018	-		4.220	Continuing	Continuing	-
Enterprise SE&I	Various	Various : Various	-	-		6.624	Jan 2018	7.571	Jan 2019	-		7.571	Continuing	Continuing	-
		Subtotal	-	-		19.750		24.336		-		24.336	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	MIPR	Aerospace : El Segundo, CA	-	-		2.465	Jan 2018	2.465	Nov 2018	-		2.465	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		0.050	Jan 2018	0.050	Nov 2018	-		0.050	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		1.936	Jan 2018	2.925	Jan 2019	-		2.925	Continuing	Continuing	-
		Subtotal	-	-		4.451		5.440		-		5.440	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		24.201		29.776		-		29.776	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206761F / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Hostable Protected Tactical PL				
Protected Tactical SATCOM Materiel Development Decision	4	2017	4	2017
Develop Architecture, Technical Baseline and Acquisition Strategy	1	2018	1	2019
Milestone A Decision	1	2019	1	2019
Release Technology Maturation and Risk Reduction (TMRR) Request for Proposal	2	2019	2	2019
TMRR Source Selection	2	2019	2	2020
TMRR Contract Award	2	2020	2	2020
TMRR Phase	2	2020	4	2022
PTS Pathfinder	3	2022	2	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206855F / *Protected SATCOM Services (PSCS) - Aggregated*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	16.000	29.379	0.000	29.379	172.206	206.247	301.617	537.124	Continuing	Continuing
643725: *Evolved Strategic SATCOM (ESS)*	-	0.000	16.000	29.379	0.000	29.379	172.206	206.247	301.617	537.124	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Protected Satellite Communications Services (PSCS) Analysis of Alternatives (AoA) evaluated alternative space and control segment architectures, along with the associated user segments, to address the required protected satellite communications capabilities in the nuclear, contested, and benign operating environments. The PSCS AoA Follow-on for Resiliency (PAFR) Study and Strategic Tiger Team further defined the need for strategic space resiliency.

To meet the requirements for strategic communications and capability gaps identified in these studies, the Evolved Strategic SATCOM (ESS) system will provide space and mission control segments for worldwide and polar DoD strategic, secure, jam-resistant, nuclear-survivable communications for ground, sea, and air assets. It will include on-board resilience features with enhanced survivability and potentially provide a Protected Tactical Waveform (PTW) capability. PTW is a waveform designed to mitigate the effects of advanced jamming in Anti-Access/Area Denial environments. PTW will ensure delivery of protected tactical SATCOM to the joint and coalition warfighters in these contested, degraded environments.

ESS will support strategic mission requirements such as Presidential and National Voice Conferencing (PNVC), Nuclear Command and Control (NC2) strategic networks, terminal report back, and Emergency Action Message (EAM) dissemination. The program will provide the National Command Authority (NCA) and Combatant Commanders with highly-reliable, secure MILSATCOM to execute the Single Integrated Operational Plan (SIOP), and command and control strategic forces at all levels of conflict. ESS will support 2030 strategic demand in all operational environments (nuclear, contested, and benign) and will be backwards compatible with the eXtended Data Rate (XDR) waveform. The space vehicles will be designed to accommodate hosted payloads as required. The ESS system will also satisfy emerging requirements and capabilities for enhanced resilience by accommodating on-board resilience payload(s), providing maneuver capability, and incorporating improved cybersecurity.

RDT&E funding is required for continued program office and other related support activities that may include, but are not limited to: architectural development, acquisition strategy development, system requirements and system trades analysis, technology maturation, risk reduction activities, system and operational concept development, design activities, prototyping, engineering, manufacturing, developing, testing and evaluating of the ESS systems and segments.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206855F / *Protected SATCOM Services (PSCS) - Aggregated*

decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Protected SATCOM services (PSCS-Aggregated) weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototypes in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	16.000	214.885	0.000	214.885
Current President's Budget	0.000	16.000	29.379	0.000	29.379
Total Adjustments	0.000	0.000	-185.506	0.000	-185.506
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-185.506	0.000	-185.506

Change Summary Explanation

FY 2019: -$185.506M: -$185.285M to align funding profile to program office estimate based on a one year ESS launch delay from 2029 to 2030, -$0.221M inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Technical Baseline and Architectural Engineering	0.000	5.062	17.661
Description: The PSCS AoA, PAFR study, and Space Enterprise Vision study further defined the need for a more resilient, protected space architecture. ESS will support 2030 strategic demand in all operational environments (nuclear, contested, and benign), as well as supporting tactical user demands through a hostable PTW payload. As such, continued development of the technical baseline and further architecture engineering is required.			
FY 2018 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206855F / *Protected SATCOM Services (PSCS) - Aggregated*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Expand technical baseline development and system requirements, previously funded under the MILSATCOM Space Modernization Initiative (PE 0605431F BPAC 657104), to include the integration of a PTW payload. Conduct system architecture development. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Finalize system requirements and Capability Development Document to include focus on risk reduction studies. Continue analyses on system design/trade-offs and affordability trades. Continue the development of technical baseline products, and other documents and product requirements, system engineering and integration plans, launch and early-orbit test plans, operational test and evaluation plans required for concept development and future efforts. Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $12.599M. Justification for the increase is described in plans above.			
Title: Acquisition Strategy and Source Selection ***Description:*** In accordance with these concept and architecture studies, ESS is conducting market research and working with AFSPC to define system requirements in support of acquisition strategy development. Increase in program office support for developing documentation and planning for activities leading up to and including a draft and final Request for Proposal (RFP) release and source selection. ***FY 2018 Plans:*** Mature acquisition strategy. Develop documentation necessary to comply with statutory and regulatory requirements to achieve DoD. 5000.02 milestones. Partner with Industry for contract activities. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Release Development RFP and conduct source selection in preparation for ESS Development Contract Authority To Proceed. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, market research, acquisition strategy development, RFP development, source selection, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $4.738M. Justification for the decrease is described in plans above.	0.000	10.938	6.200
Title: ESS Development	0.000	0.000	5.518

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206855F / *Protected SATCOM Services (PSCS) - Aggregated*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: Develop and acquire the space and ground architecture for the ESS System ***FY 2018 Plans:*** ESS Development contract was previously included in Major Thrust "Technical Baseline and Architectural Engineering" ***FY 2019 Plans:*** Conduct studies and analyses to determine contractor capabilities to meet the requirements in preparation for Development Contract Award. Continue to define the space and ground architecture. Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 increased compared to FY2018 by $5.518M. Justification for the increase is described in plans above.			
Accomplishments/Planned Programs Subtotals	0.000	16.000	29.379

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 05 PE 1206431F: *Advanced EHF MILSATCOM (Space)*	6.000	-	-	-	-	-	-	-	-	0.000	6.000
• RDTE 04 PE 1206761F: *Protected Tactical Service (PTS)*	0.000	24.201	29.776	-	29.776	173.694	253.392	263.096	461.058	Continuing	Continuing

Remarks

E. Acquisition Strategy

Multiple acquisition strategy Course of Actions (COAs) are being evaluated. The current cost estimates for ESS assume a full-and-open competition for the ESS Development Contract. Federally Funded Research Development Center (FFRDC) studies and University Affiliated Research Center (UARC) studies will assist to refine required capabilities and develop recommended architectural options prior to Milestone B.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206855F / *Protected SATCOM Services (PSCS) - Aggregated*	**Project (Number/Name)** 643725 / *Evolved Strategic SATCOM (ESS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ESS Development	TBD	Not specified. : TBD	-	-		0.000		5.518	Nov 2018	-		5.518	Continuing	Continuing	-
Requirement Definition	Various	Various : Various	-	-		4.766	Jan 2018	5.600	Nov 2018	-		5.600	Continuing	Continuing	-
Technical Mission Analysis	MIPR	Aerospace : El Segundo, CA	-	-		1.714	Jan 2018	2.950	Nov 2018	-		2.950	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	Linquest : Los Angeles, CA	-	-		4.762	Jan 2018	9.111	Nov 2018	-		9.111	Continuing	Continuing	-
		Subtotal	-	-		11.242		23.179		-		23.179	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : Various	-	-		3.428	Jan 2018	3.700	Nov 2018	-		3.700	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		0.050	Jan 2018	0.150	Oct 2018	-		0.150	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		1.280	Jan 2018	2.350	Nov 2018	-		2.350	Continuing	Continuing	-
		Subtotal	-	-		4.758		6.200		-		6.200	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		16.000		29.379		-		29.379	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206855F / *Protected SATCOM Services (PSCS) - Aggregated*	**Project (Number/Name)** 643725 / *Evolved Strategic SATCOM (ESS)*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206855F / *Protected SATCOM Services (PSCS) - Aggregated*	**Project (Number/Name)** 643725 / *Evolved Strategic SATCOM (ESS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ESS Development				
Acquisition Strategy Approval	3	2018	3	2018
Draft Capability Development Document (CDD)	1	2018	3	2018
Final CDD Approval	3	2018	2	2019
Draft Development Release Request for Proposal (RFP)	4	2018	4	2018
Final Development RFP Release	2	2019	2	2019
Source Selection	3	2019	2	2020
ESS Development Contract	2	2020	4	2022
System Requirements Review (SRR)	1	2021	1	2021
Preliminary Design Review (PDR)	2	2022	2	2022
Milestone B	4	2022	4	2022
Initiate Engineering and Manufacturing Development	1	2023	1	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	17.976	87.577	366.050	12.395	378.445	42.742	9.044	8.826	8.987	Continuing	Continuing
64A020: *AF Funded ORSSats*	-	17.976	87.577	366.050	12.395	378.445	42.742	9.044	8.826	8.987	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Per the FY2018 NDAA, the Operationally Responsive Space (ORS) Office is now the Space Rapid Capabilities Office (RCO). Its mission is being broadened to expedite developing and fielding operationally focused activities for immediate and near-term needs as directed by the Space RCO Executive Committee. Key operating principles include a short and narrow chain of command, overarching programmatic insight, early and prominent war fighter involvement with small integrated operating teams within a single office. U.S. Strategic Command (USSTRATCOM) has identified three needs: 1) to rapidly augment existing space capabilities when needed to expand operational capability; 2) to rapidly reconstitute/replenish critical space capabilities to preserve "continuity of operations" capability; 3) to rapidly exploit and infuse space technological or operational innovations to increase U.S. advantage. Space RCO projects are optimized for prioritized theater use and/or surge, augmentation and replenishment of traditional space capabilities. The Space RCO Concept of Operations (CONOPS) drives the need for satellites featuring high degrees of modularity, standard interface vehicles, and the use of plug and play payloads and buses.

The Space RCO is ready to develop, test, train, and equip urgent needs of the warfighter as they are identified at any time. First, the urgent needs must be validated by the commander, USSTRATCOM; second, the project must be approved by the Space RCO Executive Committee; third, the project will be executed by the Space RCO. If the effort is initiated during execution year, it will be described in the next year's budget exhibit.

The highest priorities of the Space RCO are development and launch of the ORS-5 USSTRATCOM validated urgent need for space situational awareness; development and launch of the ORS-6 Compact Ocean Wind Vector Radiometer (COWVR) technology demonstration, and the low cost automated manufacturing initiative, ORS-7; and development and launch of the ORS-8 USSTRATCOM validated urgent need for an interim capability addressing weather gap 1 (cloud characterization) and gap 2 (theater weather imagery). The remaining priorities are to satisfy the high priority needs for augmentation and reconstitution, including Missile Warning, Wideband Protected Communication, Narrowband Communication, Data Exfiltration, Space Situational Awareness, Electro-Optical/Infrared (EO/IR) imagery, Blue/Friendly Force Situational Awareness, Maritime Domain Awareness, Positioning, Navigation, and Timing, Remote Access Solar Power, Weather, and Battlefield ISR.

Additional Space RCO efforts include maturing enabling elements which are transitioned as appropriate across the National Space Enterprise and allows the Space RCO to meet the USSTRATCOM specified responsiveness timelines and the 2007 NDAA goal ($40M satellites/$20M launches). This includes authenticating commercial space parts, confirming automated assembly lines, validating digital mission assurance processes, developing a modular open system architecture employing plug and play standards, and providing assembly, integration & test in the Rapid Response Space Works. It also includes integrating with the Multi-Mission Satellite Operations Center (MMSOC) and Enterprise Ground Service (EGS) to proliferate common satellite command and control. Additional developments include visionary, tailored, and future Space/Cyber projects to special operations forces (SOF).

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver its capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 04, Advanced Component Development and Prototypes, because the efforts are necessary to evaluate integrated technologies, representative modes, or prototype systems in a high fidelity and realistic operating environment.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	17.921	87.577	82.805	0.000	82.805
Current President's Budget	17.976	87.577	366.050	12.395	378.445
Total Adjustments	0.055	0.000	283.245	12.395	295.640
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	10.500	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.445	0.000			
• Other Adjustments	-10.000	0.000	283.245	12.395	295.640

Change Summary Explanation

FY2017: +$10.500M Congressional Add to maintain fiscal year funding level; -$10.000M decrease in Other Adjustments because FY 2017 Request for Additional Appropriations (RAA) for ORS-8 initial funding was not appropriated.
FY2019: +$283.245M added for the Space RCO Solar Power project, -$2.755M for inflation adjustment.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Operational Capabilities, Development, Enablers, Integration, and Rapid Assembly, Integration & Test	2.741	0.100	283.245	-	283.245

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: These projects are accomplished per the FY2017 congressional add. Execute urgent needs as identified by USSTRATCOM. Integrate space rapid capabilities and concepts, including resiliency, into operations plans of the combatant commands, tactics, techniques and procedures of the military departments, and exercises, demonstrations, and war games. Develop the Space RCO Solar Power project to collect solar energy and provide uninterrupted, assured, and logistically agile power to expeditionary forces operating in unimproved areas such as forward operating bases. Develop proof of concept for Responsive Manufacturing to include development of factory environment, integration with Digital Assurance architecture, transportation and factory flow requirements, standard, high-definition, and machine readable camera requirements. ***FY 2018 Plans:*** Integrate space rapid capabilities and concepts, including resiliency, into operations plans of the combatant commands, tactics, techniques and procedures of the military departments, and exercises, demonstrations, and war games. ***FY 2019 Base Plans:*** Develop space-based solar power collection and transmission capability using light weight, high efficiency solar cells coupled with individual radio frequency transmitters to collect solar energy and provide uninterrupted, assured, and logistically agile power to expeditionary forces operating in unimproved areas such as forward operating bases. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $283.145M. This increase is for the Space RCO Solar Power project.					
Title: Space RCO Executive Committee Projects ***Description:*** Execute prototyping projects, under rapid acquisition authorities inherent to the Space RCO, that address emergent capabilities and respond to Commander, USSTRATCOM-validated requirements and other Space RCO EXCOM approved efforts to meet Joint Force Commander needs identified in year of execution. ***FY 2019 Base Plans:*** Initiate rapid prototyping projects that address emergent capabilities and respond to Commander, USSTRATCOM-validated requirements and other Space RCO EXCOM approved efforts as required to meet	-	-	1.800	-	1.800

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Joint Force Commander and warfighter needs. These activities may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $1.800M due to this being a new major thrust.					
Title: Space RCO Development ***Description:*** Rapidly exploit and infuse space technological and operational innovations to increase U.S. advantage. ***FY 2018 Plans:*** Execute approved ORS-8 program in support of JFC need #7. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. including the development and launch of the ORS-6 Compact Ocean Wind Vector Radiometer (COWVR) technology demonstration. ***FY 2019 Base Plans:*** Continue to develop ORS-8 as the interim capability addressing weather gap 1 (cloud characterization) and gap 2 (theater weather imagery). Support, as applicable, the Enterprise Ground Service (EGS). Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $5.350M. Justification for this decrease is described in plans above.	9.143	79.755	74.405	-	74.405
Title: Space RCO: Cross Cutting ***Description:*** Provide systems engineering and program management support across all the Space RCO activities. Perform modeling, simulation, analysis, and assess alternative concepts and requirements. Support response to USSTRATCOM tasking and future mission development to meet Joint Force Commander (JFC) and warfighter needs. ***FY 2018 Plans:***	6.092	7.722	6.600	-	6.600

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue ongoing systems engineering support of future mission development. Refine Space RCO CONOPS, Enterprise and Architecture, and Systems Engineering Processes. Lead, participate in, and support, as appropriate, the solidification of space doctrine. Continue to support Combatant Commands. Investigate options and implement technology, procedures, and concepts for reducing costs and shortening satellite deployment times. Execute approved ORS-8 program in support of JFC need #7. Complete ORS-7 development and support FY2018 rideshare launch. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Base Plans:*** Continue ongoing systems engineering support of future mission development. Refine Space RCO CONOPS, Enterprise and Architecture, and Systems Engineering Processes. Lead, participate in, and support, as appropriate, the solidification of space doctrine. Continue to support Combatant Commands. Investigate options and implement technology, procedures, and concepts for reducing costs and shortening satellite deployment times. Execute approved ORS-8 program in support of JFC need #7. Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 Decreased compared to FY 2018 by $1.122M due to creation of new Major Thrust, Space RCO Executive Committee Taskings.					
Title: Space Related Tactical Communications and Cyber Enhancements for SOF ***Description:*** Provides enhanced communication and cyber capabilities to support tactical operations by Quick Reaction Forces (QRF) and Special Operations Forces (SOF). ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:***	0.000	0.000	0.000	12.395	12.395

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
-- Fast Wanderer - Develop enemy location & vulnerability exploitation capability for advanced satellite communication systems & methods. Capability will be integrated into existing SOF satellite exploitation systems and 2-way data dissemination capabilities. -- Tip Association & De-Duplication - Build & integrate a system algorithm with multiple criteria that de-duplicates redundant enemy tip information in real time. Greatly reduces dissemination of duplicate information from one or more sources providing more clarity for SOF entities. -- Resilient Collection Architecture - Provides advanced 2-way cross-communication system, cross-classification, low probability of intercept/exploitation communications. Uses multi-communication (i.e. space, terrestrial, and ground) domains for maximized communication options for SOF. -- SOF Nano Synthetic Aperture Radar - Provides high-resolution ISR from stratospheric aircraft, Unmanned Aerial Systems (UAS), high-altitude balloons; Anti-Access Area Denial capability; immune to cloud cover, severe weather, and adversary counter-measures. -- Kinetic Associated End Game - Build and test an airborne geolocation system for new enemy communications capabilities for kinetic end game. -- Select Spector - Develops and implements prototypes for satellite communications for SOF tactical radio systems providing Low Probability of Intercept communications through jamming environments with the potential for doubling channel capacity. -- Long Intermediate Gap Enhanced Reconnaissance (LINGER) - Build & integrate high altitude/long loiter platform architecture with shared precision geolocation capabilities in real time. -- Special COmms Transport Yield (SCOTY) - Provides robust special comms transport using a custom waveform on commercial Software Defined Radios (SDR). Enables collaborative machine-to-machine interoperability with other sensors. -- SOF ISR Real-Time On Board Processing - Delivers low-power high-capacity lightweight airworthy on-board data processor for exploiting high-bandwidth video and imagery data in real-time, and relaying data to the appropriate operations center for immediate display and analysis. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	17.976	87.577	366.050	12.395	378.445

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 1206422F: *Weather System Follow-On*	82.506	112.088	138.052	-	138.052	122.897	57.275	37.392	38.073	Continuing	Continuing

Remarks

E. Acquisition Strategy

Expeditiously award contracts through Space RCO or partner organizations.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operational Capabilities, Development, Enablers, and Rapid Assembly, Integration, & Test	Various	Various : Various	-	2.741	Nov 2016	0.100	Mar 2018	-		-		-	Continuing	Continuing	-
Space RCO Solar Power	TBD	TBD : TBD	-	-		-		283.245	Jan 2019	-		283.245	Continuing	Continuing	-
ORS-6 (COWVR)	C/CPFF	Millennium Engineering : Albuquerque, NM	-	0.527	Nov 2016	0.481	Nov 2017	-		-		-	Continuing	Continuing	-
ORS-5 Acquisition	SS/CPFF	MIT/LL : Boston, MA	-	6.515	Oct 2016	4.180	Nov 2017	-		-		-	Continuing	Continuing	-
ORS-5 Launch	C/FPIF	Orbital : Chandler, AZ	-	1.351	Dec 2016	-		-		-		-	Continuing	Continuing	-
ORS-8 (Weather gaps 1&2)	TBD	TBD : TBD	-	0.750	Jun 2017	75.094	Mar 2018	74.405	Oct 2018	-		74.405	Continuing	Continuing	-
Space RCO EXCOM approved projects	C/CPAF	TBD : TBD, NM	-	-		-		1.800	Dec 2018	-		1.800	Continuing	Continuing	-
Modular Bus/Open Manufacturing (ORS-7)	C/CPFF	Raytheon : Tucson, AZ	-	0.445	Nov 2016	0.107	Mar 2018	-		-		-	Continuing	Continuing	-
Develop/modify software/ hardware tools/models (OCO)	C/TBD	Various : Various	-	-		-		0.000		12.395	Dec 2018	12.395	Continuing	Continuing	-
		Subtotal	-	12.329		79.962		359.450		12.395		371.845	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advisory & Assistance Services	Various	Various : Various	-	4.431	Dec 2016	5.565	Dec 2017	4.399	Dec 2018	-		4.399	Continuing	Continuing	-
FFRDC	Various	Various : Various	-	1.216	Dec 2016	2.050	Dec 2017	2.201	Dec 2018	-		2.201	Continuing	Continuing	-
		Subtotal	-	5.647		7.615		6.600		-		6.600	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 1206857F / *Operationally Responsive Space*	Project (Number/Name) 64A020 / *AF Funded ORSSats*	

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	17.976		87.577		366.050		12.395		378.445	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Operationally Responsive Space				
Operational Capabilities, Development, Enablers, and Rapid Assembly, Integration, & Test	1	2017	4	2018
Space RCO Solar Power	1	2019	4	2020
ORS-1 (CENTCOM Urgent Need)	1	2017	3	2017
ORS-6 (COWVR)	1	2017	4	2019
ORS-5 Acquisition and Launch	1	2017	4	2017
ORS-5 Space Situational Awareness Operations	4	2017	4	2018
ORS-8 Weather gaps 1&2	2	2017	4	2022
Space RCO EXCOM approved projects	1	2019	4	2023
Modular Bus/Open Manufacturing (ORS-7)	1	2017	3	2018
Develop/modify software/hardware and models (OCO)	1	2019	4	2019
Cross-Cutting Activities: Modeling, Sim, Analysis; JFC Needs	1	2017	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604200F / *Future Advanced Weapon Analysis & Programs*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	5.100	39.602	0.000	39.602	0.000	0.000	0.000	0.000	0.000	44.702
653133: *Armament Subsystems*	-	0.000	5.100	39.602	0.000	39.602	0.000	0.000	0.000	0.000	0.000	44.702
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Air Force Life Cycle Management Center, Armament Systems Development Division plans and executes early Systems Engineering and risk reduction activities to tailor weapons concepts and analysis for 2030+ Air Dominance Weapon System candidates. Results enable highly informed decisions on future weapons concepts to develop, refine, and integrate technologies into new weapons concepts to defeat evolving threat scenarios and environments. Technical risk reduction activities include Concept Development, Trade Studies, Model Development, Concept Experimentation, and demonstrative prototypes. Conducts early Modeling, Simulation, and Analysis (MS&A) of virtual systems, validated through integration of empirical data derived from prototypes and demonstrations. Plans and executes pre-AoA and AoA activities as directed by ACC and Global Strike Command to prepare for major program milestone decisions (MDD, MS-A, MS-B). Also includes institutional costs required for quick-reaction answers to activities listed above. Examples of such efforts include but are not limited to, Next Generation Strike Weapon (NGSW) Analysis of Alternatives and Long Range Engagement Weapon (LREW).

This program element may include necessary civilian pay expenses required to manage and execute these program activities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

BA5 - This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	5.100	0.000	0.000	0.000
Current President's Budget	0.000	5.100	39.602	0.000	39.602
Total Adjustments	0.000	0.000	39.602	0.000	39.602
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	39.602	0.000	39.602

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604200F / *Future Advanced Weapon Analysis & Programs*

Change Summary Explanation

FY19 increase to continue Long Range Engagement Weapon

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: 2030AS Weapons	0.000	5.100	39.602	0.000	39.602

Description: The 2030+ Air Dominance Weapon Systems candidate concepts will define, refine and integrate technologies into evolving threat scenarios and environments. Studies that refine system concepts and operational/system architectures to include family of systems and system of systems are required in support of the strategic choices. Included but not limited to effectiveness analyses, concept characterization, risk assessments, survivability analyses, mission and campaign analyses, and early acquisition planning. Technical risk reduction activities will be conducted to include experimentation, integration, and building demonstrative prototypes.

Includes A&AS, travel, supplies, software, civilian pay and program costs.

FY 2018 Plans:
Define, refine and integrate technologies into evolving threat scenarios and environments. Studies that refine system concepts and operational/system architectures to include family of systems and system of systems are required in support of the strategic choices. Included but not limited to analysis of alternatives, effectiveness analyses, concept characterization, risk assessments, survivability analyses, mission and campaign analyses, and early acquisition planning. Technical risk reduction activities will be conducted to include experimentation, integration, and building demonstrative prototypes.

FY 2019 Base Plans:
Define, refine and integrate technologies into evolving threat scenarios and environments. Studies that refine system concepts and operational/system architectures to include family of systems and system of systems are required in support of the strategic choices. Included but not limited to analysis of alternatives, effectiveness analyses, concept characterization, risk assessments, survivability analyses, mission and campaign analyses, and early acquisition planning. Technical risk reduction activities will be conducted to include experimentation, integration, and building demonstrative prototypes.

FY 2019 OCO Plans:
N/A

FY 2018 to FY 2019 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604200F / *Future Advanced Weapon Analysis & Programs*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Increase in FY19 budget required to continue 2030 AS early systems engineering and technical risk reduction.					
Accomplishments/Planned Programs Subtotals	0.000	5.100	39.602	0.000	39.602

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Acquisition strategy is competitive prototyping; multiple vendors will be used to maximum extent possible.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604200F / *Future Advanced Weapon Analysis & Programs*	**Project (Number/Name)** 653133 / *Armament Subsystems*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
2030AS Development and Analysis	C/FFP	UKN : UKN	-	0.000		0.000		35.000	Oct 2018	0.000		35.000	Continuing	Continuing	-
		Subtotal	-	0.000		0.000		35.000		0.000		35.000	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Mgmt Administration	Various	Various : Eglin AFB, FL	-	0.000		5.100		4.602		0.000		4.602	Continuing	Continuing	-
		Subtotal	-	0.000		5.100		4.602		0.000		4.602	Continuing	Continuing	N/A

Remarks

Includes A&AS support plus IT requirements, TDY and office supplies.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		5.100		39.602		0.000		39.602	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604200F / *Future Advanced Weapon Analysis & Programs*	**Project (Number/Name)** 653133 / *Armament Subsystems*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
2030 Air Dominance Weapon System																												
Design, Engineering, Testing, Risk Reduction																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604200F / *Future Advanced Weapon Analysis & Programs*	**Project (Number/Name)** 653133 / *Armament Subsystems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
2030 Air Dominance Weapon System				
Design, Engineering, Testing, Risk Reduction	1	2018	4	2019

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	101.203	58.531	0.000	58.531	16.782	0.000	0.000	0.000	Continuing	Continuing
651030: *GPS Receiver Development*	-	0.000	101.203	58.531	0.000	58.531	16.782	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2018, specific efforts initiated under PE 0305164F, NAVSTAR Global Positioning System (User Equipment) (Space), Project 643833, Military Global Positioning System User Equipment were transferred to PE 0604201F, Integrated Avionics Planning & Development, Project 651030, Aircraft Receiver Development, to realign resources with the execution responsibilities supporting aircraft weapon system platforms along with increased transparency to stakeholders.

A. Mission Description and Budget Item Justification

Positioning, Navigation and Timing (PNT) solutions are critical to defense operations by enabling delivery of precision fires, safe aerial navigation and time coordination across multiple platforms and subsystems. PNT must be maintained in the face of emerging and continuously evolving electronic and cyber threats, requiring increased system resiliency and rapid adaptability similar to that historically required of electronic warfare systems. Evolving threats will drive upgrades such as Global Positioning System (GPS) receiver modernization, development of standard navigational system formats/interfaces, increased use of open system architecture design principles, incorporation of alternative navigation sources into navigational solutions, advanced anti-jam antennas, antenna electronics and precision clock improvements to maintain current force capabilities.

Efforts transferred from PE 0305164F and now conducted under PE 0604201F, Project 651030 include Embedded GPS/Inertial Navigation System (INS) Modernization (EGI-M), Miniaturized Airborne GPS Receiver 2000 Modernization (MAGR 2K-M), Defense Advanced GPS Receiver (DAGR), Resilient EGI (R-EGI) development, anti-jam antenna/antenna electronics development, Situational Awareness devices and other advanced/alternative PNT solutions. Activities also include, but are not limited to, both current program planning and execution and future program planning. Funds may be used to address emerging and short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issues.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver PNT solutions. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

This program is in Budget Activity 5, Engineering and Manufacturing Development, because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year. Production funding for modernized airborne receivers is not covered in this PE and will be requested by using platform when necessary.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	101.203	58.971	0.000	58.971
Current President's Budget	0.000	101.203	58.531	0.000	58.531
Total Adjustments	0.000	0.000	-0.440	0.000	-0.440
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.440	0.000	-0.440

Change Summary Explanation

No Significant Changes

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Embedded GPS/INS - Modernized (EGI-M)	0.000	66.300	49.261

Description: EGI is a combined INS/GPS aircraft position, navigation, and timing system. Program upgrades EGI design to enhance resiliency against existing and emerging navigational warfare threats, incorporating design features (such as interface standardization and software modularity) to incorporate alternative navigation and timing sources, where cost effective, to reduce DoD cost and time-lines to respond to any newly identified threats and maintain current force capabilities. Incorporates M-Code and potential ADS-B compliance capability into EGI receivers while addressing parts obsolescence, reducing configuration count from 260+ to approximately 16.

FY 2018 Plans:
Conduct the EGI-M Preliminary Design Review, obtain Milestone B approval, and award Engineering & Manufacturing Development contracts in late 4QFY18 and early 1QFY19. Prepare for Critical Design Review and develop box level vendor and government test objectives/plans.

FY 2019 Plans:
Conduct the Critical Design Review (CDR), develop Initial Capabilities Documents (ICD), and begin full qualification and environmental testing.

FY 2018 to FY 2019 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Requirements are increasing but funding is decreasing. Year of execution unfunded request will be needed to sustain program.			
Title: MAGR 2K-M ***Description:*** MAGR 2K-M is an aircraft GPS receiver. Program increases MAGR-2K resiliency against existing and emerging navigational warfare threats while reducing cost and time-lines to incorporate agile capabilities to respond to newly identified threats. Incorporates M-Code capability into MAGR 2K receivers while addressing parts obsolescence and providing a pathway to ADS-B Out implementation. Performs appropriate trade studies and incorporates additional resiliency features, such as alternate navigation inputs, where cost effective. ***FY 2018 Plans:*** Conduct MAGR 2K-M CDR, finalize modifications, incorporate new cyber security features, and conduct initial box-level bench testing, ***FY 2019 Plans:*** Complete box level bench testing, conduct full qualification testing to include environmental testing, and deliver Production Representative Units (PRU) for platform integration and flight testing. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Requirements are increasing but funding is decreasing. Year of execution unfunded request will be needed to sustain program.	0.000	23.850	5.270
Title: DAGR ***Description:*** DAGR is a vehicle mounted and hand-held GPS receiver. Program improves DAGR receiver performance by integrating software and hardware capability enhancements into DAGR receivers, providing improved resiliency to mitigate current and emerging operational threats and maintain the navigational capability required for ground personnel and vehicles. ***FY 2018 Plans:*** Initiate trade studies to further define requirements and award development contract to mature promising system enhancements. ***FY 2019 Plans:*** Continue maturing system enhancements and initiate new trade studies to address any emerging operational threat to the DAGR system (as required). ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Requirements are increasing but funding is decreasing. Year of execution unfunded request will be needed to sustain program.	0.000	3.653	2.000
Title: Resilient EGI (R-EGI)	0.000	7.400	2.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: Provide improved EGI resiliency to counter navigational warfare threats through the design, development, test and transition of science and technology efforts to EGI-M. Establish a Government Reference Architecture (GRA) embodying open systems architecture concepts and enabling future resilient PNT DoD systems. Provide upgrade and transition paths to flow new technologies into EGI-M hardware and software wherever practical. ***FY 2018 Plans:*** Begin development of hardware standards and software navigation/communication protocols. Develop simulation capability and implement prototyping to include ability to demonstrate and test capabilities prior to development. Develop programmatic plans with insertion points for potential hardware and software upgrades to EGI-M. ***FY 2019 Plans:*** Continue development of hardware standards and software navigation/communication protocols, simulation capability and implement prototyping to include ability to demonstrate and test capabilities prior to development, and programmatic plans with insertion points for potential hardware and software upgrades to EGI-M. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Requirements are increasing but funding is decreasing. Year of execution unfunded request will be needed to sustain program.			
Accomplishments/Planned Programs Subtotals	0.000	101.203	58.531

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 PE 0305164F: *Navstar GPS*	70.387	-	0.000	-	0.000	0.000	0.000	0.000	-	0.000	70.387

Remarks

In FY2018, PE 0305164F, NAVSTAR Global Positioning System (User Equipment) (Space), Project 643833, Military Global Positioning System User Equipment specific efforts are being transferred to PE 0604201F, Integrated Avionics Planning & Development, Project 651030, Aircraft Receiver Development for transparency and to realign resources with execution responsibilities that support various aircraft weapon system platforms.

E. Acquisition Strategy

Modifications to existing receivers designs will occur via Engineering Change Proposals (ECPs)/Task Orders on existing USAF contracts. The GRA and open standards associated with R-EGI will be developed in cooperation with an industry consortium.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 651030 / *GPS Receiver Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EGI-M	SS/CPFF	Honeywell : Clearwater, FL	-	-		13.573	Nov 2018	14.305	Jan 2019	-		14.305	Continuing	Continuing	-
EGI - M	SS/CPFF	Northrop Grumman : Woodland Hills, CA	-	-		44.112	Sep 2018	20.726	Jan 2019	-		20.726	Continuing	Continuing	-
MAGR-2K-M	SS/CPFF	Raytheon : El Segundo, CA	-	-		18.465	Apr 2018	4.300	May 2019	-		4.300	Continuing	Continuing	-
DAGR	SS/CPFF	Rockwell Collins : Des Moines, IA	-	-		3.653	Jul 2018	2.000	Jul 2019	-		2.000	Continuing	Continuing	-
R-EGI	TBD	TBD : NV	-	-		7.400	May 2018	2.000	May 2019	-		2.000	Continuing	Continuing	-
		Subtotal	-	-		87.203		43.331		-		43.331	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EGI-M FFRDC	Various	MITRE : NV	-	-		2.000	Oct 2017	3.080	Oct 2018	-		3.080	Continuing	Continuing	-
EGI-M Lab	PO	ISF : NV	-	-		1.100	Jan 2018	0.000	Jan 2019	-		0.000	Continuing	Continuing	-
		Subtotal	-	-		3.100		3.080		-		3.080	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EGI-M	PO	Not specified. : NV	-	-		0.000		0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	-		0.000		0.000		-		0.000	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 651030 / *GPS Receiver Development*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Strategic Planning/PMA	TBD	TBD : NV	-	-		10.900	Sep 2018	12.120	Sep 2019	-		12.120	Continuing	Continuing	-
		Subtotal	-	-		10.900		12.120		-		12.120	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		101.203		58.531		-		58.531	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 651030 / *GPS Receiver Development*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604201F / *Integrated Avionics Planning and Development*	**Project (Number/Name)** 651030 / *GPS Receiver Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
PNT				
EGI-M TMRR	3	2017	4	2018
EGI EMD	1	2019	4	2020
EGI EMD Testing	1	2021	4	2022
MAGR-2K-M EMD	1	2017	4	2020
MAGR-2K-M Testing	1	2017	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	3.009	4.468	0.000	4.468	5.957	16.376	11.429	6.546	Continuing	Continuing
654236: *Engineering Analysis*	-	0.000	3.009	2.979	0.000	2.979	3.972	4.466	4.479	4.560	Continuing	Continuing
655708: *Nuclear Weapons Support*	-	0.000	0.000	1.489	0.000	1.489	1.985	11.910	6.950	1.986	Continuing	Continuing

Note

This program, BA 5, PE 0604222F, project 655708, Weapon Storage Facility Material Handling Systems, is a new start.

A. Mission Description and Budget Item Justification

The Air Force Nuclear Weapons Center, Kirtland AFB, NM, is the executing agency for this program. The Air Force is tasked with maintaining and providing technical expertise on all AF nuclear weapons and weapon systems and with developing and maintaining counter-chemical, biological, radiological, and nuclear (C-CBRN) capabilities. This program provides resources for technical and programmatic activities which includes performing independent analyses on all AF nuclear weapons systems activities including weapons development and sustainment; interoperability; compatibility; safety, security, and reliability; Air Force legacy nuclear stockpile management/retirement; nuclear certification and nuclear certification management.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver nuclear weapon support capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it is conducting engineering and manufacturing development tasks aimed at meeting validated requirements.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	3.009	3.001	0.000	3.001
Current President's Budget	0.000	3.009	4.468	0.000	4.468
Total Adjustments	0.000	0.000	1.467	0.000	1.467
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	1.467	0.000	1.467

Change Summary Explanation

FY19 increase of $1.5M for Weapon Storage Facility Material Handling System

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*	**Project (Number/Name)** 654236 / *Engineering Analysis*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
654236: *Engineering Analysis*	-	0.000	3.009	2.979	0.000	2.979	3.972	4.466	4.479	4.560	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Air Force Nuclear Weapons Center, Kirtland AFB, NM, is the executing agency for this program. The Air Force is tasked with maintaining and providing technical expertise on all AF nuclear weapons and weapon systems and with developing and maintaining counter-chemical, biological, radiological, and nuclear (C-CBRN) capabilities. This program provides resources for technical and programmatic activities which includes performing independent analyses on all AF nuclear weapons systems activities including weapons development and sustainment; interoperability; compatibility; safety, security, and reliability; Air Force legacy nuclear stockpile management/retirement; nuclear certification and nuclear certification management.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it is conducting engineering and manufacturing development tasks aimed at meeting validated requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Engineering Analysis	0.000	3.009	2.979
Description: Provide the technical oversight of all Air Force (AF) nuclear weapons, delivery systems, and support systems. Provide the engineering and technical management expertise required in critical areas of nuclear weapons safety, security, reliability, operations, modernization, testing, certification, and counter proliferation. ***FY 2018 Plans:*** Analyze and document nuclear weapons issues related to risk assessment, data collection, model development, model validation,weapon effectiveness and nuclear stockpile planning and requirements assessment. ***FY 2019 Plans:*** Efforts in FY19 will continue to analyze and document nuclear weapons issues related to risk assessment, data collection, model development, model validation, weapon effectiveness, and nuclear stockpile planning and requirements assessment. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased in accordance with FY18 PB plan.			
Accomplishments/Planned Programs Subtotals	0.000	3.009	2.979

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*	**Project (Number/Name)** 654236 / *Engineering Analysis*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 07 64222F/674237: *EMP Certification*	-	27.579	-	-	-	-	-	-	-	0.000	27.579

Remarks

D. Acquisition Strategy

Cost Plus Award Fee (CPAF)and Military Interdepartmental Purchase Request (MIPR) will be used to obtain technical analyses and technical support for safety, operations, and counter proliferation assessments. Supporting activities are contracted separately using contract strategies deemed most appropriate to the effort. All contracts will be openly competed.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604222F / *Nuclear Weapons Support*	Project (Number/Name) 654236 / *Engineering Analysis*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	MIPR	TBD : Kirtland AFB, NM	-	-		0.700	Mar 2018	0.700	Oct 2018	-		0.700	Continuing	Continuing	-
SBIR	TBD	TBD : Kirtland AFB, NM	-	-		0.500	Mar 2018	0.500	Oct 2018	-		0.500	Continuing	Continuing	-
		Subtotal	-	-		1.200		1.200		-		1.200	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	MIPR	SNL : Kirtland AFB, NM	-	-		0.500	Mar 2018	0.500	Mar 2019	-		0.500	Continuing	Continuing	-
		Subtotal	-	-		0.500		0.500		-		0.500	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
UARC	Reqn	JHU : Kirtland AFB, NM	-	-		0.809	Mar 2018	0.779	Mar 2019	-		0.779	Continuing	Continuing	-
		Subtotal	-	-		0.809		0.779		-		0.779	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	TBD	TBD : Kirtland AFB, NM	-	-		0.500	Mar 2018	0.500	Mar 2019	-		0.500	Continuing	Continuing	-
		Subtotal	-	-		0.500		0.500		-		0.500	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*	**Project (Number/Name)** 654236 / *Engineering Analysis*

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		3.009		2.979		-		2.979	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*	**Project (Number/Name)** 654236 / *Engineering Analysis*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Engineering & Cyber security Analysis																												
Cyber security Vulernerability Assessments & Analysis																												
Documentation & Instruction Analysis & Development																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*	**Project (Number/Name)** 654236 / *Engineering Analysis*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Engineering & Cyber security Analysis				
Cyber security Vulernerability Assessments & Analysis	2	2018	4	2023
Documentation & Instruction Analysis & Development	3	2018	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600 / 5					R-1 Program Element (Number/Name) PE 0604222F / *Nuclear Weapons Support*				Project (Number/Name) 655708 / *Nuclear Weapons Support*			
COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
655708: *Nuclear Weapons Support*	-	0.000	0.000	1.489	0.000	1.489	1.985	11.910	6.950	1.986	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 0604222F, project 655708, Weapon Storage Facility Material Handling Systems, is a new start.

A. Mission Description and Budget Item Justification

New Weapon Storage Facilities (WSF) within AFGSC are adopting a new concept of operations by integrating maintenance and storage mission sets into one facility. To support mission generation requirements, facility support equipment and capabilities must be reviewed, modified or in extreme cases, re-developed in order to maintain operational readiness. Examples of equipment under review include but not limited to MB-4 & MHU-196/204. This review and potential modification of existing equipment ensures mission generation remains executable.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Weapon Storage Facility Material Handling Systems	-	0.000	1.489
Description: Weapon Storage Facility Material Handling System Review ***FY 2018 Plans:*** N/A ***FY 2019 Plans:*** This effort initiates a review of material handling system equipment to accommodate new Weapon Storage Facilities (WSF) concept of operations by integrating maintenance and storage mission sets into one facility. Analysis will determine the ability of existing equipment capability to support mission generation requirements and facility support equipment. Analysis will determine whether modification or re-development of equipment is required. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to FY19 new start.			
Accomplishments/Planned Programs Subtotals	-	0.000	1.489

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*	**Project (Number/Name)** 655708 / *Nuclear Weapons Support*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 07 64222F/674237: *EMP Certification*	-	27.579	-	-	-	-	-	-	-	0.000	27.579

Remarks

D. Acquisition Strategy

The acquisition strategy focuses on determining if the existing equipment can be modified or if a re-development effort is required. Once the analysis determines which course of action is required the appropriate acquisition strategy will be defined.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*	**Project (Number/Name)** 655708 / *Nuclear Weapons Support*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Facility Support Equipment Analysis	MIPR	Not specified. : TBD	-	-		-		0.969		-		0.969	Continuing	Continuing	-
		Subtotal	-	-		-		0.969		-		0.969	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contractor Support	C/CPAF	Not specified. : TBD	-	-		-		0.500		-		0.500	Continuing	Continuing	-
Government Services	MIPR	Not specified. : TBD	-	-		-		0.020		-		0.020	Continuing	Continuing	-
		Subtotal	-	-		-		0.520		-		0.520	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		1.489		-		1.489	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*	**Project (Number/Name)** 655708 / *Nuclear Weapons Support*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
WSF - Facility Support Equipment																												
Market Research																												
Facility Support Equipment Modification/ Development																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604222F / *Nuclear Weapons Support*	**Project (Number/Name)** 655708 / *Nuclear Weapons Support*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
WSF - Facility Support Equipment				
Market Research	2	2019	1	2020
Facility Support Equipment Modification/Development	2	2020	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604270F / *Electronic Warfare Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	4.986	2.241	1.909	0.000	1.909	2.066	2.102	2.145	2.185	Continuing	Continuing
653891: *Adv Infrared Counter Measures(Aircm)*	-	4.986	2.241	1.909	0.000	1.909	2.066	2.102	2.145	2.185	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Advanced Infrared Countermeasure (AIRCM) project contains related aircraft self-protection efforts aimed at increasing aircraft survivability against the increasing threat of sophisticated surface-to-air and air-to-air missiles. These missiles may employ sophisticated next-generation Electro-Optics (EO), Infrared (IR), Radio Frequency (RF), dual-mode (i.e. IR and RF), or multi-mode seekers. AIRCM will provide advanced expendable countermeasures and/or techniques that will be functionally compatible with existing dispenser systems and employed across multiple USAF weapons systems. This also explicitly includes any and all flare, chaff, decoy, and associated components development and testing that may be demanded or needed in current operations supporting the war on terrorism regardless of aircraft platform. Similar activities that are supplementary to this effort may be accomplished ad hoc using platform specific funding or through other activities such as joint services or NATO test groups.

BA-5 - This program is in Budget Activity 5, SDD because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	12.476	2.241	1.924	0.000	1.924
Current President's Budget	4.986	2.241	1.909	0.000	1.909
Total Adjustments	-7.490	0.000	-0.015	0.000	-0.015
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-7.490	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.015	0.000	-0.015

Change Summary Explanation

FY17 Congressional reduction total (-$7.3M) -$3.3M for improved GPS- Department requested realignment of funds to RDTE, AF lines 19 and 48 and RDTE,N line 139; -$4M for forward financing

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604270F / *Electronic Warfare Development*	**Project (Number/Name)** 653891 / *Adv Infrared Counter Measures(Aircm)*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
653891: *Adv Infrared Counter Measures(Aircm)*	-	4.986	2.241	1.909	0.000	1.909	2.066	2.102	2.145	2.185	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Advanced Infrared Countermeasure (AIRCM) project contains related aircraft self-protection efforts aimed at increasing aircraft survivability against the increasing threat of sophisticated surface-to-air and air-to-air missiles. These missiles may employ sophisticated next-generation Electro-Optics (EO), Infrared (IR), Radio Frequency (RF), dual-mode (i.e. IR and RF), or multi-mode seekers. AIRCM will provide advanced expendable countermeasures and/or techniques that will be functionally compatible with existing dispenser systems and employed across multiple USAF weapons systems. This also explicitly includes any and all flare, chaff, decoy, and associated components development and testing that may be demanded or needed in current operations supporting the war on terrorism regardless of aircraft platform. Similar activities that are supplementary to this effort may be accomplished ad hoc using platform specific funding or through other activities such as joint services or NATO test groups.

BA5 - This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Countermeasure Testing ***Description:*** IR flare testing and qualification on aircraft ***FY 2018 Plans:*** Activities include testing and qualification of expendable countermeasure cocktails on various aircraft. ***FY 2019 Base Plans:*** Activities include testing and qualification of expendable countermeasure cocktails on various aircraft. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decrease minimal. Continuing effort.	2.476	2.241	1.909	0.000	1.909
Title: Military Code (M code) receiver	2.510	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604270F / *Electronic Warfare Development*	**Project (Number/Name)** 653891 / *Adv Infrared Counter Measures(Aircm)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: The development and integration of a GPS receiver capable of receiving a Military Code (M code). ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	4.986	2.241	1.909	0.000	1.909

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• PAAF 01 Line Item 356010: *Flares*	115.706	124.850	107.482	0.000	107.482	93.042	106.905	146.033	-	Continuing	Continuing

Remarks

Qualified flares, if not in AF inventory, will be procured under program 0208030F War Reserve Munitions, Flares.

D. Acquisition Strategy

Contracts are awarded through the Department of Defense Ordnance Technology Consortium (DOTC). DOTC facilitates collaborative Government, Industry, and Academic ordnance technology development and prototyping initiatives. It serves as a single point contracting agent for development/technology demonstrations needed to advance and expand our military technological superiority.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604270F / *Electronic Warfare Development*	**Project (Number/Name)** 653891 / *Adv Infrared Counter Measures(Aircm)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Digital RWR development	MIPR	TBD : NV	-	-		-		-		-		-	Continuing	Continuing	-
Military Code (M code) receiver	SS/CPFF	Raytheon : Tucson, AZ	-	2.510	Jun 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	2.510		-		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aircraft/Unit Support	MIPR	AATC : Tucson, AZ	-	0.290	Jun 2017	0.300	Jun 2018	0.260	Jun 2019	-		0.260	Continuing	Continuing	-
Mission Planning	MIPR	TBD : NV	-	0.324	Jun 2017	0.300	Jun 2018	0.260	Jun 2019	-		0.260	Continuing	Continuing	-
		Subtotal	-	0.614		0.600		0.520		-		0.520	Continuing	Continuing	N/A

Remarks

AATC supports ACC/CAF in coordinating and managing aircraft use to conduct advanced expendable countermeasure testing (this does not support other AMC or AFSOC)

Mission planning: Provides for programming of mission data required for each airframe and each expendable countermeasure or flare cocktail; this does not support AMC or AFSOC

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Modeling and Simulation	MIPR	Air Force Research Laboratory : WPAFB, OH	-	0.325	Jun 2017	0.330	Jun 2018	0.245	Jun 2019	-		0.245	Continuing	Continuing	-
Range Test	MIPR	96th Test Wing : Eglin AFB, FL	-	1.397	Jun 2017	1.171	Jun 2018	1.016	Jun 2019	-		1.016	Continuing	Continuing	-
Test Support	MIPR	Various : NV	-	0.120	Jun 2017	0.120	Jun 2018	0.108	Jun 2019	-		0.108	Continuing	Continuing	-
		Subtotal	-	1.842		1.621		1.369		-		1.369	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604270F / *Electronic Warfare Development*	**Project (Number/Name)** 653891 / *Adv Infrared Counter Measures(Aircm)*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Modeling and simulation
- This entails performance of modeling and simulation which helps to predict advanced expendable countermeasure effectiveness
- Performing activity varies; conducted by AFRL and GTRI

Range Test
- This is the cost to use the range for testing (Radiometric, Captive Seeker, Flight, etc.)
- Performing Activity & Location varies; 96th Test Wing, Eglin AFB, FL, White Sands Missile Range, NM, Gila Bend, AZ

Test Support
- This includes but is not limited to Seeker Test Vans (multiple vans required for Captive Seeker), Duo chrome camera, and other test equipment activities, Support during testing (i.e. communications/electric/security)
- Performing Activity & Location should remain "Various: TBD", multiple activities are included

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Office/ Government Support	Various	Air National Guard Air Force Reserve Command Test Center : Tucson, AZ	-	0.020	May 2017	0.020	May 2018	0.020	May 2019	-		0.020	Continuing	Continuing	-
		Subtotal	-	0.020		0.020		0.020		-		0.020	Continuing	Continuing	N/A

Remarks

AATC provides all the management, preparation and coordination of advanced expendable countermeasure testing efforts for ACC/CAF (this does not include support for AMC or AFSOC)

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	4.986		2.241		1.909		-		1.909	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604270F / *Electronic Warfare Development*	**Project (Number/Name)** 653891 / *Adv Infrared Counter Measures(Aircm)*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604270F / *Electronic Warfare Development*	**Project (Number/Name)** 653891 / *Adv Infrared Counter Measures(Aircm)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Advance IR Aircm				
First FY17 Semi-Annual Test Event	2	2017	2	2017
Second FY17 Semi-Annual Test Event	4	2017	4	2017
First FY18 Semi-Annual Test Event	2	2018	2	2018
Second FY18 Semi-Annual Test Event	4	2018	4	2018
First FY19 Semi-Annual Test Event	2	2019	2	2019
Second FY19 Semi-Annual Test Event	4	2019	4	2019
First FY20 Semi-Annual Test Event	2	2020	2	2020
Second FY20 Semi-Annual Test Event	4	2020	4	2020
First FY21 Semi-Annual Test Event	2	2021	2	2021
Second FY21 Semi-Annual Test Event	4	2021	4	2021
First FY22 Semi-Annual Test Event	2	2022	2	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	78.167	38.250	207.746	0.000	207.746	261.742	202.483	202.505	192.550	Continuing	Continuing
655050: *TDL System Integration*	-	34.990	35.585	188.888	0.000	188.888	212.243	156.237	121.293	127.904	Continuing	Continuing
655262: *Family of Gateways*	-	43.177	2.665	18.858	0.000	18.858	49.499	46.246	81.212	64.646	Continuing	Continuing

Note

This program, BA 5, PE 0604281F, project 655050, Agile Comms, is a new start.
This program, BA 5, PE 0604281F, project 655050, High Capacity Backbone (HCB), is a new start.
This program, BA 5, PE 0604281F, project 655050, Link 16 Enhancements, is a new start.

A. Mission Description and Budget Item Justification

The Tactical Data Networks Enterprise (TDNE) develops, enhances and fields Tactical Data Links (TDL), advanced waveforms, radios, network management tools, and associated hardware and software that comprise the Joint Aerial Layer Network (JALN). This will be accomplished by upgrading currently fielded communications and TDL systems and by developing and fielding more advanced systems in the future. Also addresses warfighter urgent demands through the establishment of Quick Reaction Capabilities (QRC) and Enterprise activities as directed by JALN council. TDNE supports the development, fielding and training of aerial layer networking capabilities across multiple core functions including air superiority, ground precision attack, command and control, space operations, intelligence, surveillance and reconnaissance (ISR), and personal recovery. These activities provide the Joint Forces Air Component Commander with networks to build a common operating picture of the battlespace. TDNE executes quick reaction response capability requests by the warfighter and support activities (including ramp-up) associated with the Joint Aerial Layer Network (JALN) Enterprise activities as directed by the JALN Council. This program ensures the continued enhanced interoperability of Air Force and joint/coalition/NATO assets through efforts such as early systems engineering and use of the Political, Operational, Economic and Technical (POET) process for program requirements analysis and architectural design development/coordination of all TDN standards and management capabilities, configuration management, platform/system interoperability assessments, development of government reference architectures, interoperability certification testing, and flight testing. PTW is a waveform designed to mitigate the effects of advanced jamming in Anti-Access/Area Denial environments. PTW provides worldwide, beyond line of sight, Anti-Jam (AJ), Low Probability of Intercept communications, via military and commercial satellite systems for tactical users in all Services. This effort funds Protected Tactical Waveform (PTW) modem development and aperture development on suitable platforms like (but not limited to) RQ-4 and BACN. PTW provides communication path diversity by increasing SATCOM resilience through satellite, spectral, and waveform diversity. This effort continues work started in Protected Tactical Service Field Demonstration (PTSFD) to complete PTW maturity and modem development, leveraging TALON Tacet Avis aperture work to develop the PTW antenna and radome. It includes terminal certification efforts (Information Assurance (IA), NSA and MIL-STD). This effort funds continued development of PTW components, protected tactical terminal modems that will be capable of being fully integrated into existing wideband terminals and will ensure delivery of protected tactical SATCOM to the joint and coalition warfighters in contested, degraded environments. PTW development activities may also include technical and acquisition-related studies, analysis, early systems engineering and risk reduction activities, addressing all subsystems to support both current program planning/execution and future AF program planning.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*

TDL System Integration will provide for the study (acquisitions current and proposed), analysis, enhancement, development, integration, demonstration, test, and evaluation of Tactical Data Links (TDLs) as a subset of the broader aerial layer networks. TDLs are used in both peace time and combat environments to exchange information such as character-oriented and fixed-formatted messages, data, radar tracks, target information, platform status, imagery, free-text messaging and command assignments. TDLs provide interoperability, local and global connectivity, and situational awareness to the user when training or fighting under rapidly changing operational conditions. TDLs increase mission effectiveness by providing enhanced air domain situational awareness, positive combat identification of aircraft in the network, fusion/correlation of on- and off-board sensor data, digital sharing of machine-to-machine target and threat information, thereby, enabling time critical targeting and other mission assignment tasking. TDLs are used by all service theater command and control (C2) elements, weapons platforms, and sensors. TDLs include, but are not limited to: Link 16, Link 11, Link 22, Situational Awareness Data Link (SADL), Variable Message Format (VMF), Intra-Flight Data Link (IFDL), and other Advanced TDL Link technologies, such as Tactical Targeting Network Technology (TTNT), Common Data Link (CDL), and Multifunction Advanced Data Link (MADL). TDLs typically include both a waveform specification as well as the standards for exchanging messages. Agile Communications include the capability to share tactically significant information within/to/from highly contested environments in support of the Air Superiority 2030 Flight Plan. Agile Communication efforts provide for pre-Analysis of Alternatives (AoA) and development activities. High Capacity Backbone (HCB), a subset of the overall JALN concept, will provide the warfighter with a robust communication infrastructure enhancing C2 capabilities. HCB connects users operating within disadvantaged conditions to space and terrestrial communications utilizing Deployed Ground Entry Points (DGEP) and aerial nodes. Link 16 Enhancements will develop and field a Link 16 Anti Jam (AJ) capabilities on 4th and 5th generation platform to address Link 16 jamming threats in the contested and highly contested environment. Link 16 Enhancement funding will be utilized for Non recurring engineering and integration of AJ capabilities on airborne and ground platforms.

Family of Gateways provides for the study (acquisitions current and proposed), analysis, enhancement, development, integration, costing, demonstration, test, and evaluation efforts that will allow joint combat forces to exchange information quickly and accurately by bridging discrete airborne, terrestrial, maritime, and space-based C4ISR networks producing operational effects not possible within individual networks. Gateway functions include enabling interoperability between data formats, protocols, and communication mediums. Additionally, gateway functions extend the connectivity range, consolidate data from multiple networks into high capacity links for transmission to key C2ISR nodes, route information between disadvantaged users, and fuse/correlate data from multiple sources to improve accuracy. Gateway functions also provide application hosting, shared data storage, on-demand information access, smart data forwarding, and system monitoring and network management. Further, this project supports 5th-to-4th Generation communications capabilities, 5th-to-5th Generation efforts and future TDL communications development. Additionally, Family of Gateways will support to enhance existing TDL performance, through upgrades and engineering analysis of system designs. Efforts in this project include waveform, ground, and rapid acquisition activities supporting Air Force requirements for communications bridging across multiple platforms, sources and communication domains. Moreover, the E-3G AWACS, 5th-to-4th Generation Gateway effort provides 4th Generation tactical edge assets with a common tactical operating picture for enhanced battlespace awareness via integration of 5th Generation sensor data. This effort integrates the core components (5th-to-4th Gateway, Correlation/fusion, and National sensor inputs) for use on the E-3G platform.

In FY18 SFF/DACAS Modernization and System-of-Systems (SoS) Enterprise Integration was a new start.
In FY18 Applique Technologies for TDLs was a new start.
In FY18 Link 16 Evolution was a new start.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver TDL weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F and 0605898F.

This program is in BA 5, SDD because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	82.380	38.250	100.028	0.000	100.028
Current President's Budget	78.167	38.250	207.746	0.000	207.746
Total Adjustments	-4.213	0.000	107.718	0.000	107.718
• Congressional General Reductions	-1.581	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.632	0.000			
• Other Adjustments	0.000	0.000	107.718	0.000	107.718

Change Summary Explanation

FY19 $68M addition for Agile Communications Development
FY19 $33M addition for High Capacity Backbone
FY19 $6M addition for Link 16 Enhancements

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600 / 5					**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*				**Project (Number/Name)** 655050 / *TDL System Integration*			
COST ($ in Millions)	**Prior Years**	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
655050: *TDL System Integration*	-	34.990	35.585	188.888	0.000	188.888	212.243	156.237	121.293	127.904	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 0604281F, project 655050, Agile Comms, is a new start.
This program, BA 5, PE 0604281F, project 655050, High Capacity Backbone (HCB), is a new start.
This program, BA 5, PE 0604281F, project 655050, Link 16 Enhancements, is a new start.

In FY 2018, Project Cursor on Target (CoT) was terminated

A. Mission Description and Budget Item Justification

TDL System Integration provides for the study, analysis, enhancement, development, integration, demonstration, joint/coalition/NATO interoperability exercises, costing, training, test, trials, and evaluation of Tactical Data Links (TDL) as a subset of the broader aerial layer network. TDLs are used in both peacetime and combat environments to exchange information such as character-oriented and fixed-formatted messages, data, radar tracks, target information, platform status, imagery, free-text messaging and command assignments. TDLs provide interoperability, local and global connectivity, and situational awareness to the user when training or fighting under rapidly changing operational conditions. TDLs increase mission effectiveness by providing enhanced air domain situational awareness, positive combat identification of aircraft in the network, fusion/correlation of on- and off-board sensor data, digital sharing of machine to machine target and threat information and, thereby, enabling time critical targeting and other mission assignment tasking. TDLs are used by all service, NATO, and coalition theater C2 elements, weapons platforms, and sensors.

The number of Air Force platforms hosting TDLs has expanded from C2 aircraft (E-3, E-8, E-11A, EQ-4B, etc.) to the fighter, bomber, intelligence, surveillance and reconnaissance (ISR), tanker, airlift and other tactical fleets (F-15, F-16, F-22A, Rivet Joint, B-1, B-2, B-52, KC-46, etc.), as well as precision guided munitions. Utilization of TDLs in joint and international environments requires the integration of terminals into host platforms and interoperability of TDL networks across all deployed joint/Coalition/NATO platforms. Recent mandates require additional studies and analysis in order to meet frequency reprogramming and cryptographic requirements.

Efforts in this project include waveform and integration activities.

Waveform:
Waveform activities include, but are not limited to, enabling and supporting Joint Interoperability of Tactical Command and Control Systems (JINTACCS), joint/Coalition/NATO Interoperability, Link 16 enhancements, and development of a next generation waveform and/or advanced tactical data link. Funding will provide training, logistics development, testing and certification of individual TDL implementations to joint/allied standards, establishment of service-wide network management procedures/operations, and system wide enhancements/testing, demonstration and experimentation.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

Integration:
Integration activities include but are not limited to, Data Link Test Facility (DTF), Block Upgrade 2 (BU2) retrofit/MIDS JTRS, Block Cycle 1 (BC1) retrofit , Air Force Participating Test Unit (AFPTU), Interoperable System Management and Requirements Transformation (iSMART), Joint Airborne Network Tactical Edge (JAN-TE), Network Centric Capability Assessment (NCCA), NATO interoperability, Coalition interoperability, TDL Planning, Analysis, and Monitoring (TDL PAM), integration analysis of C2 of JALN, Cursor on Target (CoT), Combat Cloud, Tactical Communications Suite (TCS), and analysis of integration on platforms of existing TDN systems, system-of-systems analysis. Funding will ensure continued enhanced interoperability of Air Force/joint/Coalition/NATO assets through efforts such as early systems engineering and use of the POET process for program requirements analysis and architectural design development/coordination of all TDN standards and management capabilities, configuration management, platform/system interoperability assessments, development of government reference architectures, integration of cyber technologies, interoperability certification testing, and flight testing, demonstration and experimentation.

Activities include studies and analysis (engineering and cost) to support both current program planning and execution and future program planning efforts for Tactical Data Networks (TDN), including development of joint concepts for C2 of JALN, JALN Analysis of Alternatives (AoA) follow-on analysis, and JALN gateway planning.

Activities also include joint/Coalition/NATO Interoperability that provides program office system engineering to support Foreign Military Sales (FMS) case development, FMS planning for tech refresh modifications, Crypto-Modernization, and Net Management.

Agile Communications include the capability to share tactically significant information within/to/from highly contested environments in support of the Air Superiority 2030 Flight Plan. Agile Communication efforts provide for pre-Analysis of Alternatives (AoA) and development activities. Agile Communications supports the application of open standards & advanced apertures over an Enterprise-wide Aerial Network, enabling all platforms to share combat-relevant data/info to, from & within the Highly Contested Environment (HCE).

High Capacity Backbone (HCB) effort implements an incremental approach for deploying resilient reachback connectivity to DISN services and in-theater rear echelon organizations through dedicated aerial gateways and opportunistic airborne nodes. The HCB Transport supports a robust deployable ground infrastructure required, through reach back, range extension and payload control. It will use an open system approach composed of non-proprietary government and commercial interface standards.

Link 16 Enhancement will develop and field Link 16 Anti Jam (AJ) capabilities on 4th and 5th generation platforms to address Link 16 jamming threats in the contested and highly contested environments. Focus will be directed toward non recurring engineering and integration of AJ capabilities on airborne and ground platforms.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver TDL weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F and 0605898F.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Tactical Data Networks (TDN) Integration	13.291	9.044	16.545
Description: TDN Integration activities include but are not limited to, Data Link Test Facility (DTF), Air Force Participating Test Unit (AFPTU), Network Centric Capability Assessment (NCCA), Joint/Coalition/NATO Interoperability, Joint Aerial Layer Network (JALN) Analysis of Alternatives (AoA) follow-on, and JALN gateway planning. ***FY 2018 Plans:*** - Manage the development, certification, developmental training, and logistics plans for individual TDL implementations to joint/ allied standards. - Provide management with the necessary engineering, technical, and administrative support needed to facilitate development. - Plan for testing, integration, and associated training for all MIDS LVT and MIDS JTRS upgrade configurations. - Provide support to TDL interoperability testing of development and fielded systems through the DTF. - Provide support to DoD-mandated TDL MIL-STD conformance testing and interoperability assessments for all TDL-capable Air Force platforms through the AFPTU. - Conduct aerial layer network focused studies and analysis that support data link enhancements. - Assess tactical airborne network and network management gaps that are validated in existing requirements documents through the Network Centric Capability Assessments (NCCA). - Studies and analysis will include, but will not be limited to, supporting both current program planning and execution and future program planning efforts for TDN (e.g. development of joint concepts for C2 and network management of the Joint Aerial Layer Network (JALN), Combat Cloud, and JALN gateway planning). - Provide support to Coalition interoperability and provide program office system engineering to support NATO C3I, Foreign Military Sales (FMS) case development, FMS planning for technology refresh modifications, Crypto-Modernization, and Net Management. - Provide support to the DTF and AFPTU with required hardware and software upgrades and license renewals, which provide development and interoperability support for new capabilities and technology growth. ***FY 2019 Plans:*** - Will continue to manage the development, certification, developmental training, and logistics plans for individual TDL implementations to joint/allied standards. - Will continue to provide management with the necessary engineering, technical, and administrative support needed to facilitate development. - Will continue to plan for testing, integration, and associated training for all MIDS LVT and MIDS JTRS upgrade configurations. - Will continue to provide support to TDL interoperability testing of development and fielded systems through the DTF. - Will continue support to DoD-mandated TDL MIL-STD conformance testing and interoperability assessments for all TDL-capable Air Force platforms through the AFPTU.			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Will continue to conduct aerial layer network focused studies and analysis that support data link enhancements. - Will continue to assess tactical airborne network and network management gaps that are validated in existing requirements documents through the Network Centric Capability Assessments (NCCA). - Studies and analysis will include, but will not be limited to, supporting both current program planning and execution and future program planning efforts for TDN (e.g. development of joint concepts for C2 and network management of the Joint Aerial Layer Network (JALN), Combat Cloud, and JALN gateway planning). - Will continue to provide support to Coalition interoperability and provide program office system engineering to support NATO C3I, Foreign Military Sales (FMS) case development, FMS planning for technology refresh modifications, Crypto-Modernization, and Net Management. - Will provide support to the DTF and AFPTU with required hardware and software upgrades and license renewals, which provide development and interoperability support for new capabilities and technology growth. - Will provide support to Agile Communications efforts that include pre-Analysis of Alternatives (AoA) and development activities. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to ramp up in development, testing and research support efforts for three new starts.			
Title: Joint Interoperability of Tactical Command and Control Systems (JINTACCS)	6.924	7.068	6.414
Description: Joint Interoperability of Tactical Command and Control Systems (JINTACCS) ensures interoperability of TDL systems with associated joint, allied, and Coalition systems. It includes configuration management of TDL Military Standards (MIL-STDs), TDL message development, interoperability test/certification, and TDL message standard implementation using interoperable System Management and Requirements Transformation (iSMART) for Link 11A/B, Link 16, Link 22, Variable Message Format (VMF), Integrated Broadcast Service (IBS), Intraflight Data Link (IFDL), Multifunction Advanced Data Link (MADL), and others. ***FY 2018 Plans:*** - Provide the necessary engineering, technical, and administrative support required to add and/or update Air Force platform and system information exchange requirements. - Ensure compatibility and interoperability of TDLs by funding required Air Force/joint MIL-STD compliance and interoperability tests. - Ensure compatibility and interoperability of TDLs by developing TDL messaging capability to address new or updated operational requirements. - Provide support to IFDL and MADL specific message translation development in support of the 5th-to-4th Generation Communications Capability. ***FY 2019 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Will continue to provide the necessary engineering, technical, and administrative support required to add and/or update Air Force platform and system information exchange requirements. - Will continue to ensure compatibility and interoperability of TDLs by funding required Air Force/joint MIL-STD compliance and interoperability tests. - Will continue to ensure compatibility and interoperability of TDLs by developing TDL messaging capability to address new or updated operational requirements. - Will continue to provide support to IFDL and MADL specific message translation development in support of the 5th-to-4th Generation Communications Capability. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to development work tapering minimally in FY19.			
Title: Cursor on Target (CoT) ***Description:*** Cursor on Target (CoT) is an extensible, 'What, When, Where' (W3) XML message format for interconnecting Command, Control, Communication and Computer (C4), Intelligence, Surveillance and Reconnaissance (ISR) systems. The CoT suite consists of the W3 base schema, 14 tailored sub-schema, and a set of 10 software plug-ins and translators that facilitate Machine-to-Machine (M2M) transmission of Command and Control (C2), ISR, and situational awareness data at reduced cost compared with traditional integration methods. ***FY 2018 Plans:*** - Bring closure to the program - Update Website to alert users that the program will no longer be supported - Send email to current users about program ending ***FY 2019 Plans:*** - Program ending in FY18 ***FY 2018 to FY 2019 Increase/Decrease Statement:*** -Funding decreased due to program ending.	1.585	1.621	0.000
Title: 5th to 4th Generation Gateway ***Description:*** 5th-to-4th Generation Gateway facilitates track sharing and sensor data between 5th Generation and 4th Generation aircraft as well as Command and Control (C2) nodes. The capabilities developed under this effort enable interoperability between data formats, protocols, and communication mediums. Additionally, these capabilities extend the connectivity range, consolidate data from multiple networks, domains and sensors into high capacity links for transmission to key C2ISR nodes, route information between disadvantaged users, and correlate data from multiple sources to facilitate early detection and tracking while enabling	12.771	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
collaborative targeting. The addition of multi-domain capabilities as a future requirement of 5th-to-4th Generation communications capabilities enable track sharing at the tactical edge for the timely destruction of ground and airborne target sets. These additional capabilities are a combat force multiplier that enhance total force synergy for target prosecution and weapons employment. The initial increment will provide the baseline 5th-to-4th communication capability upon which future requirements will build capability. ***FY 2018 Plans:*** No funding or work in FY18. ***FY 2019 Plans:*** No funding or work in FY 19 ***FY 2018 to FY 2019 Increase/Decrease Statement:*** No delta			
Title: TDL Planning, Analysis, and Monitoring (TDL PAM) ***Description:*** This effort was previously captured in project 655050 under TDN Integration. Project is pending result of a DCR. The greater burdens placed on Multi-TDL Networks (MTN) due to an increasing number of network subscribers and emerging capabilities such as Net-Enabled Weapon (NEW) systems and Digital Aided Close Air Support (DACAS) via Combat Net Radio (CNR) requires an automated toolset to enable Interface Control Officers (ICO) to effectively employ TDL capabilities to support different AORs and missions within an increasingly complex MTN. Tasks include but are not limited to managing the TDL interfaces (and data that flows across them) that build the common tactical/operational pictures; planning the MTN; running predictive LOS computations; creating validated operational tasking data links messages; monitoring connectivity status; perceiving and remedying network conflicts and outages; and performing other analyses to enhance MTN performance. ***FY 2018 Plans:*** - Engage stakeholders to refine requirements in support of developing relevant documentation needed to inform key decision points, e.g. MOA/MOUs, ECPs for future capability drops/requirements development packages, etc. - Support enterprise level HPT DCR efforts to leverage a joint materiel solution for ICOs across the theater air control system - Perform studies and analysis, risk reduction and prototype user evaluation exercises (e.g. Bold Quest, Timber Express). ***FY 2019 Plans:*** - Will continue to engage stakeholders to refine requirements in support of developing revelant pre-acquisition documentation needed to inform key decision points, e.g. MOA/MOUs, ECPs for future capability drops/requirements development packages. - Will continue to support enterprise level HPT DCR effort to field a joint materiel solution to satisfy the TDL PAM capability gap	0.419	1.952	29.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Will continue to perform studies and analysis, risk reduction and prototype user evaluation exercises (e.g. Bold Quest). ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to additional development work in FY19.			
Title: Agile Comms ***Description:*** Agile Comms supports the application of open standards and advanced apertures over an Enterprise-wide Aerial Network, enabling all platforms to share combat-relevant data/info to, from and within the Highly Contested Environment (HCE). ***FY 2018 Plans:*** No funding in FY 18 ***FY 2019 Plans:*** - Will engage in post ICD and pre AoA activities including the development of the Architecture and Enterprise Approach to the Joint Aerial Network ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Effort starts in FY19	-	0.000	68.000
Title: High Capacity Backbone (HCB) ***Description:*** The Joint Aerial Layer Network High Capacity Backbone (JALN HCB) will provide a robust communication infrastructure to the warfighter enhancing command and control (C2) capabilities within any theater of operations. JALN HCB will enable range extension, enhance interoperability, increase situation awareness by reducing the time it takes to gather intelligence data, delivery the intelligence for analysis and to delivery the information to the user. ***FY 2018 Plans:*** No funding in FY18 ***FY 2019 Plans:*** Will conduct risk reduction efforts/experiments to inform decision ahead of CDD ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Efforts starts in FY19	-	0.000	33.000
Title: Link 16 Enhancements ***Description:*** Link 16 Enhancement will develop and field Link 16 Anti Jam (AJ) capabilities on 4th and 5th generation platforms to address Link 16 jamming threats in the contested and highly contested environments.	-	0.000	5.955

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2018 Plans: No funding in FY18 ***FY 2019 Plans:*** - Will perform non recurring engineering and integration on airborne and ground platforms ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Effort starts in FY19			
Title: SFF/DACAS Modernization and System-of-Systems (SoS) Enterprise Integration ***Description:*** This effort will support the development and demonstration of Small Form Factor (SFF) technologies that can support Digitally Assisted Close Air Support (DACAS) and other missions across the full spectrum of operating environments. This effort will consider System-of-Systems (SoS) engineering, technical analysis/performance, platform integration, and Tactics, Techniques, and Procedures (TTPs) to best utilize technologies and acquisition approaches for enterprise modernization. ***FY 2018 Plans:*** - Engage Subject Matter Expert (SME) and stakeholder community to identify initial demonstration objectives and intended technical performance. - Perform market research and/or analyze alternative materiel solutions - Baseline key candidate solutions. - Develop statement of work for risk reduction contract - Establish initial evaluation/analysis process for SoS interoperability/capability. ***FY 2019 Plans:*** - Will continue to engage Subject Matter Expert (SME) and stakeholder community to identify initial demonstration objectives and intended technical performance. - Award risk reduction contract developing prototypes. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to ramp up in development effort.	-	7.000	11.910
Title: Applique Technologies for TDLs ***Description:*** This effort will develop and test low Size, Weight, and Power (SWaP) applique production kits to support TDL communications; it will incorporate proven techniques related to RF components, system interfaces, and platform integration. This effort will identify appropriate platforms, apertures, and interfaces and evaluate using representative flight environments and conditions.	-	0.900	9.131

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2018 Plans: - Complete low SWaP prototype and develop production kit. - Identify and vet candidate platform(s). - Complete lab integration testing and relevant Modeling, Simulation, and Analysis (MS&A). - Prepare for ground and flight test activities. - Identify and develop necessary test equipment and infrastructure. ***FY 2019 Plans:*** - Will continue to complete low SWaP prototype and develop production kit. - Will continue to identify and vet candidate platform(s). - Will continue to complete lab integration testing and relevant Modeling, Simulation, and Analysis (MS&A). - Will continue to prepare for ground and flight test activities. - Will continue to identify and develop necessary test equipment and infrastructure. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to ramp up in development effort.			
Title: Link 16 Evolution (changed from "Cognitive Enterprise Development and Baselining" on FY18 PB) ***Description:*** This effort will implement Link 16 technologies into TDL terminals and investigate the integration of additional emerging technologies to improve communications reliability. This effort will maintain a government-controlled technical baseline(s) to efficiently execute development and enhancements. Emerging technologies will be developed and evaluated for efficacy; recommendations will be identified for appropriate terminal fielding/upgrades to platforms and will be considered when evaluating enterprise TDL capabilities/gaps. ***FY 2018 Plans:*** - Coordinate scope and schedule with terminal developers and stakeholders to establish technical baseline for future work. - Assess and mature emerging technologies in coordination with terminal developers and stakeholders. ***FY 2019 Plans:*** - Will continue to coordinate scope and schedule with terminal developers and stakeholders to establish technical baseline for future work. - Will continue to assess and mature emerging technologies in coordination with terminal developers and stakeholders. ***FY 2018 to FY 2019 Increase/Decrease Statement:***	-	8.000	8.933

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Funding increased due to a minimal bump in development work.			
Accomplishments/Planned Programs Subtotals	34.990	35.585	188.888

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 07 PE 0207448F: *C2ISR TDL*	1.580	2.875	1.505	-	1.505	1.531	1.559	1.587	1.616	Continuing	Continuing
• APAF 05 Line Item F01500: *F-15*	0.000	0.844	46.903	-	46.903	53.211	40.167	20.933	21.310	Continuing	Continuing
• APAF 05 Line Item F01600: *F-16*	6.447	-	6.755	-	6.755	8.371	8.525	8.695	8.851	Continuing	Continuing
• APAF 05 Line Item B00200: *B-2A*	0.415	1.718	2.315	-	2.315	0.201	0.206	0.210	0.213	Continuing	Continuing
• APAF 05 Line Item B01B00: *B-1B*	1.380	-	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• OPAF 03 Line Item 834010: *General Information Technology*	1.842	0.312	0.177	-	0.177	0.180	1.698	1.701	1.731	Continuing	Continuing

Remarks

D. Acquisition Strategy

The Airborne Networking Directorate provides for common development, integration, and interoperability across the entire airborne network and ensures that data links are procured and maintained as a joint, end-to-end command and control system. The program is post Milestone A but still determining the type of materiel solution going forward. Awaiting results from High Performance Team to determine way ahead.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TDN Integration	Various	Various : Various	-	11.538	Jan 2017	6.150	Jan 2018	15.639	Jan 2019	-		15.639	Continuing	Continuing	-
TDN Integration - TDL PAM	MIPR	Various : Various	-	-		-		28.325	Feb 2019	-		28.325	Continuing	Continuing	-
High Capacity Backbone (HCB)	C/TBD	Various : Various	-	-		-		33.000	Mar 2019	-		33.000	Continuing	Continuing	-
Agile Comms	C/TBD	Various : Various	-	-		-		60.000	Mar 2019	-		60.000	Continuing	Continuing	-
SFF/DACAS Modernization and SoS Enterprise	MIPR	Various : Various	-	-		7.000	Mar 2018	11.910	Mar 2019	-		11.910	Continuing	Continuing	-
Applique Technologies for TDLs	MIPR	Various : Various	-	-		0.900	Mar 2018	9.131	Mar 2019	-		9.131	Continuing	Continuing	-
Link 16 Evolution	MIPR	Various : Various	-	-		8.000	Mar 2018	14.933	Mar 2019	-		14.933	Continuing	Continuing	-
		Subtotal	-	11.538		22.050		172.938		-		172.938	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TDN Integration - NCCA	C/T&M	MITRE : Bedford, MA	-	1.719	Oct 2016	1.183	Oct 2017	1.287	Oct 2018	-		1.287	Continuing	Continuing	-
		Subtotal	-	1.719		1.183		1.287		-		1.287	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TDN Integration - DTF	PO	46th Test Squadron : Eglin AFB, FL	-	0.900	Feb 2017	0.900	Feb 2018	1.222	Dec 2018	-		1.222	Continuing	Continuing	-
JINTACCS	C/FFP	Spectrum Comm Inc : Newport News, VA	-	2.676	Feb 2017	2.665	Feb 2018	6.414	Feb 2019	-		6.414	Continuing	Continuing	-
TDN Integration - AFPTU	MIPR	Various : Various	-	2.281	Jun 2017	1.157	Sep 2018	1.802	Sep 2019	-		1.802	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
5th to 4th redirect efforts	MIPR	Various : Various	-	10.423	Sep 2017	-		-		-		-	Continuing	Continuing	-
Cursor on Target	PO	46 TS : FL	-	0.000	Nov 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	16.280		4.722		9.438		-		9.438	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TDN Integration PMA - A&AS support - NCCA, Coalition Interoperability, JALN AoA	C/CPAF	Various : Various	-	3.529	Jan 2017	4.085	Jan 2018	3.667	Jun 2019	-		3.667	Continuing	Continuing	-
Cursor on Target PMA - A&AS support	C/CPAF	Various : Various	-	0.419	Dec 2016	1.000	Jan 2018	-		-		-	Continuing	Continuing	-
TDN Integration PMA - FFRDC support - Coalition Interoperability, JALN AoA	C/T&M	MITRE : Bedford, MA	-	0.660	Oct 2016	0.709	Oct 2017	0.538	Oct 2018	-		0.538	Continuing	Continuing	-
TDN Integration PMA - Travel, Government Purchase Cards, etc...DTF, NCCA, Coalition Interoperability, AFPTU, JALN AoA	Various	Various : Various	-	0.361	Sep 2017	0.750	Sep 2018	0.285	Sep 2019	-		0.285	Continuing	Continuing	-
JINTACCS PMA - Travel, Government Purchase Cards, etc...	Various	Various : Various	-	0.042	Sep 2017	0.035	Sep 2018	0.060	Sep 2019	-		0.060	Continuing	Continuing	-
TDL PAM development program	C/CPAF	Various : Various	-	0.442	Jun 2017	1.051	Jan 2018	0.675	Jun 2019	-		0.675	Continuing	Continuing	-
		Subtotal	-	5.453		7.630		5.225		-		5.225	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
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	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	34.990		35.585		188.888		-		188.888	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655050 / *TDL System Integration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Tactical Data Network Enterprise				
TDN Integration	1	2017	4	2023
JINTACCS	1	2017	4	2023
Cursor on Target (CoT)	1	2017	4	2018
TDL Planning, Analysis, and Monitoring (TDL PAM)	2	2018	4	2023
Agile Comms	1	2019	4	2023
High Capacity Backbone (HCB)	1	2019	4	2023
Link 16 Enhancement	1	2019	4	2023
SFF/DACAS Modernization and SoS Enterprise Integration	2	2018	4	2023
Applique Technologies for TDLs	2	2018	4	2020
Link 16 Evolution (changed from "Cognitive Enterprise Development and Baselining" on FY18 PB)	2	2018	4	2019

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655262 / *Family of Gateways*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
655262: *Family of Gateways*	-	43.177	2.665	18.858	0.000	18.858	49.499	46.246	81.212	64.646	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Family of Gateways provides for the study (acquisitions current and proposed), analysis, enhancement, development, integration, costing, demonstration, test, and evaluation efforts that will allow joint combat forces to exchange information quickly and accurately by bridging discrete airborne, terrestrial, maritime, and space-based C4ISR networks producing operational effects not possible within individual networks. Gateway functions include enabling interoperability between data formats, protocols, and communication mediums. Additionally, gateway functions extend the connectivity range, consolidate data from multiple networks into high capacity links for transmission to key C2ISR nodes, route information between disadvantaged users, and fuse/correlate data from multiple sources to improve accuracy. Gateway functions also provide application hosting, shared data storage, on-demand information access, smart data forwarding, and system monitoring and network management. Further, this project supports 5th-to-4th Generation communications capabilities, 5th-to-5th Generation efforts and future TDL communications development. Additionally, Family of Gateways will support to enhance existing TDL performance, through upgrades and engineering analysis of system designs. Efforts in this project include waveform, ground, and rapid acquisition activities supporting Air Force requirements for communications bridging across multiple platforms, sources and communication domains. Moreover, the E-3G AWACS, 5th-to-4th Generation Gateway effort provides 4th Generation tactical edge assets with a common tactical operating picture for enhanced battlespace awareness via integration of 5th Generation sensor data. This effort integrates the core components (5th-to-4th Gateway, Correlation/fusion, and National sensor inputs) for use on the E-3G platform.

Activities also include studies, analysis, demonstrations and experiments to support both current program planning/execution and future program planning efforts for Family of Gateways.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver TDL weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: 5th-to-4th Generation Gateway	43.177	2.665	18.858
Description: 5th-to-4th Generation Gateway facilitate sharing track and sensor data between 5th Generation and 4th Generation aircraft as well as Command and Control (C2) nodes. The capabilities developed under this effort enable interoperability between data formats, protocols, and communication mediums. Additionally, these capabilities extend the connectivity range, consolidate data from multiple networks, domains and sensors into high capacity links for transmission to key C2ISR nodes, route information between disadvantaged users, and correlate data from multiple sources to facilitate early detection and tracking while enabling collaborative targeting. The addition of multi-domain capabilities as a future requirement of 5th-to-4th Generation communications			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655262 / *Family of Gateways*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
capability enables track sharing at the tactical edge for the timely destruction of ground and airborne target sets. These additional capabilities are a combat force multiplier that enhance total force synergy for target prosecution and weapons employment. The initial increment will provide the baseline 5th-to-4th communication capability upon which future requirements will build capability. ***FY 2018 Plans:*** - Continue to develop the 5th-to-4th Generation GW / communications capabilities. - Upgrade the 46 TS facility to MADL capability and conduct Link-16 NDL development demo. ***FY 2019 Plans:*** - Will continue to develop the 5th-to-4th Generation GW / communications capabilities. - Will upgrade the 46 TS facility to MADL capability and conduct Link-16 NDL development demo. - Will provide 4th Generation tactical edge assets with a common tactical operating picture for enhanced battlespace awareness via integration of 5th Generation sensor data, as part of the E-3G AWACS, 5th-to-4th Generation Gateway effort. -- Will integrate the core components (5th-to-4th Gateway, Correlation/fusion, and National sensor inputs) for use on the E-3G platform. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to change in requirement.			
Accomplishments/Planned Programs Subtotals	43.177	2.665	18.858

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 07 PE 0207448F: *C2ISR TDL*	1.580	2.875	1.505	-	1.505	1.531	1.559	1.587	1.616	Continuing	Continuing
• APAF 05 Line Item F01500: *F-15*	0.000	0.844	46.903	-	46.903	53.211	40.167	20.933	21.310	Continuing	Continuing
• APAF 05 Line Item F01600: *F-16*	6.447	-	6.755	-	6.755	8.371	8.525	8.695	8.851	Continuing	Continuing
• APAF 05 Line Item B00200: *B-2A*	0.415	1.718	2.315	-	2.315	0.201	0.206	0.210	0.213	Continuing	Continuing
• APAF 05 Line Item B01B00: *B-1B*	1.380	-	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• OPAF 03 Line Item 834010: *General Information Technology*	1.842	0.312	0.177	-	0.177	0.180	1.698	1.701	1.731	Continuing	Continuing

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655262 / *Family of Gateways*

D. Acquisition Strategy

The Airborne Networking Directorate provides for common development, integration and interoperability across the entire airborne network and ensures that data links are procured and maintained as a joint, end-to-end, command and control system. The program is post-Milestone-A but still determining the type of materiel solution going forward. Awaiting results from High Performance Team to determine way ahead.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655262 / *Family of Gateways*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
5th To 4th Generation Gateway development	Various	Various : Various	-	42.937	Mar 2017	2.665	Mar 2018	18.858	Mar 2019	-		18.858	Continuing	Continuing	-
		Subtotal	-	42.937		2.665		18.858		-		18.858	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
5th To 4th Generation Gateway PMA - Travel, Government Purchase Cards, etc.	Various	Various : Various	-	0.240	Jun 2017	0.000		0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	0.240		0.000		0.000		-		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	43.177		2.665		18.858		-		18.858	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655262 / *Family of Gateways*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
5th-to-4th Generation Gateway																												
5th-to-4th Generation Gateway Development																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604281F / *Tactical Data Networks Enterprise*	**Project (Number/Name)** 655262 / *Family of Gateways*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
5th-to-4th Generation Gateway				
5th-to-4th Generation Gateway Development	2	2017	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604287F / *Physical Security Equipment*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	63.101	19.739	14.421	0.000	14.421	9.700	10.066	10.276	10.462	Continuing	Continuing
655120: *Physical Security Equipment - SD ED*	-	63.101	19.739	14.421	0.000	14.421	9.700	10.066	10.276	10.462	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Integrated Base Defense Security Systems (IBDSS) provides improvements and enhancements, demonstrates, and tests Physical Security Equipment (PSE) systems to include Force Protection. This program supports the protection of tactical, fixed, and nuclear weapons systems, AF personnel and AF facilities. The PSE program is organized to provide PSE RDT&E for Air Force specific needs but as a complement to, and in conjunction with, the PSE RDT&E programs funded by the DOD Physical Security Enterprise and Analysis Group (PSEAG). As such this program will obtain, demonstrate, and test PSE in the same manner and to the same standards and architecture as PSEAG-funded projects to ensure interoperability with PSEAG-developed PSE. In support of PSE, this RDT&E program includes spectrum planning for radio frequency (RF), communication security (cyber), and information assurance requirements. This Program Element also includes funding for Force Protection Commercial Off The Shelf (FP COTS) market research, evaluation and testing. The FP COTS testing applies to all available technologies (delay, denial, detection, assessment, communication display, access control, power, mobility, and defeat effects) which are considered effective for AF physical security use. This program supports the maintenance and test support at Site C 3 and the Cold Weather Test Site (CWTS), as annotated in DoD Directive 3200.11, listing the 46th Test Wing (TW) as a Major Range and Test facility, conducting developmental and operational testing as the primary mission. Force Protection programs are inherently subject to rapid changes in the operational environment and will retain sufficient Program flexibility to meet changes in location, scope and capability in order to protect Air Force people, facilities and warfighting assets.

Counter Small Unmanned Aerial Systems (Cs-UAS) Joint Emergent Operational Need (JEON) is a rapid acquisition and deployment capability existing of full kill (detect, track, assess and defeat with various capabilities (fixed, mobile, portable and hand-held.) It is a layered system-of-systems using COTS technologies, integrated via GOTS C2 system.

Counter Small Unmanned Aerial Systems (Cs-UAS) Joint Urgent Operational Need (JUON) supports EUCOM JUON to protect specific strategic assets in overseas theaters of operation from the evolution of small unmanned aerial systems based on low cost, extensive proliferation, and availability in the commercial marketplace. This is Overseas Contingency Operations (OCO) funding.

Counter Small Unmanned Aerial Systems (Cs-UAS) Joint Urgent Operational Need (JUON)in support of the Combined Joint Task Force - Operations INHERENT RESOLVE in CENTCOM. This funding protects assets from the evolution of small UAS systems based on low cost, extensive proliferation and availability in the current market place.

Counter Small Unmanned Aerial System (Cs-UAS) protection capabilities at downward selected high propriety sites.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604287F / *Physical Security Equipment*

Air Base Ground Defense (ABGD) will support all Development testing, Evaluation, Integration, Certification, and proof of concept for Tactical Automated Security Systems (TASS) and other tactical/expeditionary equipment that is required to provide robust force protection capabilities worldwide; flight-line security, aircraft, intelligence, surveillance, and reconnaissance assets, critical infrastructure, sustained sortie generation and air operations, advanced technology force multipliers to include: night vision and thermal imagery equipment, counter sniper/battery capabilities, ground weapons, target acquisition radar, inter operable tactical communications, [required C3 and protective standoff equipment for] wheeled tactical [non-tactical], armored [un-armored] vehicles, tactical sensors systems, and unit/ personnel protective field equipment. Additionally, ABGD will support all Development testing, Evaluation, Integration, Certification, and proof of concept for Technology Integration Management (TIM) and associated integration and interoperability efforts

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver these weapon system capabilities.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	35.458	19.739	9.492	0.000	9.492
Current President's Budget	63.101	19.739	14.421	0.000	14.421
Total Adjustments	27.643	0.000	4.929	0.000	4.929
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	27.643	0.000	4.929	0.000	4.929

C. Accomplishments/Planned Programs ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Title: IBDSS-1	8.458	9.239	9.421	-	9.421

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604287F / *Physical Security Equipment*	

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: IBDSS (Integrated Base Defense Security Systems) qualifies, demonstrates, and tests Physical Security Equipment (PSE) systems to include Force Protection. This continuing effort was previously named Physical Security Equipment. ***FY 2018 Plans:*** Includes, but not limited to continuing Force Protection Commercial Off The Shelf (COTS) market research, evaluation and testing to address capability gaps and obsolescence. This includes integration and testing to qualify COTS equipment to provide essential upgrades/improvements and state-of the art technology to support integrated based security systems installations worldwide. Type of technologies includes delay/denial/detection/ assessment/communication display/access control/power equipment; systems for IBDSS projects. Continue with previous integrated or modified COTS efforts to improve IBDSS physical security equipment: - Purchasing and installing Video Analytics - Re-compete Command, Control, Detection, Equipment (CCDE)effort - Test and integrate Ground Base Radars (GBRs) - Complete Tactical Automated Security System (TASS)(also known as Tactical Security System) - Market research replacement for Long Range Passive Infrared Radar (PIR) - Purchase and installing Cameras for obscured views - Conduct analyses to include the adversary needs assessment and System Effectiveness Assessment (SEA) of the Nuclear Environment. - Qualify Physical Security Alarm Systems; identify, integrate and evaluate fusion and display capability to improve command, control and communication to include fusion of disparate sensor technologies and threat indicators. ***FY 2019 Base Plans:*** Includes, but not limited to continuing Force Protection Commercial Off The Shelf (COTS) market research, evaluation and testing to address capability gaps and obsolescence. This includes integration and testing to qualify COTS equipment to provide essential upgrades/improvements and state-of the art technology to support integrated based security systems installations worldwide. Type of technologies includes delay/denial/detection/ assessment/communication display/access control/power equipment & systems for IBDSS projects.					

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604287F / *Physical Security Equipment*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue with previous integrated or modified COTS efforts to improve IBDSS physical security equipment. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** PEM HAF/A4 Request					
Title: Counter Small Unmanned Aerial Systems (Cs-UAS) Joint Emergent Operational Need (JEON) - STRATCOM ***Description:*** Counter Small Unmanned Aerial Systems (Cs-UAS) Joint Emergent Operational Need (JEON) is a rapid acquisition and deployment capability existing of full kill (detect, track, assess and defeat with various capabilities (fixed, mobile, portable and hand-held.) It is a layered system-of-systems using COTS technologies, integrated via GOTS C2 system. ***FY 2018 Plans:*** Complete Communication and Control (C2) and Fixed-Site DT/OT. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** All development for this JEON will be completed by Nov 18	16.000	10.500	-	-	-
Title: Counter Small Unmanned Aerial Systems (Cs-UAS) Joint Urgent Operational Need (JUON)- EUCOM ***Description:*** Counter Small Unmanned Aerial Systems (Cs-UAS) Joint Urgent Operational Need (JUON) supports EUCOM JUON to protect specific strategic assets in overseas theaters of operation from the evolution of small unmanned aerial systems based on low cost, extensive proliferation, and availability in the commercial marketplace. This is Overseas Contingency Operations (OCO) funding. ***FY 2018 Plans:*** No FY18 funding required. ***FY 2019 Base Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	11.000	0.000	0.000	-	0.000
Title: Counter Small Unmanned Aerial Systems (Cs-UAS) Joint Urgent Operational Need (JUON) - CENTCOM ***Description:*** Counter Small Unmanned Aerial Systems)Cs-UAS) Joint Urgent Operational Need (JUON) in support of the Combined Joint Task Force - Operations INHERENT RESOLVE in CENTCOM. This funding	27.643	0.000	0.000	-	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604287F / *Physical Security Equipment*	

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
protects assets from the evolution of small UAS systems based on low cost, extensive proliferation and availability in the current market place. ***FY 2018 Plans:*** Includes but not limited to DT&E of Blue Force UAV and SIL-Trainer, Integration efforts for MIT/LL and AMRDEC. Maintain Signal Library and Software Updates for WISP and NINJA. ***FY 2019 Base Plans:*** None					
Title: Counter Small Unmanned Aerial System (Cs-UAS) protection capabilities at downward selected high priority sites. ***Description:*** N/A ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** Plans include but are not limited to: -Research/development/integration into DE/laser options for C-sUAS defeat options. -Research/development/integration for passive and/or bistatic detection capabilities. -Continued research/development efforts into blue-force C-sUAS capabilities. -Research/development/integration for communicating up and down the C2 structure for C-sUAS SA and C2. -Integration of new/upgraded capabilities into our C-sUAS C2 system, and upgrades to our systems integration lab. -Incremental DT/OT required to verify/validate functional capabilities of newly integrated C-sUAS detect/track/id/defeat layers. -Development of C-sUAS technology roadmap.	0.000	0.000	5.000	0.000	5.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604287F / *Physical Security Equipment*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
-Development/sustainment of signatures library. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Plus up					
Accomplishments/Planned Programs Subtotals	63.101	19.739	14.421	0.000	14.421

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 03 Line Item 29: *Base Physical Security Systems*	230.982	166.437	92.679	-	92.679	76.406	50.241	-	-	Continuing	Continuing

Remarks

E. Acquisition Strategy

AFSFC and Force Protection program office investigates requirements to include new and/or obsolete items. COTS sub-systems, equipment and components are competitively acquired from industry after thorough market research. Equipment for testing is purchased via competitive selection processes via direct purchase orders. For security systems COTS that are required to be qualified for nuclear security environments where industry COTS sources may not be mature, consideration is given to replacement of new items or modification of COTS through the competitive selection procedure as well.

Counter Small Unmanned Aerial Systems (Cs-UAS) Joint Emergent Operational Need (JEON). The Force Protection program office is acquiring COTS sub-systems and equipment for DT/OT as well as minor development of an existing C2 System for integration.

Counter Small Unmanned Aerial Systems (Cs-UAS) Joint Urgent Operational Need (JUON). The Force Protection program office is acquiring COTS sub-systems and equipment in support of EUCOM JUON for DT/OT as well as minor development of an existing C2 System for integration.

Delivery Orders on Indefinite Delivery/Indefinite Quantity contract vehicles or other approved purchase methods are utilized to acquire equipment.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604287F / *Physical Security Equipment*	**Project (Number/Name)** 655120 / *Physical Security Equipment - SD ED*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Base Defense Security Systems (IBDSS-1)	Various	Various : Various	-	2.053		-		3.229		-		3.229	Continuing	Continuing	-
Counter Small Unmanned Aerial Systems (CsUAS) Joint Emergent Operational Need (JEON) STRATCOM	Various	Various : Various	-	15.069		9.747		-		-		-	Continuing	Continuing	-
Counter Small Unmanned Aerial Systems (CsUAS) Joint Urgent Operational Need (JUON) EUCOM	MIPR	Various : Various	-	11.000		-		-		-		-	Continuing	Continuing	-
Counter Small Unmanned Aerial Systems (CsUAS) Joint Urgent Operational Need (JUON) CENTCOM	Various	Various : Various	-	27.643		-		-		-		-	Continuing	Continuing	-
Counter Small Unmanned Aerial System (Cs-UAS) protection capabilities at downward selected high priority sites	Various	Various : Various	-	-		-		5.000		-		5.000	Continuing	Continuing	-
		Subtotal	-	55.765		9.747		8.229		-		8.229	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Base Defense Security Systems (IBDSS-1)	Various	Various : Various	-	0.978		1.203		1.249		-		1.249	Continuing	Continuing	-
		Subtotal	-	0.978		1.203		1.249		-		1.249	Continuing	Continuing	N/A

Remarks

The support funding is planned at the above amounts. If the support contracts are less, the available funds will be transitioned to the Product Development line.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604287F / *Physical Security Equipment*	**Project (Number/Name)** 655120 / *Physical Security Equipment - SD ED*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Integrated Base Defense Security Systems (IBDSS-1)	PO	TAC-3 : FL	-	5.427		8.035		4.943		-		4.943	Continuing	Continuing	-
Counter Small Unmanned Aerial Systems (CsUAS) Joint Emergent Operational Need (JEON) STRATCOM	PO	TAC-3 : FL	-	0.931		0.754		-		-		-	Continuing	Continuing	-
		Subtotal	-	6.358		8.789		4.943		-		4.943	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	63.101		19.739		14.421		-		14.421	Continuing	Continuing	N/A

Remarks

Various delivery orders will be awarded throughtout the fiscal year for numerous projects.

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604287F / *Physical Security Equipment*	**Project (Number/Name)** 655120 / *Physical Security Equipment - SD ED*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
FY19 Events																												
Integrated Base Defense Security Systems (IBDSS-1)																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604287F / *Physical Security Equipment*	**Project (Number/Name)** 655120 / *Physical Security Equipment - SD ED*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
FY19 Events				
Integrated Base Defense Security Systems (IBDSS-1)	1	2018	4	2019

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	1,060.423	37.603	38.979	73.158	0.000	73.158	31.241	17.311	27.427	27.927	0.000	1,314.069
655191: *SDB Increment II*	1,060.423	37.603	38.979	73.158	0.000	73.158	31.241	17.311	27.427	27.927	0.000	1,314.069
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 439

A. Mission Description and Budget Item Justification

Small Diameter Bomb Increment II (SDB II) is a joint interest United States Air Force (USAF) and department of Navy (DoN) ACAT IC program, with the Air Force (AF) as the lead service. SDB II provides the war-fighter the capability to attack mobile targets from stand-off, through weather. SDB II addresses the following war-fighter requirements: attack moving and stationary targets, adverse weather operations, multiple kills per pass, multiple ordnance carriage, precision munitions capability, reduced munitions footprint, increased weapons effectiveness, minimized potential for collateral damage, reduced susceptibility of munitions to countermeasures and provides a network enabled weapon capability via Link-16 and Ultra High Frequency (UHF) Weapon Data Link. The threshold aircraft for the AF is the F-15E, and the threshold aircraft for the (DoN) are the F-35B and F-35C. Objective aircraft include the F-22, F-16, F-35A, B-2, A-10, MQ-9, B-1, B-52, AC-130 and the F /A-18E /F. SDB II will be compatible with the BRU-61 (Bomb Rack Unit) miniature munitions carriage, Type II carriage systems, the CNU-660 /E carriage system, the Common Munitions BIT /Reprogramming Equipment (CMBRE), and the Joint Mission Planning System (JMPS). The SDB II program will develop and field a single weapon storage container (USAF) and a dual weapon container (DoN).

SDB II is an events-driven program. SDB II completed a 42-month competitive Risk Reduction phase in October 2009 and entered the Milestone B Engineering and Manufacturing Development (EMD) phase in August 2010. A Fixed Price Incentive Firm EMD contract was awarded on 09 August 2010. The SDB II Program received Milestone C approval to enter Low Rate Initial Production (LRIP) on 3 June 2015. A Fixed Price Incentive Firm Contract for Lot 1 production of 144 weapons was awarded on 12 June 2015, Lot 2 production contract option for 250 weapons was exercised on 8 September 2016, and Lot 3 production contract option for 312 weapons was exercised on 27 January 2017. An updated Milestone C Acquisition Program Baseline is complete. Developmental Testing (DT), including Guided Test Vehicles (GTV) and Live Fire (LF) test missions is nearing completion. A 28-shot Government Confidence Test program began in FY2016 as part of DT. There are no significant software-related issues with the program at this time. Required Assets Available (RAA) for the F-15E is to be completed in FY2019. The DoN Initial Operational Capability (IOC) on the F-35B and F-35C will occur once all F-35B and F-35C operational testing is completed. SDB II is a key component of the Air Force Global Strike Task Force CONOPs. Department of the Navy first Lot (Lot 4) will support F/A-18E/F Initial Operational Capability.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SDB II weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting Engineering and Manufacturing Development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	54.838	38.979	73.709	0.000	73.709
Current President's Budget	37.603	38.979	73.158	0.000	73.158
Total Adjustments	-17.235	0.000	-0.551	0.000	-0.551
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-15.851	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.384	0.000			
• Other Adjustments	0.000	0.000	-0.551	0.000	-0.551

Change Summary Explanation

FY17 Congressional Mark totaling -$15.7M (-$7.9M for Forward Financing and a requested transfer of -$7.8M to M-code).

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: SDB II Development	24.643	13.774	27.699

Description: Development of SDB II to deliver the capability described in the SDB II Capability Development Document (CDD), in lieu of Capability Production Document (CPD) as specified in the government approved SDB II System Performance Specification (SPS) for production, deployment, and sustainment. Upgrades to SDB II hardware and software to meet emerging threats (i.e., M-Code, GPS, Cryptographic Modernization, advanced guidance, navigation and control). Development of the SDB II design to ensure exportability, cyber security, program protection, and address obsolescence issues and affordability opportunities.

FY 2018 Plans:
Begin Multi-Service Operational Test and Evaluation (MOT&E) on the F-15E platform. Continue Operational Flight Program (OFP) update and qualification efforts for the BRU-61. Continue Advanced Joint Effectiveness Model (AJEM) lethality modeling and testing. Continue collaboration with National Security Agency (NSA) on weapon data link key management software. Continue collaboration with Joint Interoperability Test Command (JITC) on interoperability testing. Continue integration of SDB II with Command and Control Infrastructure, including Air and Space Operations Command (AOC) and integration with Joint Terminal Attack Controller (JTAC) kits. Continue mission planning support during Operational Test (OT). Continue design, development and integration to upgrade SDB II hardware and software to meet emerging threats and to maintain compatibility with external systems

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
(i.e., M-Code, Cryptographic Modernization, advanced guidance, navigation and control, ensure exportability, cyber security, program protection, and address obsolescence issues and affordability opportunities). ***FY 2019 Plans:*** Continue MOT&E on the F-15E platform. Continue OFP update and qualification efforts for the BRU-61. Continue AJEM lethality software. Continue collaboration with JITC on interoperability testing. Continue integration of SDB II with Command and Control Infrastructure, including AOC and integration with JTAC kits. Continue mission planning support during OT. Continue design, development and integration to upgrade SDB II hardware and software to meet emerging threats and to maintain compatibility with external systems (i.e., M-Code, Cryptographic Modernization, advanced guidance, navigation and control, ensure exportability, cyber security, program protection, and address obsolescence issues and affordability opportunities)modeling and testing. Continue collaboration with NSA on weapon data link key management. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increase due to multiple upgrades in different phases of ongoing development, integration and test efforts for each of the areas discussed above (M-Code, Cryptographic Modernization, exportability, cyber security, program protection, obsolescence, and affordability).			
Title: SDB II Integration and Qualification Testing ***Description:*** F-15E Aircraft Integration incorporates tests and targets, Modeling and Simulation (M&S), target lethality, data link and mission planning. Develop F-15E OFP upgrades to provide the capability to program the weapon with mission planned targets, weapon data link control, and exclusion zone information prior to launch of the weapon. It also allows the aircrew to make in-flight edits of target and weapon data link programming if/when required based on employment scenarios. ***FY 2018 Plans:*** Begin Multi-Service Operational Test and Evaluation (MOT&E) on the F-15E platform. Continue Operational Flight Program (OFP) update and qualification efforts for the BRU-61. Continue Advanced Joint Effectiveness Model (AJEM) lethality modeling and testing. Continue collaboration with National Security Agency (NSA) on weapon data link key management software. Continue collaboration with Joint Interoperability Test Command (JITC) on interoperability testing. Continue integration of SDB II with Command and Control Infrastructure, including Air and Space Operations Command (AOC) and integration with Joint Terminal Attack Controller (JTAC) kits. Continue mission planning support during Operational Test (OT). Continue design, development and integration to upgrade SDB II hardware and software to meet emerging threats and to maintain compatibility with external systems (i.e., M-Code, Cryptographic Modernization, advanced guidance, navigation and control, ensure exportability, cyber security, program protection, and address obsolescence issues and affordability opportunities). ***FY 2019 Plans:***	4.959	8.405	4.216

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Continue MOT&E on the F-15E platform. Continue OFP update and qualification efforts for the BRU-61. Continue AJEM lethality modeling and testing. Continue collaboration with NSA on weapon data link key management software. Continue collaboration with JITC on interoperability testing. Continue integration of SDB II with Command and Control Infrastructure, including AOC and integration with JTAC kits. Continue mission planning support during OT. Continue design, development and integration to upgrade SDB II hardware and software to meet emerging threats and to maintain compatibility with external systems (i.e., M-Code, Cryptographic Modernization, advanced guidance, navigation and control, ensure exportability, cyber security, and program protection, and address obsolescence issues and affordability opportunities). ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to multiple upgrades in different phases of ongoing development, integration and test efforts for each of the areas discussed above (F-15 OFP updates and qualification, M-Code, Mission Planning, JITC interoperability testing and JTAC fielding, Cryptographic Modernization, advanced guidance, navigation and control, ensure exportability, cyber security, and program protection, and address obsolescence issues and affordability opportunities).			
Title: SDB II M-Code ***Description:*** M-code provides an enhanced anti-jam capability and secures access to military GPS signals. M-code will provide the ability to operate in increasing adversarial A2/AD jamming environment with increased accuracy, better signal acquisition, and advanced security. ***FY 2018 Plans:*** Continue activities to provide SDB II with M-Code capabilities for improved anti-jam and secure access to military GPS signals. M-Code activities include, but are not limited to, trade studies; development and implementation of an acquisition strategy; and design, development, integration and testing of M-Code and enhanced anti-jam components. Complete Preliminary Design Review and prototype development for M-Code and enhanced anti-jam receiver. Continue design, test and qualification of engineering changes to the SDB II system to integrate the new M-Code receiver. Update mission planning and threshold aircraft OFPs to ensure aircraft to weapon integration and transmission of the appropriate M-Code initialization data and crypto keys. ***FY 2019 Plans:*** Continue activities to provide SDB II with M-Code capabilities for improved anti-jam and secure access to military GPS signals. M-Code activities include, but are not limited to, trade studies; development and implementation of an acquisition strategy; and design, development, integration and testing of M-Code and enhanced anti-jam components. Complete Preliminary Design Review and prototype development for M-Code and enhanced anti-jam receiver. Continue design, test and qualification of engineering changes to the SDB II system to integrate the new M-Code receiver. Update mission planning and threshold aircraft OFPs to ensure aircraft to weapon integration and transmission of the appropriate M-Code initialization data and crypto keys. ***FY 2018 to FY 2019 Increase/Decrease Statement:***	8.001	16.800	41.243

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Funding increase due to continued electronics and receiver development, and receiver certification and qualification.			
Accomplishments/Planned Programs Subtotals	37.603	38.979	73.158

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• MPAF 02 Line Item SDB000: *Small Diameter Bomb*	251.361	356.950	-	-	-	-	-	-	-	0.000	608.311
• MPAF 02 Line Item SDB002: *Small Diameter Bomb II*	-	-	100.861	-	100.861	212.434	333.546	308.116	321.972	489.974	1,766.903
• RDTE 05 PE 0604329N: *Small Diameter Bomb II*	37.605	57.637	72.573	-	72.573	73.547	58.914	44.409	45.360	0.000	390.045
• WPN Line Item 223800: *Small Diameter Bomb II*	-	20.968	91.272	-	91.272	118.461	114.574	117.019	119.502	301.856	883.652

Remarks

FY17 and FY18 MPAF 02 Line Item SDB000 includes SDB I and SDB II funding. FY19 and out-years includes SDB I funding only.
FY19 and out-years MPAF 02 Line Item SDB002 includes SDB II funding only.
FY17 MPAF 02 Line Item SDB000 includes $151M Overseas Contingency Operations (OCO) for SDB I.
FY18 MPAF 02 Line Item SDB000 includes $90.92M Overseas Contingency Operation (OCO) for SDB I.
Navy RDT&E funds include F-35B and F-35C Integration and Support Cost.

E. Acquisition Strategy

The SDB II Engineering and Manufacturing Development (EMD) contract was awarded using competitive procedures. At the completion of the 42-month Risk Reduction phase in October 2009, one contractor was selected in April 2010 and awarded the EMD contract in August 2010. The EMD contract is a Fixed-Price Incentive Firm (FPIF) contract with priced production options for the first five production lots. SDB II production Lots 1-3 are FPIF. Production Lots 4-5 are fixed price not-to-exceed pricing with an economic price adjustment clause for labor and materials. The Government is buying the SDB II based on the contractor System Performance Specification (SPS) which has been approved by the Government. The contractor is accountable for system performance as defined in the SPS and a system warranty as defined in the EMD contract and follow-on production contracts. Accordingly, the contractor is accountable to the Government for the design of the weapon system, as well as the planning and execution of the Development Test & Evaluation (DT&E) program to verify system performance. The Government formally arranges and funds the use of Government flight test support for DT&E.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*	**Project (Number/Name)** 655191 / *SDB Increment II*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Risk Reduction Contract 1	C/CPFF	Boeing : St. Louis, MO	151.922	0.000		0.000		0.000		0.000		0.000	0.000	151.922	151.922
Risk Reduction Contract 2	C/CPFF	Raytheon : Tucson, AZ	150.800	0.000		0.000		0.000		0.000		0.000	0.000	150.800	150.800
EMD Contract	C/FPIF	Raytheon : Tucson, AZ	460.169	0.000		0.000		0.000		0.000		0.000	0.000	460.169	460.169
Technical Support Contract	SS/ Various	Raytheon : Tucson, AZ	68.643	23.699	Dec 2016	10.235	Feb 2018	21.580	Dec 2018	0.000		21.580	21.262	145.419	136.520
M Code Development	C/Various	Not specified. : NV	0.000	8.001	Jun 2017	16.800	Jan 2018	41.243	Jan 2019	0.000		41.243	43.393	109.437	109.437
IMPACT High Pressure Air Compressor System	SS/FFP	Boeing : St. Charles, MO	3.175	0.000		0.000		0.000		0.000		0.000	0.000	3.175	3.175
F-15E Integration and Test Support	SS/ Various	Boeing : St. Louis, MO	45.956	0.931	Jan 2017	2.000	Jun 2018	2.000	Jun 2019	0.000		2.000	0.724	51.611	49.762
BRU-61/A Integration and Test Support	SS/ Various	Boeing : St. Charles, MO	8.529	0.000		0.000		0.000		0.000		0.000	0.000	8.529	8.529
Mission Planning	Various	Various : Various	5.631	0.201	Jan 2017	0.914	Feb 2018	0.000		0.000		0.000	0.000	6.746	5.832
Data Link Integration & Support	Various	Various : Various	2.934	0.070	Dec 2016	0.000		0.000		0.000		0.000	0.000	3.004	3.004
System Performance & Lethality	Various	Various : Various	38.388	0.300	Nov 2016	0.300	Nov 2017	0.312	Nov 2018	0.000		0.312	0.000	39.300	39.334
Other Product Development	Various	Various : Various	11.576	0.275	Nov 2016	6.284	Mar 2018	2.780	Mar 2019	0.000		2.780	36.791	57.706	69.594
		Subtotal	947.723	33.477		36.533		67.915		0.000		67.915	102.170	1,187.818	N/A

Remarks

EMD contract is budgeted to the contract ceiling price $509.9M.

The EMD Target Value is AF funding only. This represents the total liability for the AF (target cost plus ceiling). The contract's target value including Navy funding is $450.827M. The target price is $509.9M. This includes AF and Navy ceiling.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*	**Project (Number/Name)** 655191 / *SDB Increment II*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Other Government Costs	Various	Various : Various	5.042	0.482	Apr 2017	1.049	Apr 2018	0.522	Apr 2019	0.000		0.522	0.736	7.831	8.201
		Subtotal	5.042	0.482		1.049		0.522		0.000		0.522	0.736	7.831	N/A

Remarks

None.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DT&E: 96th Test Wing	PO	96th Test Wing : Eglin AFB, FL	30.941	1.370	Apr 2017	0.239	Apr 2018	2.853	Dec 2019	0.000		2.853	0.000	35.403	33.725
DT&E: UTTR, WSMR	Various	Various : Various	9.625	0.480	Feb 2017	0.000		0.000		0.000		0.000	0.000	10.105	10.105
Targets	PO	Various : Various	25.248	0.150	Feb 2017	-		0.000	Dec 2018	0.000		0.000	0.000	25.398	26.336
Other Test Support	Various	Various : Various	9.263	0.700	Dec 2016	0.299	Dec 2017	1.000	Apr 2019	0.000		1.000	0.000	11.262	11.896
		Subtotal	75.077	2.700		0.538		3.853		0.000		3.853	0.000	82.168	N/A

Remarks

UTTR: Utah Test and Training Range
WSMR: White Sands Missile Range

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EPASS	Various	Various : Eglin AFB, FL	21.758	0.750	Jun 2017	0.750	Jun 2018	0.750	Jun 2019	0.000		0.750	1.500	25.508	25.508
Program Management Administration (PMA)	Various	Various : Eglin AFB, FL	10.823	0.194	Oct 2016	0.109	Oct 2017	0.118	Oct 2018	0.000		0.118	0.264	11.508	11.536
SBIR	Various	Various : Eglin AFB, FL	0.000	0.000	Sep 2018	-		-		-		-	0.000	0.000	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*	**Project (Number/Name)** 655191 / *SDB Increment II*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	32.581	0.944		0.859		0.868		0.000		0.868	1.764	37.016	N/A

Remarks

EPASS: Engineering, Professional & Administrative Support Services

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	1,060.423	37.603		38.979		73.158		0.000		73.158	104.670	1,314.833	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*	**Project (Number/Name)** 655191 / *SDB Increment II*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604329F / *Small Diameter Bomb (SDB) - EMD*	**Project (Number/Name)** 655191 / *SDB Increment II*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SDB Increment II				
F-15 Integration Developmental/Operational Testing	1	2017	2	2019
SDB II M-Code	3	2017	4	2020
Government Confidence Testing	1	2017	2	2018
Operational Testing	3	2018	2	2019
F-15E Required Assets Available	2	2019	2	2019
SDB II Integration on Threshold F-35B/C	3	2018	2	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604421F / *Counterspace Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	32.618	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
65A001: *Counter Satellite Communications System*	-	26.416	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
65A005: *Offensive Counterspace (OCS) C2*	-	3.832	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
65A013: *BOUNTY HUNTER*	-	2.370	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

In FY2018, PE 0604421F, Counterspace Systems efforts were transferred to PE 1206421F, Counterspace Systems, due to the creation of a new Major Force Program for Space. FY2017 funding is documented in the exhibits for PE 1206421F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	41.919	0.000	0.000	0.000	0.000
Current President's Budget	32.618	0.000	0.000	0.000	0.000
Total Adjustments	-9.301	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.081	0.000			
• SBIR/STTR Transfer	-1.120	0.000			
• Other Adjustments	-7.100	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604421F / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
65A001: *Counter Satellite Communications System*	-	26.416	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission Description not provided.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604421F / *Counterspace Systems*	**Project (Number/Name)** 65A005 / *Offensive Counterspace (OCS) C2*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
65A005: *Offensive Counterspace (OCS) C2*	-	3.832	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission Description not provided.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600 / 5					R-1 Program Element (Number/Name) PE 0604421F / *Counterspace Systems*				Project (Number/Name) 65A013 / *BOUNTY HUNTER*			
COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
65A013: *BOUNTY HUNTER*	-	2.370	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission Description not provided.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604425F / *Space Situation Awareness Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	25.540	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
65A006: *Space Based Space Surveillance*	-	25.540	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Mission Description not provided.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	23.945	0.000	0.000	0.000	0.000
Current President's Budget	25.540	0.000	0.000	0.000	0.000
Total Adjustments	1.595	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	1.595	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604426F / *Space Fence*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	162.510	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
65A009: *Space Fence*	-	162.510	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0604426F, Space Fence efforts were transferred to PE 1206426F, Space Fence due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206426F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	168.364	0.000	0.000	0.000	0.000
Current President's Budget	162.510	0.000	0.000	0.000	0.000
Total Adjustments	-5.854	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-5.854	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604429F / *Airborne Electronic Attack*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	8.589	7.091	7.153	0.000	7.153	0.002	0.000	0.000	0.000	Continuing	Continuing
655192: *Network & Sys -of-Sys Dev*	-	8.589	7.091	7.153	0.000	7.153	0.002	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project concentrates on the overall systems engineering, modeling and simulation, architecture and network requirements development, effectiveness assessment and requirements allocation to component systems of the Airborne Electronic Attack (AEA) System of Systems (SoS). Funding supports establishment and use of virtual test capabilities for system of systems effectiveness testing/evaluation for AEA, instantiating updated Defense Planning Guidance (DPG) scenarios into digital representations suitable for supporting modeling and simulation, conducting studies and technology risk mitigation demonstrations for potential AEA SoS components and AEA SoS battle management, development planning, planning for and conducting an OSD directed Joint AEA Analysis of Alternatives (AoA) (working group support and organic civilian salaries), and the development and maintenance of the Air Force electronic warfare capability investment strategy. These efforts are crucial in the development of critical electronic attack capabilities in support of Air Force and joint operations to include Global Strike and Persistent Global Attack Concepts of Operations (CONOPS).

The joint AEA SoS has evolved since 2004 and now includes the Navy EA-18G and its Next Generation Jammer (NGJ) subsystem and the Air Force EC-130H Compass Call Baseline 3 (significant upgrades to the former Block 35) configuration as modified escort/stand-off components, respectively. As stand-in/penetrating components, the AEA SoS includes the Air Force Miniature Air Launched Decoy (MALD) and its jammer variant, MALD-J; Active Electronically Scanned Array (AESA) radar equipped aircraft; and possible unmanned stand-in jamming/counter electronics platforms and other stand-in and distributed components capable of suppressing or degrading enemy integrated air defense system (IADS) and non-IADS targets. Current military actions continue to drive the need for increased focus on developing advanced electronic attack capabilities for use against both IADS and non-IADS targets such as radar sensors, infrared (IR) sensors, communications networks, remote controlled improvised explosive devices, computers, command and control links, man portable air defenses, etc. in both major combat and irregular warfare scenarios.

"This program element may include necessary civilian pay expenses required to manage, execute, and deliver AEA weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F."

This program is included in Budget Activity 5, System Development and Demonstration, because it pursues materiel solutions passing Milestone B approval and is conducting engineering and manufacturing development tasks aimed at validating requirements.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604429F / *Airborne Electronic Attack*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	9.187	7.091	7.207	0.000	7.207
Current President's Budget	8.589	7.091	7.153	0.000	7.153
Total Adjustments	-0.598	0.000	-0.054	0.000	-0.054
• Congressional General Reductions	-0.598	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.054	0.000	-0.054

Change Summary Explanation

No significant program changes

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: AEA System Engineering Studies & Technology Transition	4.409	2.985	3.034

Description: Apply systems engineering rigor to manage Air Force Airborne Electronic Attack (AEA) System of Systems (SoS) program requirements, designs, and operational concepts. Assess operational effectiveness of multiple Electronic Warfare systems in both offensive and defensive roles.

FY 2018 Plans:
Finalize preparations for Joint AF/Navy AEA SoS AoA. Conduct technology demonstrations to provide potential solutions to AF Electronic Support system limitations; update/revise AF EW roadmap as directed by HQ AF; update AF EW capability investment strategy with studies in support of CAF Core Function Support Plans.

N/A

FY 2019 Plans:
Conduct technology demonstrations to provide potential solutions to AF Electronic Support system limitations; update/revise AF EW roadmap as directed by HQ AF; update AF EW capability investment strategy with studies in support of CAF Core Function Support Plans.

FY 2018 to FY 2019 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604429F / *Airborne Electronic Attack*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Studies still ongoing. No significant change			
Title: AEA Capability Planning ***Description:*** Provide capability planning to the Air Force electronic warfare and Airborne Electronic Attack (AEA) System of Systems (SoS) portfolio and constructive modeling and simulation and analysis management. ***FY 2018 Plans:*** Initiate and begin execution of the Joint AEA SoS AoA. ***FY 2019 Plans:*** Complete the Joint AEA SoS AoA. Report out preferred concepts that provide advanced cost and operationally effective materiel solutions for joint AF/Navy combat operations in the 2030+ time frame. Develop acquisition plans to acquire those preferred concept capabilities for future improved AF EW capabilities. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Studies still ongoing. No Significant change	4.180	4.106	4.119
Accomplishments/Planned Programs Subtotals	8.589	7.091	7.153

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604429F / *Airborne Electronic Attack*	**Project (Number/Name)** 655192 / *Network & Sys -of-Sys Dev*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AEA system of systems engineering	C/CPFF	Various : Various	-	4.409	Dec 2016	2.805	Dec 2017	3.000	Dec 2018	-		3.000	Continuing	Continuing	-
AF EW Capability/ Development Planning	MIPR	Various : Various	-	3.799	Dec 2016	3.836	Dec 2017	3.753	Dec 2018	-		3.753	Continuing	Continuing	-
		Subtotal	-	8.208		6.641		6.753		-		6.753	Continuing	Continuing	N/A

Remarks

Includes system of systems engineering; architecture development; network requirements planning; requirements refinement and development; EW assessments, including Air Force Electronic Warfare Capability Investment Strategy (AFEWCIS) roadmap development, maintenance & assessments; technology risk mitigation, DoD scenario initiation & distribution; conduct of Joint AoA (working group support and organic civilian salaries); engineering and test planning; capability planning for AF EW portfolio; conduct of constructive/virtual modeling simulation and analysis.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mission Support	Various	Various : Various	-	0.381	Dec 2016	0.450	Dec 2017	0.400	Dec 2018	-		0.400	Continuing	Continuing	-
		Subtotal	-	0.381		0.450		0.400		-		0.400	Continuing	Continuing	N/A

Remarks

Element includes miscellaneous support to projects. Costs include travel and unique security expenses.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	8.589		7.091		7.153		-		7.153	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604429F / *Airborne Electronic Attack*	**Project (Number/Name)** 655192 / *Network & Sys -of-Sys Dev*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604429F / *Airborne Electronic Attack*	**Project (Number/Name)** 655192 / *Network & Sys -of-Sys Dev*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Airborne Electronic Attack				
DoD Planning Scenarios Suppressor updates	1	2017	4	2020
Continuing to Support EW Assessments	1	2017	4	2020
AEA SoS Suppressor Improvements	1	2017	4	2020
AF EW Investment Strategy	1	2017	4	2020
Non Kinetic Counter Electronics Analysis	1	2017	4	2017
Conduct Joint AEA development and AoA planning	1	2017	2	2018
Conduct Joint AEA AoA	3	2018	2	2019

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604441F / *Space Based Infrared System (SBIRS) High EMD*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	161.966	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
653616: *SBIRS High Element Emd*	-	108.890	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
657009: *Space Modernization Initiatives*	-	53.076	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

In FY2018, PE 0604441F, SBIRS HIGH EMD efforts were transferred to PE 1206441F, SBIRS HIGH EMD due to the creation of a new Major Force Program for Space. FY2017 funding is documented in the exhibits for PE 1206441F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	218.766	0.000	0.000	0.000	0.000
Current President's Budget	161.966	0.000	0.000	0.000	0.000
Total Adjustments	-56.800	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-20.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-36.800	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 653616 / *SBIRS High Element Emd*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
653616: *SBIRS High Element Emd*	-	108.890	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission Description not provided.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657009 / *Space Modernization Initiatives*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657009: *Space Modernization Initiatives*	-	53.076	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission Description not provided.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	21.507	46.540	58.590	0.000	58.590	13.043	6.197	6.597	6.717	Continuing	Continuing
651033: *Sensor Fuzed Weapon*	-	0.000	32.092	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
653133: *Bombs & Fuzes*	-	12.079	9.592	53.692	0.000	53.692	8.054	1.122	1.416	1.442	Continuing	Continuing
653134: *BLU-109 and BLU-113 Upgrade*	-	4.336	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.336
655361: *Stores-Aircraft Interface*	-	5.092	4.856	4.898	0.000	4.898	4.989	5.075	5.181	5.275	Continuing	Continuing

Note

This program, BA 5, PE 0604602F, project 653133, Joint Air-to-Ground Missile for Fixed Wing (JAGM-F), is a new start.

A. Mission Description and Budget Item Justification

The Armament/Ordnance Development program provides for the development and integration of advanced precision, navigation, and timing (PNT)capabilities (i.e., GPS, non-GPS, optical, passive, active, etc.); initial and continuing development of weapons, munitions, and munitions equipment for aircraft integration, support, and operation use. This program develops, characterizes, and improves current, future, and legacy munitions, ammunitions, and subsystems.

653133: The Bombs & Fuzes (Armament Subsystems) develops and integrates advanced precision, navigation, and timing (PNT) capabilities (i.e., GPS, non-GPS, optical, passive, active, etc.); and improves conventional weapons/munitions (kinetic and non-kinetic), fuzes, and height-of-burst sensors (HOBS). The project also provides an opportunity to quickly insert emerging technologies into existing and developing aircraft munitions and fuzes. Bombs and fuzes provides research, development and testing of conventional warhead, fuzing, and HOBS modifications to improve lethality against area, mobile, hard and deeply buried, and fixed targets, to include anti-personnel anti-materiel (APAM) targets. This project provides for the development and testing necessary to provide a suitable manufacturing base of conventional warheads, fuzes, HOBS and munitions materiel handling equipment (MMHE).

655361: Stores-Aircraft Interface: This project conducts stores-aircraft interface upgrades and standards development to include the Universal Armament Interface (UAI). UAI is an Air Force initiative to develop standardized software interfaces in aircraft weapons and Mission Planning. UAI standardizes software interfaces to support integration of weapons independent of aircraft Operational Flight Programs (OFP) cycles. UAI is currently being implemented on the F-15E, F-16 Block 40/50 and EPAF (European Participating Air Forces) F-16 aircraft, Small Diameter Bomb (SDB) I and II, Joint Direct Attack Munition (JDAM), Laser JDAM, Joint Air-to-Surface Stand-off Missile (JASSM) and Precision Guided Munitions Planning Software (PGMPS). Additional aircraft and weapons, including but not limited to, Joint Strike Fighter (JSF/ F-35), B-1, B-52, B-21, MQ-9, JASSM-ER, CWDS as well as Army and Navy UAVs and Navy F/A-18s, have program plans to implement UAI. The UAI program office is responsible for development and enhancement of the standard (U.S. and allied) support to coalition/allied/joint interoperability efforts for weapons-platform interface efforts, provision of certification tools and implementation support to aircraft and weapons.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Armament/Ordnance Development weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	20.312	46.540	75.547	0.000	75.547
Current President's Budget	21.507	46.540	58.590	0.000	58.590
Total Adjustments	1.195	0.000	-16.957	0.000	-16.957
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	1.917	0.000			
• SBIR/STTR Transfer	-0.722	0.000			
• Other Adjustments	0.000	0.000	-16.957	0.000	-16.957

Change Summary Explanation

FY2019, decrease of $41M from Sensor Fuzed Weapon-ER, BPAC 651033 realigned to higher AF priorities.
FY2019, decrease of $7.5M from Bombs and Fuzes, BPAC 653133, transferred to Stand-In Attack Weapon, PE 0207328F.
FY2019, additional $31.596M for Bombs and Fuzes, BPAC 653133, for JAGM-F

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 651033 / *Sensor Fuzed Weapon*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
651033: *Sensor Fuzed Weapon*	-	0.000	32.092	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Effort to develop a wing kit to extend the range of inventory Cluster Bomb Unit-105 (CBU-105) anti-tank area attack weapons.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Sensor Fuzed Weapon-Extended Range (SFW-ER) ***Description:*** Effort to develop a wing kit to extend the range of inventory Cluster Bomb Unit-105 (CBU-105) anti-tank area attack weapons. ***FY 2018 Plans:*** Develop wing kit to extend the range of inventory Cluster Bomb Unit-105 (CBU-105) anti-tank area attack weapons. ***FY 2019 Base Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding realigned in FY19 to support higher Air Force priorities.	0.000	32.092	0.000	-	0.000
Accomplishments/Planned Programs Subtotals	0.000	32.092	0.000	-	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Develop wing kit to extend the range of inventory Cluster Bomb Unit-105 (CBU-105) anti-tank area attack weapons.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604602F / *Armament/Ordnance Development*	Project (Number/Name) 651033 / *Sensor Fuzed Weapon*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Design Development	TBD	Not specified. : NV	-	-		17.330		-		-		-	Continuing	Continuing	-
		Subtotal	-	-		17.330		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	TBD	Not specified. : NV	-	-		0.802		-		-		-	Continuing	Continuing	-
		Subtotal	-	-		0.802		-		-		-	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Modeling and Simulation	TBD	Not specified. : NV	-	-		13.158		-		-		-	Continuing	Continuing	-
		Subtotal	-	-		13.158		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Contract Support	TBD	Not specified. : NV	-	-		0.802		-		-		-	Continuing	Continuing	-
		Subtotal	-	-		0.802		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		32.092		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 651033 / *Sensor Fuzed Weapon*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Sensor Fuzed Weapon																												
Development /Testing																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 651033 / *Sensor Fuzed Weapon*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Sensor Fuzed Weapon				
Development /Testing	1	2018	4	2018

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
653133: *Bombs & Fuzes*	-	12.079	9.592	53.692	0.000	53.692	8.054	1.122	1.416	1.442	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 0604602F, project 653133, Joint Air-to-Ground Missile for Fixed Wing (JAGM-F), is a new start.

A. Mission Description and Budget Item Justification

The Bombs & Fuzes (Armament Subsystems) develops and integrates advanced precision, navigation, and timing (PNT) capabilities (i.e., GPS, non-GPS, optical, passive, active, etc.); and improves conventional weapons/munitions (kinetic and non-kinetic), fuzes, and height-of-burst sensors (HOBS). The project also provides an opportunity to quickly insert emerging technologies into existing and developing aircraft munitions and fuzes. Bombs and fuzes provides research, development and testing of conventional warhead, fuzing, and HOBS modifications to improve lethality against area, mobile, hard and deeply buried, and fixed targets, to include anti-personnel anti-materiel (APAM) targets. This project provides for the development and testing necessary to provide a suitable manufacturing base of conventional warheads, fuzes, HOBS and munitions materiel handling equipment (MMHE).

- Munitions Materiel Handling Equipment (MMHE): MMHE is a continuing project to develop and improve the standardization and commonality of munitions handling and armament equipment to preclude duplication. Efforts are primarily the study, design, and development of MMHE and armament control systems; however, support may be provided to other functional areas as requested. Procurement will be performed and funded by the applicable weapons system project.

- Medium Caliber Ammunition project assesses, refines, and develops medium caliber ammunition, to include, but not limited to, conducting 25mm (F-35) qualification testing, comparative testing and mitigate ammunition inventory health issues.

- Insensitive Munitions (IM): Supports AF IM strategic planning to achieve IM compliance IAW U.S. Code, Title 10, Subtitle A, Part N, Chapter 141, Section 2389, ensuring safety regarding insensitive munitions. Models and validates munition performance, integrates less sensitive explosive fills, addresses IM explosive fill deficiencies, and develops bomb case modifications to improve the response of conventional weapons to unplanned stimuli. Explores and develops IM solutions.

- Next Generation Area Attack Weapons (NGAAWs) are a family of unitary area attack weapon capabilities to meet the DoD policy on cluster munitions. They consist of BLU-134/B and BLU-136/B warheads with a height of burst sensor. BLU-134/B, Improved Lethality Warhead (ILW), Next Generation Area Attack Weapon Increment I is an area attack employed, near-term solution, 500 lb warhead for improved anti-personnel anti-material (APAM) target lethality. BLU-136/B NGAAW Inc II continues development to improve lethality against area targets to include APAM targets via an accelerated acquisition strategy. This effort studies, designs, develops and tests a warhead design which significantly improves lethality against APAM while meeting current DoD policy on cluster munitions and unintended harm to civilians.

- Cockpit-selectable Height-Of-Burst Sensor (C-HOBS): Development activities for fuzes and HOBS.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

- Joint Air-to-Ground Missile for Fixed Wing Aircraft (JAGM-F) is an improvement to the Army's JAGM which will allow the missile to be released from fixed wing aircraft in order to eliminate time sensitive moving targets and high value covered/sheltered targets. JAGM-F will be able to combat adverse weather/low visibility battlefield and countermeasure environments and austere communication environments and have the ability to engage multiple target types near simultaneously in multiple engagement modes. Efforts include but are not limited to testing, qualification, and design/build demo components to production standards. Intent is to meet all BRU-55, BRU-57, and BRU-61 environments.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Armament/Ordnance Development weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Munitions Materiel Handling Equipment (MMHE)	0.674	0.692	0.696	0.000	0.696
Description: MMHE. Armament Standardization/Control/Munitions Materiel Handling Equipment (MMHE) is a continuing project to develop and improve the standardization and commonality of munitions handling and armament equipment to preclude duplication. Efforts are primarily the study, design, and development of MMHE and armament control systems; however, support may be provided to other functional areas as requested. Procurement will be performed and funded by the applicable weapons system project.					
FY 2018 Plans: Completed 20 MMHE support equipment projects to include engineering, drafting, proof load, technical data, and safety authorizations. Fabricated 12 prototypes for test and evaluation purposes. Completed 17 first article equipment fabrications for drafting verification and delivery to Air Force units for additional test and evaluation. Provided support to all system program offices with new weapons and aircraft configurations, as needed. Continued support to the F-35 program with equipment to aid safe munitions loading and handling of various pylons and adapters. Provided support to the B-21 program office with evaluations and recommendations for equipment to aid safe munitions loading and handling of various pylons and adapters. Provided support to DARPA with designs and manufacturing of equipment to aid safe munitions loading and handling of Hypersonic weapons. Continued support and sustainment of all previously existing items developed by the MMHE program office. Continued to provide MMHE Sustainment office at Robins AFB with engineering support.					
FY 2019 Base Plans: Complete 20 MMHE support equipment projects to include engineering, drafting, proof load, technical data, and safety authorizations. Fabricate 15 prototypes for test and evaluation purposes. Complete 15 first article equipment fabrications for drafting verification and delivery to Air Force units for additional test and evaluation. Provide support to all system program offices with new weapons and aircraft configurations, as needed.					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue support to the F-35 program with equipment to aid safe munitions loading and handling of various pylons and adapters. Continue to support the B-21 program office with evaluations and recommendations for equipment to aid safe munitions loading and handling of various pylons and adapters. Continue support to DARPA with designs and manufacturing of equipment to aid safe munitions loading and handling of Hypersonic weapons. Continue support and sustainment of all previously existing items developed by the MMHE program office. Continue to provide MMHE Sustainment office at Robins AFB with engineering support. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Additional funds to fabricate more prototypes, while decreasing the number of first articles produced.					
Title: Medium Caliber Ammunition ***Description:*** The Medium Caliber ammunition efforts support the warfighter's medium caliber ammunition research, development, test, and evaluation (RDT&E) requirements, DoN/USAF collaboration for the medium caliber family of ammunition, foreign comparative testing, inventory health challenges, procurement of ammunition, and other emerging technologies. ***FY 2018 Plans:*** Provided engineering and technical support for PGU-48/B rounds as well as further comparative testing/EMD of alternative products/sources. Continued to assess and mitigate Medium Caliber ammunition inventory health challenges. ***FY 2019 Base Plans:*** Continue to provide engineering and technical support for PGU-48/B rounds as well as further comparative testing/EMD of alternative products/sources. Continue to assess and mitigate Medium Caliber ammunition inventory health challenges. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	0.100	0.100	0.100	0.000	0.100
Title: Insensitive Munitions (IM)	0.314	0.300	0.300	0.000	0.300

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Model and validate munition performance; assess and correct IM deficiencies; explore and develop new IM technology; conduct strategic IM planning for the AF; support Joint Service IM efforts; provide technical guidance and test expertise to AF IM programs. ***FY 2018 Plans:*** Executed the Insensitive Munitions Strategic Plan (IMSP) and Plan of Action and Milestones (POAM). Modeled and validated munition performance; supported DoD and Joint Service IM planning; provided IM planning expertise to individual AF programs and continued to improve, characterize, and integrate less sensitive explosive fills, assessed and corrected identified IM explosive fill deficiencies, and developed bomb case modifications to improve the response of conventional weapons to unplanned stimuli. ***FY 2019 Base Plans:*** Execute the Insensitive Munitions Strategic Plan (IMSP) and Plan of Action and Milestones (POAM). Model and validate munition performance; support DoD and Joint Service IM planning; provide IM planning expertise to individual AF programs and continue to improve, characterize, and integrate less sensitive explosive fills, assess and correct identified IM explosive fill deficiencies, and develop bomb case modifications to improve the response of conventional weapons to unplanned stimuli. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A					
Title: BLU-136/B Next Generation Area Attack Weapon Inc II (NGAAW II) ***Description:*** The Next Generation Area Attack Weapon Increment II continues development to improve lethality against area targets to include anti-personnel anti-materiel (APAM) targets via an accelerated acquisition strategy. This effort studies, designs, develops and tests a warhead design which significantly improves lethality against APAM while meeting current DoD policy on cluster munitions and unintended harm to civilians. ***FY 2018 Plans:***	7.633	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continued Government RDT&E of BLU-136/B. Continued warhead design TMRR, EMD, and qualification of Next Generation Area Attack Weapon Increment II, in preparation for production. Completed Critical Design Review. Continued planning for NGAAW pre-planned product improvements (P3I). ***FY 2019 Base Plans:*** Continue Government RDT&E of BLU-136/B. Continue warhead design TMRR, EMD, and qualification of Next Generation Area Attack Weapon Increment II, in preparation for production. Complete developmental testing prior to production. Continued planning for NGAAW pre-planned product improvements (P3I). ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A					
Title: BLU-134/B Improved Lethality Warhead (ILW), Next Generation Area Attack Weapon Inc I ***Description:*** This Next Generation Area Attack Weapon (NGAAW Inc I), formerly known as Improved Lethality (IL), continues and expands development planning and legacy warhead efforts to improve lethality against area targets, to include anti-personnel anti-material (APAM) targets. This effort studies, designs, develops and tests warhead and fuzing modifications which improve lethality against APAM while meeting current DoD policy on cluster munitions and unintended harm to civilians. These improvements may be synergistic with maintaining a suitable manufacturing base. This effort was a new start in Project 653133, Bombs & Fuzes, in FY15. ***FY 2018 Plans:*** Continued Government RDT&E of BLU-134/B ILW. Continued warhead design TMRR, EMD, and qualification of Next Generation Area Attack Weapon Increment II, in preparation for production. Continued planning for NGAAW pre-planned product improvements (P3I). ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:***	2.858	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A					
Title: Cockpit-Selectable Height-Of-Burst Sensor (C-HOBS) ***Description:*** Cockpit-Selectable Height-Of-Burst Sensor (C-HOBS): The C-HOBS sensor will be a replacement for the DSU-33D/B proximity sensor. The form and fit of the C-HOBS shall be similar to the form and fit of the DSU-33D/B; however, the modification shall include the addition of multiple height-of-burst options selectable via both manual switches and via an RS-422 interface, eliminating single factory height-of-burst setting. These selection options allow flexibility during flight to address a wide array of targets. The C-HOBS Sensor is intended to interface with and provide general and special purpose weapons with a proximity function. ***FY 2018 Plans:*** Supported development contract source selection activities. Began Engineering and Manufacturing Development (EMD) Phase with focus on Integrated System Design. Completed activities leading up to and including Systems Requirements Review (SRR), followed by preparatory actions required to execute Preliminary Design Review (PDR) in FY19. ***FY 2019 Base Plans:*** Continue design and development effort; design and qualification test; and integration work. Conduct government/industry reviews to include: Systems Requirement Review (SRR) completion, initiation and closure of Preliminary Design Review (PDR) and Critical Design Review (CDR), and the initiation of Test Readiness Review (TRR). Evaluate production representative articles and prepare Initial Product Baseline and Product Support Plan. Complete a Post Critical Design Review Assessment based on test results for the Milestone Decision Authority (MDA) in preparation of a Milestone C and Production Decision in FY20. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Additional funds are needed to continue Engineering and Manufacturing Development (EMD) phase as well as to support the Developmental Test and Evaluation (DT&E) phase of the program.	0.000	8.500	21.000	0.000	21.000
Title: Advanced Precision Kill Weapon System II Rotary Wing Plus (APKWS II RW+) ***Description:*** Integrate rotary wing rocket (2.75-inch), M151 warhead (Frag) with a new BAE laser guidance system on A-10/F-16.	0.500	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: N/A ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A					
Title: Joint Air-to-Ground Missile for Fixed Wing (JAGM-F) ***Description:*** Joint Air-to-Ground Missile for Fixed Wing Aircraft (JAGM-F) is an improvement to the Army's JAGM which will allow the missile to be released from fixed wing aircraft in order to eliminate time sensitive moving targets and high value covered/sheltered targets. JAGM-F will be able to combat adverse weather/low visibility battlefield and countermeasure environments and austere communication environments and have the ability to engage multiple targets types near simultaneously in multiple engagement modes. Efforts include but are not limited to testing, qualification, and design/build demo components to production standards. Intent is to meet all BRU-55, BRU-57, and BRU-61 environments. ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** Exercise Defense Ordnance Technology Consortium (DOTC) contract. Model design and build, Jettison and Capture Analysis, Mechanical Design, Electronic Design and Testing, Electrical Packaging, software design and code development, weapons system integration, aircraft systems integration, test vehicle design and build, and test vehicle flight planning. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** New Start	0.000	0.000	31.596	0.000	31.596
Accomplishments/Planned Programs Subtotals	12.079	9.592	53.692	0.000	53.692

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• PAAF 01 Line Item 353020: *General Purpose Bombs*	0.000	81.573	85.000	-	85.000	87.000	0.000	-	-	0.000	253.573
• PAAF 01 Line Item 356120: *Fuzes*	-	-	-	-	-	20.400	31.400	29.300	-	Continuing	Continuing
• PAAF 01 Line Item 352010: *Cartridges*	8.000	4.000	14.150	-	14.150	14.270	14.440	14.640	14.860	Continuing	Continuing

Remarks

D. Acquisition Strategy

- Fuzes (including C-HOBS) is a continuing effort with most activities performed through contracted services.

- Munitions Materiel Handling Equipment (MMHE) project activities are performed in-house with limited technical and analysis contract support.

- Medium Caliber ammunition project activities are performed in-house with technical and analysis contract support, organic government test support, and possible contracted services (small contracts).

- Insensitive Munitions project activities are performed in-house with limited technical and analysis contract support.

- The BLU-136/B NGAAW II warhead design program will implement an accelerated acquisition program strategy. The strategy includes concurrent TMRR and development of warhead designs and building and testing prototypes to develop a final technical data package (TDP). The TDP will be used to compete production for the low-rate initial production and follow-on warhead production. The NGAAW program will continue pre-planned product improvements.

- Joint Air-to-Ground Missile for Fixed Wing Aircraft (JAGM-F) will utilize the Defense Ordnance Technology Consortium (DOTC) contract combined with modeling and simulation contract support and government test support.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
IM	Various	Various : TBD	-	-		0.300	Mar 2018	0.300	Mar 2019	-		0.300	Continuing	Continuing	-
MMHE -- Prototypes	PO	Prototype Fabrication Shop : Eglin AFB, FL	-	0.206	Apr 2017	0.082	Apr 2018	0.086	Apr 2019	-		0.086	Continuing	Continuing	-
BLU-134/B ILW Development	C/FFP	AMW/GD-OTS : Various	-	0.000	Aug 2017	-		-		-		-	Continuing	Continuing	6.040
BLU-134/B / BLU-136 ILW - NGAAW Concept Development	Various	Various : Eglin AFB, FL	-	1.718	May 2017	-		-		-		-	Continuing	Continuing	-
BLU-134/B ILW - Mission Planning	Reqn	EBDW-WPS : Eglin AFB, FL	-	0.550	Jan 2018	-		-		-		-	Continuing	Continuing	0.748
CHOBS - HW/SW Selectability	C/Various	Various : Eglin AFB, FL	-	-		5.955	Aug 2018	16.385	Jan 2019	-		16.385	Continuing	Continuing	-
JAGM-F	C/FFP	DOTC : Huntsville, AL	-	0.000		0.000		25.000	Jan 2019	-		25.000	Continuing	Continuing	-
		Subtotal	-	2.474		6.337		41.771		-		41.771	Continuing	Continuing	N/A

Remarks

BLU-134/B ILW awarded contracts to General Dynamics Ordnance and Tactical Systems (GD-OTS) and Allied Mechanical Wisconsin (AMW)for the development of the 500lb, CDI warhead in June 2016. NGAAW concept development continues.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MMHE -- Shipping/ Supplies	Various	MMHE Program Office : Eglin AFB, FL	-	0.175	Mar 2017	0.130	Mar 2018	0.130	Mar 2019	-		0.130	Continuing	Continuing	-
		Subtotal	-	0.175		0.130		0.130		-		0.130	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medium Caliber	TBD	Various : Various	-	-		-		-		-		-	Continuing	Continuing	-
IM	MIPR	NAWC : China Lake, CA	-	0.314	Dec 2016	-		-		-		-	Continuing	Continuing	-
BLU-134/B / BLU-136 ILW - Test and Evaluation	PO	Various : Various	-	7.353	May 2017	-		-		-		-	Continuing	Continuing	6.530
APKWS - Test and Evaluation	RO	Various : Various	-	0.500		-		-		-		-	Continuing	Continuing	-
CHOBS - Test and Evaluation	C/Various	Various : Various	-	-		1.650	Oct 2018	2.700	Mar 2019	-		2.700	Continuing	Continuing	-
MMHE -- Test Support	PO	96 TW : Eglin AFB, FL	-	-		0.040	Apr 2018	0.040	Apr 2019	-		0.040	Continuing	Continuing	-
JAGM-F - Test Support	PO	Various : Various	-	-		-		4.596	Sep 2019	-		4.596	Continuing	Continuing	-
		Subtotal	-	8.167		1.690		7.336		-		7.336	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Medium Caliber - PMA	Various	Various : Eglin AFB, FL	-	0.100	Jun 2017	0.100	Jun 2018	0.100	Jun 2019	-		0.100	Continuing	Continuing	-
MMHE - PMA	Various	Various : Eglin AFB, FL	-	0.293	Aug 2017	0.440	Jun 2018	0.440	Jun 2019	-		0.440	Continuing	Continuing	-
BLU-134/B ILW PMA	Various	Various : NV	-	0.870	Sep 2017	-		-		-		-	Continuing	Continuing	-
CHOBS -- PMA	Various	Various : Eglin AFB, FL	-	-		0.895	Apr 2018	1.915	Oct 2018	-		1.915	Continuing	Continuing	-
JAGM-F - PMA	Various	Various : Eglin AFB, FL	-	-		-		2.000	Oct 2018	-		2.000	Continuing	Continuing	-
		Subtotal	-	1.263		1.435		4.455		-		4.455	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	12.079		9.592		53.692		-		53.692	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653133 / *Bombs & Fuzes*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Bombs and Fuzes				
Munitions Materiel Handling Equipment (MMHE): design, prototype, test priority MMHE projects	1	2017	4	2022
Execute IMSP POAM	1	2017	4	2023
BLU-134/B ILW Mold Design, Build, Test	3	2017	3	2018
BLU-136/B- Warhead Design / Initial Prototype	1	2017	4	2019
CHOBS --RFP/Contract Prep/Source Selection	1	2018	4	2018
CHOBS -- Contract Award	4	2018	4	2018
CHOBS -- Integration and Qualification	4	2018	3	2020
Medium Caliber Ammunition: Assess, refine and develop medium caliber ammunition	1	2017	4	2022
JAGM-F - Contract Award	1	2019	2	2019
JAGM-F - Design, Build, Test, and Integration	1	2019	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653134 / *BLU-109 and BLU-113 Upgrade*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
653134: *BLU-109 and BLU-113 Upgrade*	-	4.336	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.336
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Advanced BLU-109 project develops and integrates advanced precision, navigation, and timing (PNT) capabilities (i.e., GPS, non-GPS, optical, passive, active, etc.) and demonstrates advancements in capability of the legacy penetrator warhead, enabling it to hold more targets at risk than currently achievable with the legacy weapon. The initial effort focused on demonstrating an Advanced 2000 lb (A2K), designated the BLU-137/B, warhead in a relevant military environment. The follow-on effort will provide production assets as a replacement warhead for the BLU-109 C/B warhead.

BLU-113 D/B incorporates BLU-137/B based design modifications to improve BLU-113 performance.

The Advanced 5000 lb Penetrator (A5K) risk reduction efforts started in the PE 0604602F/Armament/Ordnance Development 653134/BLU-109 and BLU-113 Upgrade but funding for the A5K development effort transitioned to PE 0604327F/Hard and Deeply Buried Target Defeat System (HDBTDS)Program 645341/Direct Strike Penetrator Systems in FY18.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Advanced 2000 lb (A2K) Penetrator and Advanced 5000 lb (A5K) Penetrator Programs	4.336	0.000	0.000	-	0.000
Description: Conduct A2K and A5K design analysis, warhead modifications, and testing to improve BLU-109/113 performance against increasingly hardened targets. A2K will maintain the current BLU-109 mold lines and will attempt to maintain current BLU-109 mass properties and Insensitive Munitions (IM) characteristics. Finalize new technical drawing package and manufacturing readiness for A2K warhead and replace BLU-109 C/B warhead production with A2K warhead.					
FY 2018 Plans: N/A					
N/A					
FY 2019 Base Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement:					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653134 / *BLU-109 and BLU-113 Upgrade*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A					
Accomplishments/Planned Programs Subtotals	4.336	0.000	0.000	-	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• PAAF 01 353020: *GP Bombs*	35.000	35.000	35.000	-	35.000	35.000	75.000	75.000	-	Continuing	Continuing
• RDTE 04 PE 0604327F: *HDBTDS*	-	17.365	72.039	-	72.039	-	-	-	-	Continuing	Continuing

Remarks

N/A

D. Acquisition Strategy

The A2K/A5K project will provide a BLU-109/BLU-113 modification package to enable a fielding recommendation.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604602F / *Armament/Ordnance Development*	Project (Number/Name) 653134 / *BLU-109 and BLU-113 Upgrade*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Design Engineering and Test Assets	Various	Various : NV	-	3.000	Feb 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	3.000		-		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Data	PO	Various : Eglin, FL	-	0.541	Mar 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	0.541		-		-		-		-	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Test and Evaluation	Various	Various : Various	-	0.526	Aug 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	0.526		-		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration/Program Support	Various	Various : Various	-	0.269	Oct 2016	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	0.269		-		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604602F / *Armament/Ordnance Development*	Project (Number/Name) 653134 / *BLU-109 and BLU-113 Upgrade*	

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	4.336		0.000		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653134 / *BLU-109 and BLU-113 Upgrade*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 653134 / *BLU-109 and BLU-113 Upgrade*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
A2K/A5K				
A2K: Risk Reduction and Demonstration/Qualification	1	2017	2	2017
Mfg and Tech Data Package	1	2017	2	2017
Insensitive Munitions Test	1	2017	4	2017
Build Assets	1	2017	1	2017
OT Flight Test	3	2017	4	2018
A5K: Risk Reduction -- Modeling and Simulation	1	2017	2	2017
A5K: Risk Reduction -- Test and Qualification	2	2017	2	2018

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 655361 / *Stores-Aircraft Interface*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
655361: *Stores-Aircraft Interface*	-	5.092	4.856	4.898	0.000	4.898	4.989	5.075	5.181	5.275	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Stores-Aircraft Interface: This project conducts stores-aircraft interface upgrades and standards development to include the Universal Armament Interface (UAI). UAI is an Air Force initiative to develop standardized software interfaces in aircraft weapons and Mission Planning. UAI standardizes software interfaces to support integration of weapons independent of aircraft Operational Flight Programs (OFP) cycles. UAI is currently being implemented on the F-15E, F-16 Block 40/50 and EPAF (European Participating Air Forces) F-16 aircraft, Small Diameter Bomb (SDB) I and II, Joint Direct Attack Munition (JDAM), Laser JDAM, Joint Air-to-Surface Stand-off Missile (JASSM) and Precision Guided Munitions Planning Software (PGMPS). Additional aircraft and weapons, including but not limited to, Joint Strike Fighter (JSF/F-35), B-1, B-52, B-21, MQ-9, JASSM-ER, CWDS as well as Army and Navy UAVs and Navy F/A-18s, have program plans to implement UAI. The UAI program office is responsible for development and enhancement of the standard (U.S. and allied) support to coalition/allied/joint interoperability efforts for weapons-platform interface efforts, provision of certification tools and implementation support to aircraft and weapons.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Armament/Ordnance Development weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: UAI Development	5.092	4.856	4.898	-	4.898
Description: Conduct stores-aircraft interface upgrades and standards development to the Universal Armament Interface (UAI) development and maintenance to the UAI, and facilitation of aircraft, stores and mission planning program users in the UAI process.					
FY 2018 Plans: Continue development and configuration management of UAI standards in response to new users including but not limited to F-35, JASSM-ER, CWDS, F/A-18 and Army & Navy UAVs and stores. Support working group management, technical meetings and workshops, risk reduction assessments, common mission planning, and support platform specific implementation of UAI. Continue maintenance of existing certification tools to meet F-35, SDB II, F/A-18, and other future user system integration lab test certification needs. These tools are shared among aircraft and weapons programs to reduce time and cost for UAI integration efforts. Support					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 655361 / *Stores-Aircraft Interface*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
multinational Memorandum of Understanding including but not limited to Joint Strike Missile (JSM), SPEAR 3 and Stand Off Missile - Joint (SOM-J). ***FY 2019 Base Plans:*** Continue development and configuration management of UAI standards in response to new users and evolving requirements including but not limited to F-35, JASSM-ER, CWDS, F/A-18, B-21, PGMPS and Army & Navy UAVs and stores. Support working group management, technical meetings and workshops, risk reduction assessments, common mission planning, and support platform specific implementation of UAI. Continue maintenance of existing certification tools to meet F-35, SDB II, F/A-18, B-21 and other future user system integration lab test certification needs. These tools are shared among aircraft and weapons programs to reduce time and cost for UAI integration efforts. Support multinational Memorandum of Understanding including but not limited to Joint Strike Missile (JSM), SPEAR 3 and Stand Off Missile - Joint (SOM-J). ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Adjustment for inflation					
Accomplishments/Planned Programs Subtotals	5.092	4.856	4.898	-	4.898

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

In December 2004, under the authority of a class Justification and Approval (J&A), the UAI program office awarded individual Cost Plus Fixed Fee (CPFF) contracts to Boeing, Lockheed Martin, Northrop Grumman and Raytheon. Each Original Equipment Manufacturer is responsible for a different piece of the total UAI requirement based on its product-specific (platform/weapon) expertise. During FY10 these contracts expired. Under the authority of the class J&A, Cost Plus Incentive Fee (CPIF) contracts were awarded to the four UAI vendors in August 2010. Follow-on period of performance was awarded in March 2014 for 16 months to better align future contract awards with funding through the Future Years Defense Program. The current period of performance was extended to 1 November 2015 to allow immediate start of the effort on F-35/JSF request for changes. A new J&A was approved in January 2015 for the follow-on sole source contracts to the original equipment manufacturers. These new sole-source contracts awarded November 2015.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 655361 / *Stores-Aircraft Interface*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Interface Control Document (ICD) Development/Updates/ Maintenance	SS/ Various	Boeing Northrop Grumman Lockheed Martin Raytheon : Various	-	4.992	Nov 2016	4.656	Nov 2017	4.698		-		4.698	Continuing	Continuing	-
UAI Common Component	SS/CPIF	Northrop Grumman : Bethpage, NY	-	-		-		-		-		-	Continuing	Continuing	-
Certification Tool	SS/CPFF	Boeing Northrop Grumman Lockheed Martin Raytheon : Various	-	-		-		-		-		-	Continuing	Continuing	-
		Subtotal	-	4.992		4.656		4.698		-		4.698	Continuing	Continuing	N/A

Remarks

--UAI Common Component has been rolled into the ICD Development line in 2016.

--Existing certification tools will be obsolete in 2018. Development has begun for a prototype for updated certification tools.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration/Program Support	Various	Various : Various	-	0.100		0.200		0.200		-		0.200	Continuing	Continuing	-
		Subtotal	-	0.100		0.200		0.200		-		0.200	Continuing	Continuing	N/A

Remarks

PE Systems Contractor provided support to the Program Office for financial services beginning Aug 14 and ongoing.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	5.092		4.856		4.898		-		4.898	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 655361 / *Stores-Aircraft Interface*	

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 655361 / *Stores-Aircraft Interface*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604602F / *Armament/Ordnance Development*	**Project (Number/Name)** 655361 / *Stores-Aircraft Interface*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Stores-Aircraft Interface				
ICD Development/Governance (SJICWG), (UAI funded)	1	2017	4	2022
Certification Tools (CTs) Dev / Update, (UAI funded)	1	2017	4	2022
UAI (Msn Plng) Common Component, (UAI funded)	1	2017	4	2021
F-15E (Program funded)	1	2017	4	2021
F-16, (Program funded)	1	2017	3	2021
JDAM, (Program funded)	1	2017	4	2021
JASSM-ER, (Program funded)	1	2017	3	2021
SDB II, (Program funded)	1	2017	4	2021
F-35, (Program funded)	1	2017	4	2021
B-1 (Program funded)	1	2017	4	2021
B-52 (Program funded)	1	2017	4	2021
BRU 61 A/A	1	2017	4	2021
BRU 57	1	2017	4	2021
ICD Development for UNI (Program funded)	1	2017	3	2017

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604604F / *Submunitions*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	2.503	2.705	2.990	0.000	2.990	3.045	3.096	3.159	3.215	Continuing	Continuing
653166: *Joint Smart Munitions Test and Evaluation*	-	2.503	2.705	2.990	0.000	2.990	3.045	3.096	3.159	3.215	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project Chicken Little (PCL) continues providing superior rapid reaction signature exploitation capabilities for use on both the traditional and the asymmetrical battlefield. PCL delivers vital one-of-a-kind research, development, test, and evaluation (RDT&E) expertise directly to the warfighter, capability developer, and allied/coalition forces.

From its inception in 1985, PCL constantly advances the state-of-the-art for developmental smart munitions, seekers/sensors, and their platforms. PCL also focuses its capability against today's networked weapons, emerging weapon concepts, and helps develop innovative targeting technologies to be employed against a wide variety of vehicle targets, theater air defense units, and an extensive array of associated equipment.

Combat systems and support equipment exhibit physical characteristics (i.e. signatures) and present certain vulnerabilities, which can be exploited by various targeting technologies leading to the elimination or incapacitation of the threat through the application of force (e.g. smart munitions or directed energy) or application of intelligence, surveillance, reconnaissance (ISR) methods. PCL collects physical, functional, and signature attributes of real foreign threat systems and related equipment; these data feed high-fidelity models used to predict detection, classification, vulnerability, and effectiveness performance for ISR sensor and weapon system design. PCL collects high resolution signature data using a variety of ground, air, and space-based sensors against both new and existing (obtained, sustained, and maintained to be signature representative) foreign targets; with and without the presence of camouflage, concealment, and deception materials; and operated using enemy tactics/CONOPS. The resulting highly reliable, realistic data directly support munitions/targeting development programs and helps mitigate overall acquisition risk. PCL serves as a major focal point for joint signature exploitation, collection, and dissemination amongst the DoD and intelligence community (IC). PCL is a prime contributor in the time critical process to rapidly exploit, assess, and determine US and allied weapon/targeting performance against high value targets. Customers include: the major Defense and Service Intelligence Centers, all Services, the Joint Technical Coordinating Group (JTCG) who develop the Joint Munitions Effectiveness Manuals (JMEMs), Combatant Commands, AF Major Commands, US Air Force Weapons School curriculum support, and others. Current projects include, but are not limited to: target signature exploitation, target geometric modeling (for identifying vulnerabilities), improving air capabilities against protected structures (specifically hard and deeply buried targets), and the testing of multiple seekers, sensors, and targeting technologies in representative environments against COCOM/MAJCOM/IC high value targets.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Chicken Little capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604604F / *Submunitions*

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	2.503	2.705	2.712	0.000	2.712
Current President's Budget	2.503	2.705	2.990	0.000	2.990
Total Adjustments	0.000	0.000	0.278	0.000	0.278
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	0.278	0.000	0.278

Change Summary Explanation

FY19 program increase to expand target signature collection to include Unmanned Aerial Systems (UAS) (+$278K)

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Project Chicken Little	2.503	2.705	2.990

Description: Provide the DoD community accurate multi-spectral signatures obtained from high-value, signature representative modern threat systems using advanced collection technologies.

Exploitations typically occur CONUS; however, Project Chicken Little is postured to support OCONUS collections as dictated by mission requirements.

A critical underpinning of the System Exploitation major thrust area, Sensor Week, occurs in even years and provides a unique air, ground, and National Technical Means (NTM) demonstration/validation of candidate Seeker/Sensor/ISR technologies.

Plan and conduct captive carry flight tests and signature collection for seeker/sensor technology evaluations.

Develop, validate, and accredit improved models for target vulnerability and weapons effectiveness in support of Combatant Commands' (CoCOMs) requirements.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604604F / *Submunitions*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2018 Plans: Exploit high value threat systems (typically 4 per year). Provide signature data from multiple threat systems in various environments using advanced and developmental seeker/sensor technologies. Conduct Sensor Week (SW), providing a singularly unique forum for joint service demonstration of developmental and operational seekers/sensors/ISR assets against a wide array of US, coalition, and foreign national ground targets. Exploit the signatures of ISR targets; conduct rapid reaction performance analysis & evaluations in support of COCOM/MAJCOM immediate/urgent warfighter needs; optimize current project methods to support ISR testing. No OCONUS requirements. Assist in obtaining relevant, high value, and emergent threat assets and/or decoys. Ensure the fleet foreign threat assets remain properly "signature representative" for systems development and testing. Develop, validate, and accredit improved computer models to determine target vulnerability and weapons effectiveness in support of warfighter requirements.			
FY 2019 Plans: Exploit high value threat systems (typically 4 per year). Provide signature data from multiple threat systems in various environments using advanced and developmental seeker/sensor technologies. Conduct Sensor Week (SW), providing a singularly unique forum for joint service demonstration of developmental and operational seekers/sensors/ISR assets against a wide array of US, coalition, and foreign national ground targets. Exploit the signatures of ISR targets; conduct rapid reaction performance analysis & evaluations in support of COCOM/MAJCOM immediate/urgent warfighter needs; optimize current project methods to support ISR testing; capture and catalog multi-spectral signatures on asymmetric threat Unmanned Aerial Systems (UAS). No OCONUS requirements. Assist in obtaining relevant, high value, and emergent threat assets and/or decoys. Ensure the fleet foreign threat assets remain properly "signature representative" for systems development and testing.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604604F / *Submunitions*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Develop, validate, and accredit improved computer models to determine target vulnerability and weapons effectiveness in support of warfighter requirements. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased to expand target signature collection capabilities and to address increase expense associated with the fuel required to operate target vehicles and measurement equipment.			
Accomplishments/Planned Programs Subtotals	2.503	2.705	2.990

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 05 No PEC/Line Item: *No Other Program Funding*	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000

Remarks

E. Acquisition Strategy

Funds are executed organically in support of test and evaluation activities including studies, analyses, flight & ground tests, model building and simulation. Virtually all of the work is performed in-house by the 96th Test Wing.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604604F / *Submunitions*	**Project (Number/Name)** 653166 / *Joint Smart Munitions Test and Evaluation*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
96th Test Wing	PO	Keeping Fleet Relevant : NV	-	0.800	Nov 2016	0.800	Nov 2017	0.800	Nov 2019	-		0.800	Continuing	Continuing	0.800
		Subtotal	-	0.800		0.800		0.800		-		0.800	Continuing	Continuing	N/A

Remarks

Fleet relevance addresses the acquisition of new and emerging threat vehicles, acquisition of high fidelity decoys, and sustainment of fleet signature quality.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
96th Test Wing (96 OG and 96 TW)	MIPR	Conducting Tests and Analysis : Eglin AFB, FL	-	1.648	Nov 2016	1.850	Nov 2017	2.135	Nov 2019	-		2.135	Continuing	Continuing	-
		Subtotal	-	1.648		1.850		2.135		-		2.135	Continuing	Continuing	N/A

Remarks

96th Test Wing is the Program Office which conducts inhouse testing.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
96 Test Wing (96 OG)	MIPR	46TS/OGEE : Eglin, FL	-	0.055	Nov 2016	0.055	Nov 2017	0.055	Nov 2019	-		0.055	Continuing	Continuing	-
		Subtotal	-	0.055		0.055		0.055		-		0.055	Continuing	Continuing	N/A

Remarks

96th Test Wing is the Program Office which conducts inhouse testing.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604604F / *Submunitions*	Project (Number/Name) 653166 / *Joint Smart Munitions Test and Evaluation*	

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	2.503		2.705		2.990		-		2.990	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604604F / *Submunitions*	**Project (Number/Name)** 653166 / *Joint Smart Munitions Test and Evaluation*

Project Chicken Little; JMT&E	
Target/warhead evaluation/analysis, signature test, captive carry flight tests.	
FY18 Sensor Week	
FY20 Sensor Week	
FY22 Sensor Week	
Signature exploitation; COCOM Support	

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604604F / *Submunitions*	**Project (Number/Name)** 653166 / *Joint Smart Munitions Test and Evaluation*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Project Chicken Little; JMT&E				
Target/warhead evaluation/analysis, signature test, captive carry flight tests.	1	2017	4	2023
FY18 Sensor Week	3	2018	3	2019
FY20 Sensor Week	3	2020	3	2021
FY22 Sensor Week	3	2022	3	2023
Signature exploitation; COCOM Support	1	2017	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	49.005	31.240	20.028	0.000	20.028	20.344	20.646	18.033	18.359	Continuing	Continuing
652895: *CE Readiness*	-	47.504	26.804	18.429	0.000	18.429	18.715	18.989	16.341	16.637	Continuing	Continuing
654910: *Aeromedical Readiness*	-	1.501	4.436	1.599	0.000	1.599	1.629	1.657	1.692	1.722	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program provides lighter, leaner, rapidly-deployable and technologically-advanced materiel, forces and capabilities to the warfighter. Current projects in this program include Civil Engineering Readiness (Project 652895) and Aeromedical Readiness (Project 654910). Civil Engineering Readiness projects enable airfield protection, and airfield damage recovery for sustainment, and increased resiliency of airfield operations anywhere in the world. Aeromedical Readiness projects provide aerospace medical systems and treatment equipment to improve casualty care and meet worldwide warfighter medical operational requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the Civil Engineering and Aeromedical Readiness capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F and 0605833F.

BA 5 - This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	53.680	31.240	17.177	0.000	17.177
Current President's Budget	49.005	31.240	20.028	0.000	20.028
Total Adjustments	-4.675	0.000	2.851	0.000	2.851
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	-15.000	0.000			
• Congressional Adds	12.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-1.675	0.000	2.851	0.000	2.851

Congressional Add Details ($ in Millions, and Includes General Reductions)

FY 2017	FY 2018

Project: 652895: *CE Readiness*

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2017	FY 2018
Congressional Add: *Bear Technology and Integration Lab (Congressional Add)*	12.000	0.000
Congressional Add Subtotals for Project: 652895	12.000	0.000
Congressional Add Totals for all Projects	12.000	0.000

Change Summary Explanation

FY17 Funding reduced -$15.0M for Forward Financing (HAC). $12.0M Program increase (SAC) for Bear Technology and Integration Lab. Reduction -$1.675 reduction for SIBR Assessment.

FY19 Program Increase +$2.851 for JCTD for PACOM Joint Expeditionary Airfield Damage Repair

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 652895 / *CE Readiness*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
652895: *CE Readiness*	-	47.504	26.804	18.429	0.000	18.429	18.715	18.989	16.341	16.637	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Civil Engineering (CE) Readiness project develops Airfield Damage Repair (ADR), Airfield Protection (AP), Energy & Utilities, and CE Materials solutions for in-garrison, expeditionary, and contingency installations & airbases. This includes: technologies for airfield assessment, pavement repair and unexploded ordnance identification & mitigation to enable rapid recovery and regeneration of airfield operations; infrastructure design criteria, construction methods, hardened shelters, evaluation tools, materials, force protection technologies, expeditionary energy, waste water recycling/treatment, CE materials applications and systems for improved resiliency and rapid recovery of airbase and airfield operations following an attack.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Airfield Damage Repair	22.504	21.837	16.429	-	16.429

Description: This effort develops, tests, and certifies equipment, materials, and Tactics, Techniques, and Procedures (TTPs) for the rapid assessment and repair of airfield damage, which includes identification, mitigation or removal of unexploded ordnance and expedient repairs for fuel and utility systems. This effort will also accelerate the transition of proven technologies in expedient and sustained protection of critical infrastructure, including operating surfaces, shelters, fuel storage and distribution systems, and command and control (C2) systems. Further, this effort focuses on the resiliency of airbase infrastructure as well as the timely repair and regeneration of airfield operations within established time limits in order to gain and maintain air superiority.

FY 2018 Plans:
Mature the rapid assessment, mitigation and repair tools and solutions for airfield damage repair through testing and delivery. Rapid assessment includes the development of IT solutions for MAOS selection, ADR command and control (C2), ADR training, and interfaces to other AF C2 systems. Mitigation includes removal of UXOs through a family of Rapid Explosive Hazard Mitigation (REHM) systems. Repair of airfield damage focuses different techniques required to return an airfield to operational status.

900K Reduction for FY18

FY 2019 Base Plans:
Mature the rapid assessment, mitigation and repair tools and solutions for airfield damage repair through research, development, testing and evaluation. Rapid assessment includes the development of spiral 2 SUAS,

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 652895 / *CE Readiness*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
sensors, and automated damaging detection solutions to significantly improve the ability to assess runway damage and conduct the MAOS selection. Mitigation includes the development of generation 2 systems to remotely neutralize and remove UXOs through a family of Rapid Explosive Hazard Mitigation (REHM) systems. Repair of airfield damage focuses on RDT&E of lighter/leaner systems and materials including maximum use of native in-situ materials for airfield recovery. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Budget decrease due to USAF planning priorities.					
Title: Airfield Protection ***Description:*** Advance and transition various solutions for protecting airfield infrastructure from ballistic and guided penetrating threats. Included within this effort are structural solutions, expeditionary and expedient hardening and protection solutions, rapid restoration of fuels distribution and storage, hardening criteria, implementation costs, and updated Tactics, Techniques and Procedures (TTPs). This effort advances solutions developed under the Hardened Installation Protection for Persistent Operations (HIPPO) Joint Capability Technology Demonstration (JCTD) for implementation at fixed and expeditionary locations, providing improved resiliency and rapid restoration of airbase and airfield operations following an attack. ***FY 2018 Plans:*** Continue exploration of new concepts for protection materials for lighter, cheaper solutions for sheltering. Advance and finalize the development of models for prediction of ultrahigh performance concrete materials (UHPC) for use in hardening and resiliency. Advance solution development for penetrating munitions including cruise missile hardening. Continue development of unconventional countermeasures technology. Improve expedient sheltering to address other threats. Initiate selective hardening development for infrastructure. Execute planning for acquisition of expedient shelters through design reviews, final testing, to deployment. ***FY 2019 Base Plans:*** Continue exploration of new concepts for protection materials for lighter, cheaper solutions for sheltering and facility hardening. Advance solution development for penetrating munitions including cruise missile hardening. Continue development of unconventional countermeasures technology. Improve expedient sheltering to address advanced threats. Continue development of selective hardening for infrastructure. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Budget decrease due to program ramp	13.000	4.967	2.000	-	2.000
Accomplishments/Planned Programs Subtotals	35.504	26.804	18.429	-	18.429

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 652895 / *CE Readiness*

	FY 2017	FY 2018
Congressional Add: Bear Technology and Integration Lab (Congressional Add)	12.000	0.000
FY 2017 Accomplishments: Install BTEIL metering, monitoring, test, communication, control, and data management equipment. .Develop specific and integrate a scientific sensor network and data acquisition/ management system for benchmarking and evaluating energy and wastewater technologies under test. Collect, analyze, and report field test results. Assemble designated modular solutions, monitoring/test equipment and network required to accomplish energy and water systems field testing. Demonstrate, test, and troubleshoot (if necessary) BTEIL, equipment, metering, monitoring, communication, and control equipment. Conduct analytics technology performance assessment for benchmarking and evaluating energy and wastewater technologies. Generate the final report that documents test results; lessons learned, and future technical or operational system capability improvements to improve the Air Force technology maturation and implementation timeline and aid in future capability transition success. ***FY 2018 Plans:*** N/A		
Congressional Adds Subtotals	12.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 04 Line Item 845100A: *Contingency Operations - Engineering and EOD Equipment*	4.000	93.920	51.632	53.500	105.132	31.906	131.952	132.519	133.097	Continuing	Continuing

Remarks

FY18-23 Procurement funding for Small Sheltering products, Rapid Airfield Damage Assessment System (RADAS) and Recovery of Airbases Denied by Ordnance (RADBO)in PE 0208028F.

D. Acquisition Strategy

The majority of efforts in this project employ existing contracts established to support CE Readiness requirements. Other DoD and US Government laboratories/ engineering centers are used whenever practical and appropriate, especially where a unique technical capability or expertise exists. Established DoD and GSA contracts are considered and evaluated for applicability and use before a new contract effort is implemented. Water and Fuel Expedient Repair (WaFERS) is being transitioned to the Air Force Life Cycle Management Center (AFLCMC), Agile Combat Support Program Executive Officer (PEO), for procurement.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 652895 / *CE Readiness*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Airfield Damage Repair (ADR)	Various	AFCEC : Tyndall AFB, FL	-	6.454	Feb 2017	7.515	Dec 2017	5.640	Dec 2018	-		5.640	Continuing	Continuing	-
Airfield Damage Repair (ADR) ERDC	MIPR	USERDC : Vicksburg, MS	-	5.500	Feb 2017	4.000	Dec 2017	3.000	Jan 2019	-		3.000	Continuing	Continuing	-
Airfield Damage Repair (ADR) Asphalt	C/CPFF	Applied Research Associates : Tyndall AFB, FL	-	1.850	Jan 2017	3.000	Jan 2018	2.000	Jan 2019	-		2.000	Continuing	Continuing	-
Rapid Explosive Hazard Mitigation (REHM) Robotics	C/CPFF	Applied Research Asscociates : Tyndall AFB, FL	-	4.450	Dec 2016	3.000	Jan 2018	1.500	Dec 2018	-		1.500	Continuing	Continuing	-
Rapid Airfield Damage Assessment System (RADAS) Integration	MIPR	TORC Robotics : Blacksburg, VA	-	3.347	Dec 2016	3.000	Jan 2018	3.000	Dec 2018	-		3.000	Continuing	Continuing	-
Airfield Protection	Various	AFCEC : Tyndal AFB, FL	-	3.644	Feb 2017	5.000	Jan 2018	2.000	Jan 2019	-		2.000	Continuing	Continuing	-
Airfield Protection - ERDC Efforts	MIPR	USERDC : Vicksburg, MS	-	5.963	Jan 2017	-		-		-		-	Continuing	Continuing	-
Airfield Protection - Shelters	C/CPFF	Jacobs Technology : FL	-	1.988	Jan 2017	-		-		-		-	Continuing	Continuing	-
Airfield Protection - WAFERS/Hardening	MIPR	NAVFAC EXWC : Port Hueneme, CA	-	1.405	Feb 2017	-		-		-		-	Continuing	Continuing	-
BEAR	Various	AFCEC : Tyndall AFB, FL	-	11.614	Oct 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	46.215		25.515		17.140		-		17.140	Continuing	Continuing	N/A

Remarks

$77K increase to FY18 ADR due to inflation adjustment

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration (PMA)	Various	AFCEC : Tyndall AFB, FL	-	0.325	Dec 2016	0.325	Nov 2017	0.325	Nov 2018	-		0.325	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 652895 / *CE Readiness*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	0.325		0.325		0.325		-		0.325	Continuing	Continuing	N/A

Remarks

PMA includes travel and supplies to support CE Readiness RDT&E activities.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS Program Support RDT&E	C/FFP	Multiple : FL	-	0.964	Jan 2017	0.964	Jan 2018	0.964	Jan 2019	-		0.964	Continuing	Continuing	-
		Subtotal	-	0.964		0.964		0.964		-		0.964	Continuing	Continuing	N/A

Remarks

Advisory and Assistance Services (A&AS) contract support for the Life Cycle Management Center (LCMC) procurement of Expeditionary Small Airfield Protection (ESAP), Expeditionary Large Airfield Protection (ELAP), and WaFERS.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	47.504		26.804		18.429		-		18.429	Continuing	Continuing	N/A

Remarks

NOTE: This is primarily a level of effort Program Element with multiple projects.

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 652895 / *CE Readiness*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 652895 / *CE Readiness*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CE Readiness				
ADR Robotic In-seat Appliques	4	2017	4	2020
ADR In-situ Material Repair RDT&E	1	2018	4	2023
ADR Lighter/Leaner Expeditionary Repair	3	2018	4	2022
REHM - Wide Area Mechanical Blade UXO Clearance	1	2017	4	2019
REHM Spiral 2 Rapid UXO Clearance	3	2018	4	2023
RADAS Development, Test & Evaluation	1	2017	4	2023
RADAS Spiral 2 RDT&E	3	2018	4	2021
Airfield Mitigation and Recovery Robotics	1	2018	3	2019
Site Infrastructure and Coordination	1	2018	4	2019
RADBO Non-Recurring Engineering, Test & Evaluation	1	2017	2	2018
Directed Energy Application for UXO Neutralization	2	2019	4	2023
Airfield Protection (AP) Small Shelters Prototypes	2	2017	3	2019
Civil engineering projects for sustained airbase operations	2	2018	1	2023
Airfield Protection - Advanced Hardening RDT&E	1	2019	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604617F / *Agile Combat Support*	Project (Number/Name) 654910 / *Aeromedical Readiness*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
654910: *Aeromedical Readiness*	-	1.501	4.436	1.599	0.000	1.599	1.629	1.657	1.692	1.722	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program provides key capabilities that provide life-saving and/or quality of life technologies and equipment. Aeromedical Readiness program enables the critical care of combat casualties by further developing and optimizing existing technologies for ground Expeditionary Medical Systems (EMEDS) and Aeromedical evacuation systems. EMEDS and Aeromedical Evacuation systems provide the urgent care that combat casualties need so they can be safely transported to a hospital for follow-on treatment. The program also supports critical capabilities development in the multi-disciplinary areas for light-weight, durable, and rapidly deployable medical equipment to ensure the Air Force is poised to meet future medical readiness and operational requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Deployable Oxygen Generation System - Small (DOGS-S) ***Description:*** This effort designs, develops and engineers manufacturing capability for a portable oxygen generation system which provides medical grade oxygen for EMEDS hospitals and mobile aeromedical staging facilities. ***FY 2018 Plans:*** Program is fully funded and will complete Jan 2018. ***FY 2019 Base Plans:*** N/A	0.004	0.000	0.000	-	0.000
Title: Non-Invasive Warming and Cooling Device (NIWCD) ***Description:*** Single device to provide therapeutic temperature control during treatment and movement of patient from point of injury through the continuum of care. The mortality in combat casualties with hypothermia is double that of normothermic casualties with similar injuries. Cooling the patient is required to treat hyperthermia. ***FY 2018 Plans:*** Complete Critical Design Review, Developmental Test Readiness Review and Developmental Test and Evaluation. ***FY 2019 Base Plans:*** NIWCD Completion of Final Testing ***FY 2018 to FY 2019 Increase/Decrease Statement:***	1.497	3.014	0.625	-	0.625

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 654910 / *Aeromedical Readiness*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Program is completing in mid-FY19.					
Title: Aeromedical Equipment Testing/Studies/Minor Development	0.000	1.422	0.974	-	0.974
Description: Procures and qualifies commercial-off-the shelf (COTS) or near COTS medical and aeromedical products and/or performs minor development/studies efforts and program management activities. Programs/ studies that are planned to be evaluated in FY19 include, but are not limited to, Multi-channel Infusion Pump for expeditionary purposes (MCIP-E) and Cognitive and Physiologic Performance (CPP) projects (formerly titled Pilot Physiology and Cognitive Performance (P2CP)). ***FY 2018 Plans:*** Evaluate MCIP-E to enter Engineering & Manufacturing Development (EMD) phase, conduct System Requirements Review and Preliminary Design Review. Formulate and begin implementing an acquisition strategy for CPP projects. ***FY 2019 Base Plans:*** Continue the development of MCIP-E in EMD. Continue implementation of the acquisition strategy for CPP projects. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Decreased to adjusted requirements.					
Accomplishments/Planned Programs Subtotals	1.501	4.436	1.599	-	1.599

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Programs will consider a streamlined acquisition approach. Whenever practical, commercial items are tested and evaluated as candidates for providing solutions to user needs. This normally involves characterization, verification, and qualification testing to ensure commercial off-the-shelf equipment is properly evaluated to identify any capability gaps that may require minor modifications for military use. However, acquisition strategies may be carried out for traditional Engineering and Manufacturing Development (EMD), e.g., Non-Invasive Warming and Cooling Device (NIWCD). Funds may be used to address associated emerging Aeromedical Readiness requirements and for program management activities.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 654910 / *Aeromedical Readiness*

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 654910 / *Aeromedical Readiness*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Deployable Oxygen Generation System - Small (DOGS-S)	C/FFP	AirSep Corporation : Amherst, NY	-	-		-		-		-		-	Continuing	Continuing	-
Non-Invasive Warming and Cooling Device (NIWCD)	C/CPIF	Edaptive Computing : Dayton, OH	-	1.403	Jul 2017	2.926	Feb 2018	0.580	Jan 2019	-		0.580	Continuing	Continuing	-
Aeromedical Equipment	C/TBD	TBD : TBD	-	-		1.305	Jun 2018	0.924	Feb 2019	-		0.924	Continuing	Continuing	-
		Subtotal	-	1.403		4.231		1.504		-		1.504	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation	MIPR	AFMESA : Ft Detrick, MD	-	0.030	May 2017	0.120	May 2018	-		-		-	Continuing	Continuing	-
		Subtotal	-	0.030		0.120		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	Various	AFLCMC : Wright-Patterson AFB, OH	-	0.068	Dec 2017	0.085	Jul 2018	0.095		-		0.095	Continuing	Continuing	-
		Subtotal	-	0.068		0.085		0.095		-		0.095	Continuing	Continuing	N/A

Remarks

FY18 cost increase result of $12K adjustment for inflation

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.501		4.436		1.599		-		1.599	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604617F / *Agile Combat Support*	Project (Number/Name) 654910 / *Aeromedical Readiness*	

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 654910 / *Aeromedical Readiness*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Aeromedical Readiness RDTE Efforts																												
Production and Fielding Phase for the DOGS - Small System																												
EMD Phase for the Non-Invasive Warming & Cooling Device (NIWCD)																												
Production and Fielding Phase for NIWCD																												
Conduct market research and initiate EMD for the Aeromedical Readiness products																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604617F / *Agile Combat Support*	**Project (Number/Name)** 654910 / *Aeromedical Readiness*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Aeromedical Readiness RDTE Efforts				
Production and Fielding Phase for the DOGS - Small System	1	2017	2	2018
EMD Phase for the Non-Invasive Warming & Cooling Device (NIWCD)	1	2017	2	2019
Production and Fielding Phase for NIWCD	2	2019	4	2019
Conduct market research and initiate EMD for the Aeromedical Readiness products	2	2018	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604618F / *Joint Direct Attack Munition*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	0.000	9.901	0.000	15.787	0.000	15.787	0.000	7.941	0.000	0.000	0.000	33.629
653891: *JDAM M-Code Integration*	0.000	9.901	0.000	15.787	0.000	15.787	0.000	7.941	0.000	0.000	0.000	33.629
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Military Code (M-Code) receivers with Enhanced Anti-Jam (EAJ) will be developed and integrated in order to provide advanced positioning, navigation, and timing (PNT) capabilities to allow operations in anti-access/area denial (A2/AD) environments. M-Code and EAJ also provide increased accuracy, better signal acquisition, and advanced security.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver M-Code/EAJ capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	9.901	0.000	15.906	0.000	15.906
Current President's Budget	9.901	0.000	15.787	0.000	15.787
Total Adjustments	0.000	0.000	-0.119	0.000	-0.119
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.119	0.000	-0.119

Change Summary Explanation

No Significant Changes

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604618F / *Joint Direct Attack Munition*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: M-Code/Enhanced Anti-Jam (EAJ)	9.901	0.000	15.787	0.000	15.787
Description: Develop and integrate M-Code receivers with EAJ to provide advanced positioning, navigation, and timing (PNT) capabilities, providing the capability to operate in adversarial anti-access/area denial (A2/AD) environments. M-Code receivers with EAJ also provides increased accuracy, better signal acquisition, and advanced security. ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** Develop and integrate M-Code/EAJ across the AFPEO weapons portfolio. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increase due to reduced funds in the specific receiver development PE.					
Accomplishments/Planned Programs Subtotals	9.901	0.000	15.787	0.000	15.787

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 04 PE 0604201F: *Integrated Avionics Planning and Development*	-	60.444	15.006	-	15.006	-	-	-	-	0.000	75.450

Remarks

E. Acquisition Strategy

M-Code/EAJ effort uses a Family of Systems approach where the three prime weapons contractors develop receivers capable of operating in any of their AF weapons. The receivers are based on a common, internally-developed IRS, TRD, and threat scenario. This approach uses a combination of contract types based on acquisition phase (TMRR, Development, Production) and risk. The Weapons SPOs share a common development PE to allow flexibility in funding and planning, switching to individual PEs for receiver integration, OT, and production. The M-Code/EAJ Weapons Receiver Development effort leverages technology currently under development by the GPS-D MGUE program and will provide the warfighter with unmatched capability to operate in future A2/AD environments.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604618F / *Joint Direct Attack Munition*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604618F / *Joint Direct Attack Munition*	**Project (Number/Name)** 653891 / *JDAM M-Code Integration*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
M-Code/EAJ Receiver chip development	MIPR	DMEA : McClellan, CA	0.000	9.901	Dec 2017	0.000		14.487	Dec 2018	0.000		14.487	Continuing	Continuing	-
M-Code/EAJ Receiver Integration	Various	Not specified. : TBD	0.000	0.000		0.000		0.000		0.000		0.000	Continuing	Continuing	-
		Subtotal	0.000	9.901		0.000		14.487		0.000		14.487	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Boeing M-Code	SS/TBD	Boeing : St Louis, MO	0.000	0.000		0.000		1.300	Jun 2019	0.000		1.300	Continuing	Continuing	-
		Subtotal	0.000	0.000		0.000		1.300		0.000		1.300	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	9.901		0.000		15.787		0.000		15.787	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604618F / *Joint Direct Attack Munition*	**Project (Number/Name)** 653891 / *JDAM M-Code Integration*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604618F / *Joint Direct Attack Munition*	**Project (Number/Name)** 653891 / *JDAM M-Code Integration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
M-Code/EAJ Receivers				
M-Code/EAJ Receiver chip development	4	2017	4	2020
M-Code/EAJ Receiver Integration	1	2020	3	2022
M-Code/EAJ Test and Evaluation	2	2019	4	2020

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604706F / *Life Support Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	8.710	9.060	8.919	0.000	8.919	8.624	18.701	18.909	19.253	Continuing	Continuing
65412A: *Life Support Systems*	-	8.710	9.060	8.919	0.000	8.919	8.624	18.701	18.909	19.253	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program saves Airmen's lives and improves aircrew performance through better aircrew flight equipment and airman combat systems. Air Force acquisition teams lead the upgrade and fielding of new equipment/systems by assessing deficiencies in existing equipment, identifying and assessing existing products or developing new technology, and conducting required Safe-to-Fly tests, certifications, and studies. Program efforts include, but are not limited to, the following projects: directed energy protective equipment; flight helmets and visors; oxygen breathing systems for aircrew; radios and locator beacons; support equipment; nuclear flash blindness protection; night vision devices; noise reduction devices; anti-gravity (anti-G) suits; flame resistant, retardant and blast/ballistic protective gear; aircraft seating; impact protection equipment; flotation devices; parachutes; ejection seats; and other aircrew/life support/ground crew systems required by the warfighter.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver these described capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

BA 5 - This program is in Budget Activity 5, System Development and Demonstration (SDD), because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	7.520	9.060	8.987	0.000	8.987
Current President's Budget	8.710	9.060	8.919	0.000	8.919
Total Adjustments	1.190	0.000	-0.068	0.000	-0.068
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	1.451	0.000			
• SBIR/STTR Transfer	-0.261	0.000			
• Other Adjustments	0.000	0.000	-0.068	0.000	-0.068

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604706F / *Life Support Systems*

Change Summary Explanation

FY17 funding increased due to BTR for Night Vision Goggle UON testing $1.451M. SBIR Adjustment of -$0.261M.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Aircrew Performance Studies/Technology Projects and Minor Development Efforts	3.254	4.335	5.858
Description: Air Force Life Cycle Management Center's Aircrew Performance Branch is the single USAF focal point for Aircrew Flight Equipment (AFE) Safe-to-Fly (STF) testing certification, addressing Safety Investigation Board (SIB) recommendations, along with studies and analysis. In addition, funding is for efforts that are responses to real-time capability gaps identified by the warfighter which may be satisfied by testing and qualifying commercial-off-the-shelf (COTS) products and/or performing minor development efforts that require less than $10M per year related to aircrew flight equipment and life support equipment. Previous successful efforts may evolve into enduring capabilities as other users / MAJCOMs seek to incorporate these STF assets into their inventory. The Cold Weather Aviation System (CWAS), Aircrew Body Armor (ABA), BA-X Low Profile Parachute (LPP) and Nuclear Flash Blindness Goggles (NFBG) are currently the active programs within Life Support Systems (LSS). Funds may be used to address associated emerging aircrew/ground crew/egress requirements and for program management activities. ***FY 2018 Plans:*** Perform STF testing and certification of COTS products. Continuation of test for Ballistic Aircrew Helmet and ABH improvements for reliability and acceptability for introduction to Air Force inventory. Address SIB recommendations. Formulate an acquisition strategy for next generation nuclear flash blindness technology. Continue the development efforts of aircrew laser eye protection (ALEP), radio modernization and improvement of parachute/flotation devices. ***FY 2019 Plans:*** Perform STF testing and certification of COTS products. Address SIB recommendations. Formulate an acquisition strategy for next generation nuclear flash blindness technology. Continue the development/test efforts of aircrew laser eye protection (ALEP), radio modernization, next generation fixed wing helmet, and improvement of parachute/flotation devices. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Minimal increase dues to ALEP Block 3 development efforts.			
Title: Integrated Aircrew Ensemble (IAE)	5.153	3.800	2.261
Description: The Integrated Aircrew Ensemble (IAE) is a multi-layer battle ready system of protective clothing, survival equipment, and anti-G protection equipment worn by aircrew members. The ensemble can layer up to seven (7) components allowing for flexible combinations depending on aircraft type, mission, and threat. Each component design is unique but engineered as a single integrated ensemble to improve mobility by reducing bulk, reducing aircrew fatigue from thermal stress using new breathable materials, and increasing overall system performance. The ensemble components are: 1) outer flight layer,			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604706F / *Life Support Systems*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
2) Environmental Protection Layer (EPL) with gloves, 3) Chemical Biological Radiological Layer (CBRL) with glove inserts, 4) Life Preserver Unit (LPU), 5) Counter Chest Pressure Bladder (CCPB), 6) survival vest, and 7) G-suit. ***FY 2018 Plans:*** Continue Low Rate Initial Production (LRIP) and Initial Operational Testing and Evaluation. Begin modification planning for the IAE Rotary/Fixed Wing variant. ***FY 2019 Plans:*** Complete Low Rate Initial Production (LRIP) and Initial Operational Testing and Evaluation. Begin modification efforts for the IAE Rotary/Fixed Wing variant. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** IOT&E of Ejection Seat Aircraft will be completing in mid-FY19.			
Title: Advanced Concept Ejection Seat ***Description:*** Ejection Seat upgrade for B-2 ***FY 2018 Plans:*** Complete Qualification testing of the ACES II SSIP for B-2. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Program to complete RDT&E efforts in FY18	0.303	0.125	0.000
Title: Next Generation Ejection Seat ***Description:*** The new ejection seat escape system shall safely accommodate greater variation in aircrew minimum/maximum weights, a minimum aircrew sitting height of 31 inches, and the use of Helmet Mounted Displays. It shall reduce the risk of injuries to the arms and legs (especially limb flail), neck, and spinal column throughout the entire ejection event. ***FY 2018 Plans:*** Program costs associated with awarding EMD contract to begin qualification testing of selected seat. ***FY 2019 Plans:*** Program costs associated with awarding EMD contract to begin qualification testing of selected seat and receive long lead items.	0.000	0.800	0.800
Accomplishments/Planned Programs Subtotals	8.710	9.060	8.919

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604706F / *Life Support Systems*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 04 Line Item 842990: *Items Less Than $5 Million (Safety and Rescue Equipment)*	13.814	28.969	24.043	-	24.043	22.206	22.607	155.324	158.119	Continuing	Continuing

Remarks

E. Acquisition Strategy

The majority of efforts funded in this project employ a streamlined acquisition approach. Whenever practical, Government-Off-The-Shelf/Commercial-Off-The-Shelf (GOTS/COTS) items are tested and evaluated as candidates for solutions to user needs. This normally involves characterization, verification, and qualification testing to ensure GOTS/COTS equipment is properly certified and adapted for military purposes. However, acquisition strategies may be carried out at the project level for traditional Engineering and Manufacturing Development (EMD), e.g., Integrated Aircrew Ensemble (IAE) and Aircrew Laser Eye Protection (ALEP) Block III. Funds may be used to address associated emerging aircrew/ground crew/egress requirements and for program management activities.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604706F / *Life Support Systems*	**Project (Number/Name)** 65412A / *Life Support Systems*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aircrew Performance Studies/Technology Projects/Minor Development Efforts	Various	Multiple Contractors : NV	-	1.895		2.835		4.043		-		4.043	Continuing	Continuing	-
Integrated Aircrew Ensemble (IAE)	C/FPIF	Tiax : Lexington, MA	-	4.550	Aug 2017	3.400	Mar 2018	1.950	Dec 2018	-		1.950	Continuing	Continuing	-
Advanced Concept Ejection Seat (ACES)	SS/FFP	United Technologies Aerospace Sys : Colorado Springs, CO	-	0.240	Mar 2018	0.125	May 2018	0.000		-		0.000	Continuing	Continuing	-
Next Generation Ejection Seat	TBD	TBD : NV	-	-		0.800	Dec 2018	0.800	Dec 2018	-		0.800	Continuing	Continuing	-
		Subtotal	-	6.685		7.160		6.793		-		6.793	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Tests (IAE, ACES, CWAS, etc.)	Various	Various : Various, NV	-	1.275	Jul 2017	1.125	Feb 2018	1.325	Feb 2019	-		1.325	Continuing	Continuing	-
		Subtotal	-	1.275		1.125		1.325		-		1.325	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration (PMA)	TBD	AFLCMC : Wright-Patterson AFB, OH	-	0.750		0.775		0.801		-		0.801	Continuing	Continuing	-
		Subtotal	-	0.750		0.775		0.801		-		0.801	Continuing	Continuing	N/A

Remarks

PMA Description: Program Management Support and Travel.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604706F / *Life Support Systems*	**Project (Number/Name)** 65412A / *Life Support Systems*

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	8.710		9.060		8.919		-		8.919	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604706F / *Life Support Systems*	**Project (Number/Name)** 65412A / *Life Support Systems*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604706F / *Life Support Systems*	**Project (Number/Name)** 65412A / *Life Support Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Life Support Systems RDTE Efforts				
IAE [Engineering and Manufacturing Development]	1	2017	3	2017
IAE [Milestone C]	4	2017	4	2017
IAE [Low Rate Initial Production] Test Assets for IOT&E	4	2017	2	2018
IAE [Initial Operational Test & Evaluation]	2	2018	2	2019
IAE [Rotary Wing Variant]	2	2019	2	2021
Advanced Concept Ejection Seat (ACES) Qualification Testing	1	2017	2	2018
Next Generation Ejection Seat Pre-Contract Award Activities	2	2018	1	2019
Next Generation Ejection Seat Contract Award	1	2019	1	2019
Next Generation Ejection Seat Qualification Effort	1	2019	4	2023
Aircrew Performance Aircrew Laser Eye Protection Block 3 Development Award	1	2019	1	2019
Aircrew Performance Next Generation Fixed Wing Helmet Development Award	2	2019	2	2019
Continue projects in support of Aircrew Performance	1	2017	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	57.200	87.350	35.895	0.000	35.895	31.165	8.415	23.795	24.228	Continuing	Continuing
652286: *Combat Training Range Equipment*	-	57.200	87.350	35.895	0.000	35.895	31.165	8.415	23.795	24.228	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 0604735F, project 652286, Live Mission Operations Capability (LMOC), is a new start.

A. Mission Description and Budget Item Justification

The Combat Training Range (CTR) program provides equipment and support to Air Force units and combat training ranges for electronic warfare (EW) mission testing, training, and evaluation of aircrews, as well as operational testing of weapon systems and tactics under simulated combat conditions. This program provides funding for the development and integration of electronic warfare training capabilities to include: Air Combat Training Systems (ACTS); threat emitters; advanced radar threat systems; communication jammers; instrumentation equipment/systems; and command & control and debrief capability. These systems and capabilities support integrated training operations for all aircraft (including 5th Gen) and for joint, coalition, and Live Virtual Constructive training events.

The Advanced Radar Threat System (ARTS) programs develop, design, build and test threat system simulators based on advanced foreign fielded surface-to-air missile (SAM) radar threat systems. ARTS will be used at Department of Defense (DoD) training ranges for 4th and 5th generation aircrew training and tactics development to increase combat effectiveness and aircrew survivability by training aircrews to engage or defend against an advanced SAM threat before encountering it in actual combat to stress their tactics, techniques and procedures. The ARTS-Variant 1 (ARTS-V1) is focused on long-range, re-locatable radar threat systems. ARTS-Variant 2 (ARTS-V2) creates mobile, short/medium-range radar threat systems. ARTS-Variant 3 (ARTS-V3) will establish a long range, high power SAM radar simulator. ARTS-Variant 4 (ARTS-V4) will establish a highly mobile, tactical modern threat simulator. The ARTS program supports early research, studies, technology development, and planning for next generation threat systems that challenge the Air Force's asymmetric advantage. The ARTS programs also fund development of high fidelity surrogate targets matching simulated threat systems, to stress 5th generation sensor fusion capabilities.

Legacy range threat systems include Multiple Threat Emitter System (MUTES), Miniature Multiple Threat Emitter System (Mini-MUTES), Modular Threat Emitter (MTE) system, Tactical Radar Threat Generator (TRTG) system, Band Simulator, Unmanned Modular Threat Emitter (UMTE) system, and legacy Joint Threat Emitter (JTE) systems. The Legacy Range Threat Systems Low Cost Mod (LRTSLCM) effort funds development of modifications for legacy threat systems to provide continued combat training relevancy and enhanced systems capabilities. Enhancements focus on upgrading threat systems to match fielded modifications for foreign threat systems faced by combat aircrews. The Common Electronic Attack Receiver (CEAR) provides reactive training and enhanced debriefs using legacy threats. The Digital Threat Relevancy (DTR) effort upgrades Band Simulator and other legacy emitters with modern electronics to improve threat relevance and sustainability. The Double Digit Threat Emitter (DDTE) effort leverages JTE to provide a lower cost EW simulator, enabling greater on-range threat density of advanced SAM radars.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*

P5 Combat Training System program addresses new capability requirements for the fielded P5 system, to include continued operations in a GPS-denied environment. Lastly, this program funds ongoing analyses, studies, risk reduction efforts, and/or technology development to enhance Operational Training Infrastructure (OTI), such as combat training range equipment integration into a blended training (Live, Virtual, Constructive) architecture, communication and GPS jammers, weapon drop scoring systems and infrastructure networks. These enhancements add a critical dimension to exercises and optimize warfighter training.

In FY19 Live Mission Operations Capability(LMOC) is a new start. In FY18 ARTS-V3 and ARTS-V4 were new starts.

This program element 0604735F may include necessary civilian pay expenses required to manage, execute, and deliver Combat Training Range weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	77.409	87.350	70.361	0.000	70.361
Current President's Budget	57.200	87.350	35.895	0.000	35.895
Total Adjustments	-20.209	0.000	-34.466	0.000	-34.466
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-9.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-9.456	0.000			
• SBIR/STTR Transfer	-1.753	0.000			
• Other Adjustments	0.000	0.000	-34.466	0.000	-34.466

Change Summary Explanation

FY2017 Congressional reduction of $9.0M was to "Improve Fund Management: Forward Financing."
FY2017 Reprogrammings support higher Air Force priorities.
FY2019 The FY19 funding request was reduced by $34.466 million to account for the availability of prior year execution balances.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: P5 Combat Training System (CTS)	5.000	0.499	0.175

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: P5 CTS funding supports Air Combat Training Systems (ACTS) capabilities and includes the development, integration and testing of future software/hardware upgrades, aircraft/pod integration, upgrades for range applications, and associated studies. Additionally, funding supports efforts to enable initial training interoperability with 5th Generation aircraft via Ground Subsystem (GS) decryption of secure (encrypted) Time, Space Position Information (TSPI), weapon simulation, and other training data. ***FY 2018 Plans:*** P5 CTS funding is supporting development, integration and testing of future software/hardware upgrades, aircraft/pod integration, and upgrades for range applications. ***FY 2019 Plans:*** Funding will be used to initiate GPS denied training operations capability development for the P5 CTS system, including program documentation and generating a request for proposal documents. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The decrease is due to the P5 CTS Block 4/4a upgrades completing in FY18 and efforts to support P5 GPS denied training operations beginning in FY19.			
Title: Legacy Range Threat Systems	0.014	4.128	0.175
Description: The Legacy Range Threat Systems Low Cost Mod (LRTSLCM) effort develops, integrates, and tests modifications to extend the systems' service life through threat relevancy and enhanced systems capabilities. Legacy Systems include the Multiple Threat Emitter System (MUTES), the Miniature Multiple Threat Emitter System (Mini-MUTES), the Modular Threat Emitter (MTE) system, the Tactical Radar Threat Generator (TRTG) system, the Band Simulator, and the Unmanned Modular Threat Emitter (UMTE) system. It also covers legacy Joint Threat Emitter systems. The Common Electronic Attack Receiver (CEAR) modification enables radar threat emitters to realistically react to electronic counter measures, expendable counter measures, maneuvers, and terrain masking initiated by aircrew during electronic combat training for simulated penetrations of hostile airspace. CEAR also enables recording of aircrew reactions for playback and debriefing. ***FY 2018 Plans:*** Funding is being used to conduct efforts for integration of the current CEAR design onto the Mini-MUTES system. ***FY 2019 Plans:*** FY2019 funds will be used to prepare for a Mini-MUTES modification for improved threat relevance. ***FY 2018 to FY 2019 Increase/Decrease Statement:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
The decrease in funding is due to decreased current requirements to support CEAR in FY19.			
Title: Advanced Radar Threat System (ARTS-V1) Development ***Description:*** The Advanced Radar Threat System-Variant 1 (ARTS-V1) program will develop, design, build and test threat system simulators based on advanced strategic, long-range, re-locatable foreign fielded surface-to-air missile (SAM) radar threat systems. ARTS-V1 will leverage an existing DoD test resource development program to reduce non-recurring development cost, schedule risk, and promote range interoperability between test and training. ARTS-V1 is designed to be used at Department of Defense (DoD) training ranges for aircrew training and tactics development to increase combat effectiveness and aircrew survivability by training aircrews to engage or defend against an advanced SAM threat before encountering it in actual combat. Various aircraft platforms may train against ARTS-V1, but the most stringent requirements for ARTS-V1 come from fifth generation aircraft capabilities. Additionally, development of a high-fidelity surrogate target, ongoing analyses, studies, and risk reduction efforts will focus on integrating ARTS and other systems into regional range and Live Virtual Constructive architectures. ***FY 2018 Plans:*** ARTS-V1 funds are supporting development and fabrication of Production Representative Article (PRA) development and creation of technical data package. ***FY 2019 Plans:*** ARTS-V1 funding will support completing development of Production Representative Article (PRA) and continue fabrication to include integration and testing. It will also support completion of a of technical data package. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The decrease in funding is due to a shift of integration efforts into late FY19.	13.033	14.050	9.919
Title: Advanced Radar Threat System (ARTS-V2) Development ***Description:*** The Advanced Radar Threat System-Variant 2 (ARTS-V2) Program will develop, design, build and test a threat system simulator based on an advanced tactical, mobile, short/medium range foreign fielded surface-to-air missile (SAM) radar threat system. ARTS-V2 is designed to be used at Department of Defense (DoD) training ranges for aircrew training and tactics development to increase combat effectiveness and aircrew survivability by training aircrews to engage or defend against an advanced SAM threat before encountering it in actual combat. Various aircraft platforms may train against ARTS-V2, but the most stringent requirements placed on ARTS-V2 design come from fifth generation aircraft capabilities. Additionally, ongoing analyses, studies, and risk reduction efforts will focus on integrating ARTS-V2 and other systems into Live Virtual Constructive architectures. ***FY 2018 Plans:*** ARTS-V2 funds are being used to support the Engineering and Manufacturing Development (EMD) contract for Production Representative Article (PRA) development through programmatic and technical reviews and build of the PRA. Additionally	39.153	57.762	17.285

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
funding is supporting ongoing analyses and studies focused on integrating ARTS into regional range and Live Virtual Constructive architectures. ***FY 2019 Plans:*** ARTS-V2 funding will be used to support the Engineering and Manufacturing Development (EMD) contract for Production Representative Article (PRA) development through programmatic and technical reviews and build of the PRA. Funding also will support integration and testing. Additionally funding will support ongoing analyses and studies focused on integrating ARTS into regional range and Live Virtual Constructive architectures. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to the program progressing through EMD and shifting from design and article build to test.			
Title: Advanced Radar Threat System (ARTS-V3) Development ***Description:*** The Advanced Radar Threat System-Variant 3 (ARTS-V3) Program will develop, design, build and test an advanced surface-to-air threat simulation systems replicating current strategic/tactical threat (s) at the fidelity necessary to stress current EW systems, 5th and 6th generation air platform engagements and be integrated into a future CAF LVC system. ARTS-V3 will provide an A2/AD environment for CAF test and training with a highly reactive threat systems that provides immediate feedback to aircrews. The ART-V3 system will create a relevant combat training threat system that is dynamic and reconfigurable to represent a modern, dynamic adversary force. ***FY 2018 Plans:*** ARTS-V3 funds are establishing program foundation to include intelligence & requirements support, early research, studies, support technology maturation, and planning to support a Milestone B decision. Funds are supporting intelligence data to ensure emulation of the real world system is relevant and realistic. ***FY 2019 Plans:*** ARTS-V3 funding will establish program foundation to include intelligence & requirements support, early research, studies, and support technology maturation and reduce Milestone B risk. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to a shift in program schedule.	0.000	4.911	1.000
Title: Advanced Radar Threat System (ARTS-V4) Development ***Description:*** The Advanced Radar Threat System-Variant 4 (ARTS-V4) Program will develop, design, build and test a modern surface-to-air threat simulation system(s) replicating current tactical highly mobile threats at the fidelity necessary to stress current EW systems, 5th and 6th generation air platform engagements and be integrated into a future CAF LVC system. ARTS-V4 will leverage an existing DoD training resource/s development program to reduce non-recurring development cost, schedule risk,	0.000	4.000	6.641

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
and promote range interoperability between test and training. ARTS-V4 will provide an A2/AD environment for CAF test and training with a highly reactive threat systems that provides immediate feedback to aircrews. The ART-V4 system will create a relevant combat training threat system that is dynamic and reconfigurable to represent a dynamic adversary force. Additionally funding will support ongoing analyses and studies focused on integrating ARTS into regional range and Live Virtual Constructive architectures. ***FY 2018 Plans:*** ARTS-V4 funds are establishing program foundation to include intelligence & requirements support, early research, studies, support technology maturation, and planning to support a Milestone B decision. Funding will be used to support intelligence data to ensure emulation of the real world system is relevant and realistic ***FY 2019 Plans:*** ARTS-V4 funding will support finalizing program foundation to include intelligence & requirements support, early research, studies, support technology maturation and demonstration, and planning to support a Milestone B decision. Funding will be used to support intelligence data to ensure emulation of the real world system is relevant and realistic. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to preliminary efforts progressing towards system development.			
Title: Digital Threat Relevancy (DTR) Development ***Description:*** Digital Threat Relevancy will conduct RDT&E to modernize the Range Threat family of systems, focusing on the Band Sim Emitter. Foreign fielded surface to air (SAM) threat systems have undergone major modernization programs to replace aging analog technology with modern digital electronics. This program requires the development of digital electronics upgrades to provide realistic electronic warfare training to combat aircrews. This effort will improve threat fidelity (ensuring threat faithful RF emissions), increase reliability, maintainability, supportability, system mobility, and support remote operations with Digital Integrated Air Defense Systems (DIADS). This effort supports warfighter development of new tactics, techniques, and procedures in a relevant, realistic combat environment. ***FY 2018 Plans:*** Digital Threat Relevancy funding is supporting preparation for Milestone B and solicitation for an Engineering and Manufacturing Development (EMD) contract award to design and build a prototype of a Mobile MPS-T1 threat system, as a first step in upgrading aging threat systems to replicate modernized foreign threat systems. Efforts are focusing on replacing analog technology with digital electronics in both the control and emitter subsystems of the MPS-T1 threat system. Funding is being used to study	0.000	2.000	0.350

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
enhancements to legacy systems capable of providing advanced SAM threats through integration of COTS or previously developed technology into existing systems. ***FY 2019 Plans:*** Digital Threat Relevancy funding will support preparation for Milestone B, solicitation, and source selection through Engineering and Manufacturing Development (EMD) contract award to design and build a prototype of a Mobile MPS-T1 threat system, as a first step in upgrading aging threat systems to replicate modernized foreign threat systems. Efforts are focusing on replacing analog technology with digital electronics in both the control and emitter subsystems of the MPS-T1 threat system. Funding is being used to study enhancements to legacy systems capable of providing advanced SAM threats through integration of COTS or previously developed technology into existing systems. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to a change in acquisition strategy and updated program schedule.			
Title: Live Mission Operations Capability (LMOC) ***Description:*** The LMOC program will regionalize and standardize training airspace, threat systems, and control centers to challenge 5th generation aircrew and provide comprehensive training support for all warfighters. It will provide a node-based enterprise that integrates range system capabilities in a multi-level secure environment to enable blended live-synthetic training for combat and combat support units including F-22 and F-35. It will address three combat training capability requirements: build and display an integrated surface and air picture; manage training; and Live Virtual Constructive training operations. ***FY 2018 Plans:*** N/A. New Start in FY 2019. ***FY 2019 Plans:*** LMOC funding will support risk reduction, pre-solicitation for development and fielding efforts, Milestone B preparation, initial stand-up of a hardware-in-the-loop lab, and associated acquisition efforts to include logistics, testing, and cyber security planning. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to being a new start in FY19.	-	0.000	0.350
Accomplishments/Planned Programs Subtotals	57.200	87.350	35.895

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 03 Line Item 834190: *Combat Training Ranges*	34.850	115.198	132.675	-	132.675	232.748	193.955	195.367	175.130	Continuing	Continuing
• OPAF 05 Line Item 861900: *Spares and Repair Parts*	5.930	15.988	10.107	-	10.107	10.882	6.783	19.100	0.725	Continuing	Continuing
• APAF 07 Line Item 000075: *Other Production Charges*	1.662	-	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• APAF 06 Line Item 000999: *Initial Spares/Repair Parts*	0.000	-	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks

E. Acquisition Strategy

The acquisition strategy is competition focused, with both cost plus and fixed price contracts.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*	**Project (Number/Name)** 652286 / *Combat Training Range Equipment*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Radar Threat System-Variant 3 (ARTS-V3) Development	MIPR	Various : Various, NV	-	-		0.080	Dec 2017	0.637	May 2019	-		0.637	Continuing	Continuing	-
Advanced Radar Threat System-Variant 1 (ARTS-V1) Development	Various	Various : Hill AFB, UT	-	8.606	Sep 2017	14.015	Mar 2018	7.419	May 2019	-		7.419	Continuing	Continuing	-
Advanced Radar Threat System-Variant 2 (ARTS-V2) Development	C/Various	Not specified. : HILL AFB, UT	-	36.385	Jun 2017	57.563	Jun 2018	13.370	Sep 2019	-		13.370	Continuing	Continuing	-
Advanced Radar Threat System-Variant 4 (ARTS-V4) Development	Various	Various : Hill AFTB, UT	-	-		0.500	May 2018	4.941	Mar 2019	-		4.941	Continuing	Continuing	-
Legacy System Improvements	Various	Not specified. : Hill AFB, UT	-	0.000	May 2017	4.108	May 2018	-		-		-	Continuing	Continuing	-
JSF Encrypted Pass-Through Development (P5CTS)	Various	Various : Various, NV	-	2.200	Mar 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	47.191		76.266		26.367		-		26.367	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Radar Threat Systems (Direct Msn Support)	Various	Various : Various, NV	-	2.750	Jun 2017	8.446	Jun 2018	1.063	Jan 2019	-		1.063	Continuing	Continuing	-
P5 CTS (Direct Msn Spt)	Various	TBD : TBD, NV	-	0.739	Mar 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	3.489		8.446		1.063		-		1.063	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*	**Project (Number/Name)** 652286 / *Combat Training Range Equipment*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
P5CTS Flight Test, 46 Test Wing	Various	Eglin AFB : FL, NV	-	0.132	Mar 2017	-		-		-		-	Continuing	Continuing	-
Advanced Radar Threat Systems (Direct Msn Support)	C/CPAF	Not specified. : TBD	-	-		-		1.400	Dec 2018	-		1.400	Continuing	Continuing	-
		Subtotal	-	0.132		-		1.400		-		1.400	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Radar Threat Systems (PMA/A&AS)	Various	Various : Hill AFB, UT	-	5.059	Jun 2017	2.139	Jun 2018	6.015	Jun 2019	-		6.015	Continuing	Continuing	-
P5 CTS (PMA/A&AS)	Various	AFLCMC/AZS : Hill AFB, UT	-	1.329	Mar 2017	0.499	Mar 2018	0.175	Jun 2019	-		0.175	Continuing	Continuing	-
Live Mission Operations Capability (LMOC) (PMA/A&AS)	Various	AFLCMC/AZS : Hill AFB, UT	-	-		-		0.350	Jun 2019	-		0.350	Continuing	Continuing	-
Digital Threat Relevancy (PMA/A&AS)	Various	AFLCMC/AZS : Hill AFB, UT	-	-		-		0.350	Jun 2019	-		0.350	Continuing	Continuing	-
Legacy Range Threat Systems Low Cost Mod (LRTSLCM) (PMA/A&AS)	Various	AFLCMC/AZS : Hill AFB	-	-		-		0.175	Jun 2019	-		0.175	Continuing	Continuing	-
		Subtotal	-	6.388		2.638		7.065		-		7.065	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	57.200		87.350		35.895		-		35.895	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*	**Project (Number/Name)** 652286 / *Combat Training Range Equipment*

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*	**Project (Number/Name)** 652286 / *Combat Training Range Equipment*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
-- ARTS-V4 Development																												
Digital Threat Relevancy (DTR), Emitter Development																												
Legacy Range Threat Systems LCM, Mini-MUTES mod																												
Live Mission Operations Capability (LMOC)																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*	**Project (Number/Name)** 652286 / *Combat Training Range Equipment*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Combat Training Range Equipment				
P5CTS Development	2	2017	4	2020
-- P5 CTS GPS Denied Capability	2	2019	2	2021
Advanced Radar Threat System-Variant 1(ARTS-V1) EMD Phase	1	2017	4	2022
-- Develop First Article (PRA)	1	2017	4	2021
-- Factory Acceptance Test	4	2020	4	2020
-- Milestone C	4	2021	4	2021
Advanced Radar Threat System-Variant 2 (ARTS-V2) EMD Phase	1	2017	4	2022
-- ARTS-V2 Contract	3	2017	1	2021
-- ARTS-V2 PDR	3	2018	3	2018
-- ARTS-V2 CDR	1	2019	2	2019
-- ARTS-V2 DT-E and OT-E	2	2019	4	2020
-- ARTS-V2 Milestone C	1	2021	1	2021
Advanced Radar Threat System-Variant 3 (ARTS-V3) EMD Phase	1	2018	4	2023
--ARTS-V3 Pre-milestone B Activities	1	2018	4	2021
--ARTS-V3 RFP Prep	1	2018	4	2020
-- ARTS-V3 Milestone B	4	2021	4	2023
-- ARTS-V3 EMD contract	4	2021	4	2023
-- ARTS-V3 PDR	4	2021	4	2022
Advanced Radar Threat System-Variant 4 (ARTS-V4) Pre-milestone B	1	2018	3	2020
-- ARTS-V4 Milestone B	1	2021	1	2021
-- ARTS-V4 Development	2	2021	4	2023

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604735F / *Combat Training Ranges*	**Project (Number/Name)** 652286 / *Combat Training Range Equipment*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Digital Threat Relevancy (DTR), Emitter Development	2	2019	4	2022
Legacy Range Threat Systems LCM, Mini-MUTES mod	2	2019	2	2023
Live Mission Operations Capability (LMOC)	2	2019	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	49,382.978	433.903	292.947	69.001	0.000	69.001	7.743	5.551	0.013	0.000	0.000	50,192.136
653831: *Joint Strike Fighter*	49,044.533	386.941	255.745	69.001	0.000	69.001	7.743	5.551	0.013	0.000	0.000	49,769.527
653832: *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*	338.445	46.962	37.202	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	422.609

Program MDAP/MAIS Code: 198

A. Mission Description and Budget Item Justification

The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the USN, USAF, USMC and allies. The three variants are the F-35A conventional takeoff and landing; F-35B short takeoff and vertical landing; and the F-35C Aircraft Carrier suitable variant. The F-35A will be a stealthy multi-role aircraft, primary air-to-ground for the Air Force to replace the F-16 and A-10 and complement the F-22. The F-35B variant will be a multi-role strike fighter aircraft to replace the AV-8B and F/A-18 for the Marine Corps, replace the Sea Harrier and GR 7 for the United Kingdom, and replace the AV-8 currently employed by the Italian Navy. The F-35C will provide the Department of the Navy a multi-role, stealthy strike fighter aircraft to complement the F/A-18E/F.

The United Kingdom, Italy, Netherlands, Turkey, Canada, Australia, Denmark, Norway, and Foreign Military Sales customers are also participants in the JSF program. The program shown here reflects USN, USMC, USAF, and International Partner funding.

Funding at the accomplishment/planned program level is reported as the total of all services and partners as these activities support all aircraft variants.

The System Development and Demonstration (SDD) budget funds a total quantity of 20 RDT&E test articles to include 6 ground test articles and 14 flight test articles for USN, USAF, and USMC use.

FY07: 1 F-35A flight test article
FY08: 1 F-35B flight test article; 1 F-35B ground test article
FY09: 1 F-35B flight test article; 2 F-35A ground test articles
FY10: 6 flight test articles: 3 F-35A, 2 F-35B, 1 F-35C; 3 ground test articles: 1 F-35B, 2 F-35C
FY11: 4 flight test articles: 1 F-35A, 1 F-35B, 2 F-35C
FY13: 1 F-35C flight test article

This program is funded under SDD because it includes those projects that have passed Milestone B approval and are conducting engineering and manufacturing development tasks aimed at meeting validated requirement prior to full-rate production decision.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	450.467	292.947	69.655	0.000	69.655
Current President's Budget	433.903	292.947	69.001	0.000	69.001
Total Adjustments	-16.564	0.000	-0.654	0.000	-0.654
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-16.564	0.000			
• Other Adjustments	0.000	0.000	-0.654	0.000	-0.654

Change Summary Explanation

FY17 Other reduction for SBIR ($16.484M) and FFRDC ($80K).

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600 / 5					R-1 Program Element (Number/Name) PE 0604800F / *F-35 - EMD*				Project (Number/Name) 653831 / *Joint Strike Fighter*			
COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
653831: *Joint Strike Fighter*	49,044.533	386.941	255.745	69.001	0.000	69.001	7.743	5.551	0.013	0.000	0.000	49,769.527
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Total cost including United States Navy (USN), United States Marine Corps (USMC), International partner contributions and United States Air Force (USAF) funding are: FY17
$1,394.043, FY18 $527.873M and FY19 $196.622M R-2 data reflects variant unique funding only.

R-2A(section B)/R-3 displays total combined Program (i.e. not Service specific), including International partners.

F-35 EMD Includes:
USAF PE 0604800F BPAC 653831
USN PE 0604800N Project Unit 2261
USMC PE 0604800M Project Unit 2262

D&S Includes:
USAF PE 0604800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

Funding for D&S in prior years for USAF totals: $238.599M through FY18.
Funding for D&S in prior years for USMC totals: $136.074M through FY18.
Funding for D&S in prior years for USN totals: $140.217M through FY18; $4.957M in FY19.

A. Mission Description and Budget Item Justification

The F-35 Joint Strike Fighter (JSF) Program will develop and field an affordable, highly common family of next generation strike aircraft for the USN, USAF, USMC and allies. The three variants are the F-35A conventional takeoff and landing; F-35B short takeoff and vertical landing; and the F-35C Aircraft Carrier suitable variant. The F-35A will be a stealthy multi-role aircraft, primary air-to-ground for the Air Force to replace the F-16 and A-10 and complement the F-22. The F-35B variant will be a multi-role strike fighter aircraft to replace the AV-8B and F/A-18 for the Marine Corps, replace the Sea Harrier and GR 7 for the United Kingdom, and replace the AV-8 currently employed by the Italian Navy. The F-35C will provide the Department of the Navy a multi-role, stealthy strike fighter aircraft to complement the F/A-18E/F.

The United Kingdom, Italy, Netherlands, Turkey, Canada, Australia, Denmark, Norway, and Foreign Military Sales customers are also participants in the JSF program. The program shown here reflects USN, USMC, USAF, and International Partner funding.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

Funding at the accomplishment/planned program level is reported as the total of all services and partners as these activities support all aircraft variants.

The System Development and Demonstration (SDD) budget funds a total quantity of 20 RDT&E test articles to include 6 ground test articles and 14 flight test articles for USN, USAF, and USMC use.

FY07: 1 F-35A flight test article
FY08: 1 F-35B flight test article; 1 F-35B ground test article
FY09: 1 F-35B flight test article; 2 F-35A ground test articles
FY10: 6 flight test articles: 3 F-35A, 2 F-35B, 1 F-35C; 3 ground test articles: 1 F-35B, 2 F-35C
FY11: 4 flight test articles: 1 F-35A, 1 F-35B, 2 F-35C
FY13: 1 F-35C flight test article

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: System Development and Demonstration (SDD) (F-35 JSF) ***Description:*** SDD execution of the Air System with Lockheed Martin, including International Commonality Effort which includes airframe, vehicle systems, mission systems, autonomic logistics, systems engineering, and integrated test efforts. ***FY 2018 Plans:*** Complete SDD execution of Air System Lockheed Martin, including International Commonality Effort which include, airframe, vehicle systems, mission systems, autonomic logistics, systems engineering, and integrated test efforts. Activity aligned to IMS in accordance with variant IOC. ***FY 2019 Base Plans:*** Continue SDD execution of Air System Lockheed Martin, including International Commonality Effort which includes,airframe, vehicle systems, mission systems, autonomic logistics, systems engineering, and integrated test efforts. Activity aligned to IMS in accordance with variant IOC. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** See comments above.	899.508	331.782	163.647	0.000	163.647
Title: F135 Propulsion System (F-35 JSF) ***Description:*** SDD execution of the F135 Propulsion System with Pratt & Whitney that includes engine testing, autonomic logistics, integration and performing technology maturation efforts.	120.000	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: N/A ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** See comments above.					
Title: Systems Engineering (SE) (F-35 JSF) ***Description:*** SDD SE including systems operations requirements analysis, program integration, requirements integration, and interoperability support. ***FY 2018 Plans:*** Complete SDD SE, including systems operations requirements analysis, program integration, requirements integration, and interoperability support. ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** See comments above.	28.181	0.912	0.000	0.000	0.000
Title: Development Test and Evaluation (DT&E) (F-35 JSF) ***Description:*** Government DT&E/Operational Testing (OT) in support of first flight of test aircraft. Elements of DT&E includes preparation for flight testing and weapons integration testing. ***FY 2018 Plans:***	265.188	143.809	4.293	0.000	4.293

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Complete government DT&E/OT in support of test aircraft. Continue flight sciences testing of CTOL, STOVL, and CV variants to expand air vehicle envelope and support mission systems testing. Elements of DT&E include flight testing, weapons integration testing, and component capabilities testing. ***FY 2019 Base Plans:*** Continue government DT&E/OT in support of test aircraft. Continue flight sciences testing of CTOL, STOVL, and CV variants to expand air vehicle envelope and support mission systems testing. Elements of DT&E include flight testing, weapons integration testing, and component capabilities testing. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** See comments above.					
Title: Development Support (F-35 JSF) ***Description:*** SDD Support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities. ***FY 2018 Plans:*** Complete SDD support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities. ***FY 2019 Base Plans:*** Continue SDD support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** See comments above.	80.945	10.676	0.764	0.000	0.764
Title: Autonomic Logistics Information System (ALIS) ***Description:*** SDD execution of Autonomic Logistics Information System (ALIS) develops the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users.	0.221	40.694	27.400	0.000	27.400

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: Continue SDD execution of ALIS to develop the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users. ***FY 2019 Base Plans:*** Continue SDD execution of ALIS to develop the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** See comments above.					
Title: Other Service Funding Adjustment (F-35 JSF) ***Description:*** Balancer line ***FY 2018 Plans:*** Balancer Line ***FY 2019 Base Plans:*** Continue SDD execution of ALIS to develop the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** See comments above.	0.000	0.000	0.000	-	0.000
Accomplishments/Planned Programs Subtotals	1,394.043	527.873	196.104	0.000	196.104
Other Service Funding Adjustment	1,007.102	272.128	127.103	-	127.103
Air Force Subtotals	386.941	255.745	69.001	0.000	69.001

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 05 PE 0604800F 3832: *JSF Deployability and Suitability Enhancements, BPAC 653832*	46.962	37.202	-	-	-	-	-	-	-	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 05 PE 0604800N 2261: *JSF SDD (CV)*	489.144	103.144	60.537	-	60.537	1.499	0.328	0.323	0.345	Continuing	Continuing
• RDTE 05 PE 0604800N 3352: *F-35C Sustainment/ Capability Enhancements (CV)*	23.518	5.787	4.957	-	4.957	-	-	-	-	Continuing	Continuing
• RDTE 05 PE 0604800M 2262: *JSF SDD (STOVL)*	495.958	141.534	66.566	-	66.566	1.713	0.542	0.558	0.569	0.000	707.440
• RDTE 05 PE 0604800M 3350: *F-35B Sustainment/ Capability Enhancements (STOVL), BPAC 3350*	23.435	11.400	-	-	-	-	-	-	-	Continuing	Continuing
• International 1: *International SDD*	0.000	27.450	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

The SDD program consists of a cost-reimbursement contract awarded to Lockheed Martin Aeronautics Company to develop the F-35 Air System, consisting of three aircraft variants and its associated logistics support system, for the U.S. Services and international participants. Similarly, a cost-reimbursement contract was awarded to Pratt & Whitney to develop the F135 propulsion system. Ground and flight testing will be conducted during development to accomplish validation and verification, with the extensive use of modeling and simulation to offset the risk of this large, complex, and concurrent lifecycle program. A comprehensive logistics support environment, including an integrated training system for aircrew, maintenance, and support personnel, is also being developed.

On 25 April 2011, the Department of Defense terminated the development of the General Electric Rolls-Royce Fighter Engine Team F136 propulsion system.

The F-35 Program has made international involvement a key element of the acquisition strategy. This includes international partnership in the development, production, and sustainment phases of the lifecycle. Additional international participation includes Foreign Military Sales arrangements.

In Fiscal Year (FY) 2007, separate cost-type contracts were awarded to Lockheed Martin Aeronautics Company and Pratt & Whitney to begin low rate initial production for F-35 air vehicles, propulsion systems, and sustainment for the fielded systems. Transition to fixed-price-type procurement contracts occurred with the fourth low rate lot. To provide logistics support for delivered aircraft, Performance-Based Logistics cost-type contracts will be awarded to Lockheed Martin Aeronautics Company and Pratt & Whitney.

At the completion of Low Rate Initial Production, a Defense Acquisition Board review, and Milestone Decision Authority approval, the F-35 Program will enter Full Rate Production. Fixed-price procurement contracts will be awarded for F-35 air vehicles and propulsion systems for the U.S. Services and international participants.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

Multiyear procurement authority for the F-35 Air System will be requested for Full Rate Production. Concurrently, multiple-year, fixed-price-type Performance Based Logistics contracts for sustainment will be requested to support multi-Service and multi-national requirements.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Lockheed Martin - SDD	SS/CPIF	Lockheed Martin : Ft. Worth, TX	31,298.696	748.290	Dec 2016	274.720	Dec 2017	161.147	Dec 2018	-		161.147	19.761	32,502.614	32,478.481
Lockheed Martin - SDD Fee	SS/CPIF	Lockheed Martin : Ft. Worth, TX	1,727.259	11.430	Dec 2016	35.000	Dec 2017	2.500	Dec 2018	-		2.500	0.000	1,776.189	1,776.189
Lockheed Martin -0031	SS/CPFF	Lochkheed Martin : Ft. Worth, TX	0.337	0.506	Dec 2016	0.169	Dec 2017	-		-		-	0.000	1.012	1.012
Lockheed Martin - BOA 0020	SS/CPFF	Lockheed Martin : Ft. Worth, TX	81.838	139.281	Dec 2016	21.893	Dec 2017	-		-		-	0.000	243.012	243.012
Lockheed Martin - BOA 0016	SS/CPFF	Lockheed Martin : Ft. Worth, TX	-	-		-		-		-		-	0.000	0.000	15.856
Pratt & Whitney - SDD	SS/CPIF	Pratt &Whitney : Hartford, CT	7,296.328	105.448	Dec 2016	-		-		-		-	0.000	7,401.776	7,401.776
Pratt & Whitney - Fee	SS/CPIF	Pratt &Whitney : Hartford, CT	677.646	14.552	Dec 2016	-		-		-		-	0.000	692.198	692.198
Systems Engineering	Various	Various : Various	435.371	23.577	Nov 2016	0.911	Dec 2017	0.000		-		0.000	0.000	459.859	459.859
Prime LM 02-C-3002 ALIS	SS/CPAF	LM : Ft Worth, TX	462.317	0.221	Dec 2016	40.694	Dec 2017	27.400		-		27.400	0.000	530.632	530.632
Prior Year not funded in FYDP	Various	Various : Various	2,909.122	0.000		0.000		0.000		-		0.000	0.000	2,909.122	2,893.266
		Subtotal	44,888.914	1,043.305		373.387		191.047		-		191.047	19.761	46,516.414	N/A

Remarks

Contract type prior to 2013 was CPAF.
Cumulative Award Fee earned in prior years for Lockheed Martin is 86%.
Cumulative Award Fee earned in prior years for Pratt and Whitney is 94%.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AFFTC/Eglin	Various	Various : Various	138.926	1.834	Nov 2016	0.830	Nov 2017	0.000		-		0.000	0.000	141.590	141.590
AFLCMC/AFRL	Various	AFLCMC/AFRL : Various	75.829	3.133	Nov 2016	-		0.000		-		0.000	0.000	78.962	78.962
AFTOC/Fuel	Various	Various : Various	199.947	3.771	Nov 2016	-		-		-		-	0.000	203.718	203.718

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Miscellaneous	Various	Various : Various	123.516	12.356	Nov 2016	2.927	Nov 2017	0.764	Nov 2018	-		0.764	0.000	139.563	139.563
NAWC China Lake	Various	NAWC WD : China Lake, CA	163.175	4.312	Nov 2016	-		-		-		-	0.000	167.487	167.487
NAWC Patuxent River	Various	NAWC AD : Patuxent River, MD	505.484	41.726	Nov 2016	6.913	Nov 2017	-		-		-	0.000	554.123	554.123
Prior Year no longer funded in FYDP	Various	Various : Various	77.641	-		-		-		-		-	0.000	77.641	77.641
		Subtotal	1,284.518	67.132		10.670		0.764		-		0.764	0.000	1,363.084	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
NAWC China Lake	Various	NAWC WD : China Lake, CA	40.545	2.712	Nov 2016	-		-		-		-	0.000	43.257	-
Development Test and Evaluation	Various	NAWC AD : Patuxent River, MD	752.168	46.702	Nov 2016	4.400	Oct 2017	-		-		-	0.000	803.270	-
Edwards AFB	Various	Edwards AFB : Edwards AFB, CA	683.943	46.734	Nov 2016	4.400	Nov 2017	-		-		-	0.000	735.077	-
Other (including Classified PIDs)	Various	Various : Various	241.272	30.602	Nov 2016	2.400	Nov 2017	-		-		-	0.000	274.274	-
WEPS/Eglin	Various	WEPS : Eglin AFB, FL	-	-		-		-		-		-	0.000	0.000	-
OT - AFOTEC/AFFTC	Various	OT AFOTEC/ AFFTC : Various	204.545	35.436	Nov 2016	41.976	Nov 2017	2.150		-		2.150	0.000	284.107	-
OT - JITC/OPTEV	Various	OT JITC/OPTEV : Various	61.243	42.956	Nov 2016	71.886	Nov 2017	2.143		-		2.143	0.000	178.228	-
OT CHLK	Various	NAWC WD : China Lake, CA	3.999	9.912	Nov 2016	15.392		0.000		-		0.000	0.000	29.303	-
OT - Various	Various	Various : Various	7.823	2.775	Nov 2016	3.274	Nov 2017	-		-		-	0.000	13.872	-
Prior Year no longer funded in FYDP	Various	Various : TBD	27.829	-		-		-		-		-	0.000	27.829	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	2,023.367	217.829		143.728		4.293		-		4.293	0.000	2,389.217	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Security - System High BOS	C/FP	System High : Arlington, VA	7.845	8.037	Dec 2016	-		-		-		-	0.000	15.882	15.882
AFLCMC Civilian Pay	Various	AFLCMC : Wright Patterson AFB, OH	120.311	10.270	Oct 2016	-		-		-		-	0.000	130.581	0.000
OPS-Jacobs BOSS	Various	TBD : Arlington, VA	32.772	9.013	Dec 2016	-		-		-		-	0.000	41.785	0.000
OPS- Allutiiq/E3	C/CPAF	TBD : Arlington, VA	2.213	0.192	Dec 2016	-		-		-		-	0.000	2.405	2.405
OPS - Cost/FM/EV	Various	TBD : Arlington, VA	2.000	3.845	Dec 2016	-		-		-		-	0.000	5.845	0.000
Andrews AFB	Various	TBD : Camp Springs, MD	0.358	0.135	Dec 2016	-		-		-		-	0.000	0.493	0.000
Program Management Support - BOS	C/CPFF	Jacobs : Arlington, VA	50.440	24.686	Dec 2016	-		-		-		-	0.000	75.126	0.000
CIO ODCs	C/CPAF	Various : Various	13.021	7.256	Dec 2016	-		-		-		-	0.000	20.277	0.000
Travel	C/CPAF	Various : Various	24.830	2.343	Oct 2016	0.088	Dec 2017	-		-		-	0.000	27.261	0.000
Prior Year not funded in FYDP	Various	Various : Various	593.944	-		-		-		-		-	0.000	593.944	0.000
Other Service Funding Adjustment	TBD	Not specified. : NV	-	0.000	Nov 2016	0.000	Nov 2018	-		-		-	0.000	0.000	-
		Subtotal	847.734	65.777		0.088		-		-		-	0.000	913.599	N/A

Remarks

Cumulative Award Fee earned in prior years for Stanley is 99%.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Subtotals	49,044.533	1,394.043		527.873		196.104		-		196.104	19.761	51,182.314	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Other Service Funding Adjustment	-	1,007.102		272.128		127.103		-		127.103			-
Project Cost Totals	49,044.533	386.941		255.745		69.001		-		69.001	19.761	51,182.314	-

Remarks

The project information shown here reflects USN, USMC, USAF and International Partner funding total for each contract. By agreement USN and USMC funding shares are approximately equal and when combined are equal to the USAF share.

NOTE 1: Prior Years reflect $21,601.831M USAF/$19,311.879M USN/$3,166.810M USMC /$4,964.013 International/Total $49,044.533M
FY 2017 reflects $386.941M USAF/$489.144M USN/$495.958M USMC/$22.000M International/Total $1,394.043M
FY 2018 reflects $255.745M USAF/$103.144M USN/$141.534M USMC/$27.450M International/Total $ 527.873M
FY 2019 reflects $ 69.001M USAF/$ 60.537M USN/$ 66.566M USMC/$ 0.000M International/Total $ 196.104

JSF EMD Includes:
USAF PE 0604800F BPAC 653831
USN PE 0604800N Project Unit 2261
USMC PE 0604800M Project Unit 2262

D&S Includes:
USAF PE 0604800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

JSF Variants - CV, STOVL & CTOL	
Acquisition Milestones: F-35C Initial Operational Capability	
Test & Evaluation: Test and Evaluation: Block 3F DT&E/Cert	
Test & Evaluation: Test and Evaluation: Initial Operational Test and Evaluation (IOT&E)	
Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY18	
Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY19	
Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY20	
Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY21	
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 10 Full Funding / Production / Delivery	
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 11 Full Funding / Production / Delivery	
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 12 Full Funding / Production / Delivery	

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 13 Full Funding / Production / Delivery																												
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 14 Full Funding / Production / Delivery																												
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 15 Full Funding / Production / Delivery																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
JSF Variants - CV, STOVL & CTOL				
Acquisition Milestones: F-35C Initial Operational Capability	4	2018	4	2018
Test & Evaluation: Test and Evaluation: Block 3F DT&E/Cert	1	2017	2	2018
Test & Evaluation: Test and Evaluation: Initial Operational Test and Evaluation (IOT&E)	2	2018	1	2020
Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY18	1	2019	1	2019
Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY19	1	2020	1	2020
Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY20	1	2021	1	2021
Defense Acquisition Reviews: System Development Reviews: Interim Program Review (IPR) FY21	1	2022	1	2022
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 10 Full Funding / Production / Delivery	2	2019	2	2020
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 11 Full Funding / Production / Delivery	1	2020	1	2021
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 12 Full Funding / Production / Delivery	2	2020	2	2021
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 13 Full Funding / Production / Delivery	2	2021	1	2022
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 14 Full Funding / Production / Delivery	2	2022	4	2023
Production Lots (Full Funding / Production / Delivery: U.S. Aircraft): LRIP 15 Full Funding / Production / Delivery	2	2023	4	2023

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653831 / *Joint Strike Fighter*

Note

Schedule details reflect fiscal years

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653832 / *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
653832: *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*	338.445	46.962	37.202	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	422.609
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Total cost including United States Navy (USN), United States Marine Corps (USMC), United States Air Force (USAF) funding and International Partner contributions to D&S is: FY2016 $184.378M, FY2017 $125.862M, FY2018 $61.770M and FY19 $4.957

R-2A (section B)/R-3 displays total combined program (i.e. not Service-specific), including International partners.

D&S Includes:
USAF PE 0604800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

A. Mission Description and Budget Item Justification

Funds enhancements to the Deployability and Suitability (D&S) of the air system such as low observable (LO) maintenance enhancements, security architecture updates, redesign of obsolete items and integrated training simulators. These enhancements will provide vital on-demand support to the warfighter within a deployed environment and are not funded via the existing System Development and Demonstration (SDD) program or tied to Block 4 Operational Flight Program development. Funding will result in achieving targeted suitability, maintainability, and affordability returns employing the F-35 in deployed or austere locations.

Funding at the accomplishment/planned program level is reported as the total of all services as these activities support all aircraft variants. By agreement, USN and USMC funding shares are approximately equal and when combined are equal to the USAF share.

BA5 - This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Sustainment and Capability Enhancements (F-35 JSF)	75.280	26.030	4.957	-	4.957

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653832 / *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Apply disciplined systems engineering, refinement of requirements, develop and acquire suitability and maintainability of the air system such as decentralized maintenance capabilities, LO maintenance enhancements, security architecture updates, redesign of obsolete items and integrated training simulators. ***FY 2018 Plans:*** Complete conducting systems engineering, technical maturation, integration and test planning for suitability and deployability enhancements. Increase is to perform sustaining engineering, development and test activities necessary to gain capacity, compatibility, and expansion in wiring, power, wing conduits, etc. in support of electronic warfare. This includes funding for suitability enhancements such as Standard Operating Unit Version 2 and Band 2/5 efforts. ***FY 2019 Base Plans:*** No funding requested in FY19. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** No funding requested in FY19.					
Title: Development Support (F-35 JSF) ***Description:*** SDD support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities. ***FY 2018 Plans:*** Continue SDD support efforts for airframe, air vehicle systems, mission systems, weapons integration, mission support, and autonomic logistics development activities. Development Support decrease is due to across the board reduction between all services. ***FY 2019 Base Plans:*** No funding requested in FY19. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** No funding requested in FY19.	3.556	1.000	0.000	-	0.000
Title: Development Test and Evaluation ***Description:*** Verification and testing for deployability and suitability enhancements. ***FY 2018 Plans:***	1.440	0.500	0.000	-	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653832 / *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue to initiate government test and evaluation of capability enhancements for Deployable Autonomic Logistics Information System and LO maintenance enhancements. ***FY 2019 Base Plans:*** No funding requested in FY19. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** No funding requested in FY19.					
Title: Autonomic Logistics Information System ***Description:*** SDD execution of Autonomic Logistics Information System (ALIS) develops the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users. ***FY 2018 Plans:*** Complete SDD execution of Autonomic Logistics Information System (ALIS) develops the information infrastructure used to transmit health and maintenance action information for the aircraft to the appropriate users. ***FY 2019 Base Plans:*** No funding requested in FY19. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** No funding requested in FY19.	45.586	33.740	0.000	-	0.000
Title: Other Program Funding (F-35 JSF) ***Description:*** NOTE: Balancer line since the R2A/R3 represents a joint budget. ***FY 2018 Plans:*** Balancer Line ***FY 2019 Base Plans:*** No funding requested in FY19. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** No funding requested in FY19.	-	0.000	0.000	-	0.000
Accomplishments/Planned Programs Subtotals	125.862	61.270	4.957	-	4.957

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653832 / *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*

B. Accomplishments/Planned Programs ($ in Millions)

	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Other Service Funding Adjustment	78.900	24.068	4.957	-	4.957
Air Force Subtotals	46.962	37.202	0.000	-	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 05 PE 0604800F 3831: *JSF SDD, BPAC 653831*	386.941	255.745	69.001	-	69.001	7.796	5.598	122.000	-	Continuing	Continuing
• RDTE 05 PE 0604800N 2261: *JSF SDD (CV)*	489.144	103.144	60.537	-	60.537	1.637	0.454	0.467	-	Continuing	Continuing
• RDTE 05 PE 0604800N 3352: *F-35C Sustainment/ Capability Enhancements (CV)*	23.518	5.787	4.957	-	4.957	-	-	-	-	Continuing	Continuing
• RDTE 05 PE 0604800M 2262: *JSF SDD (STOVL)*	495.958	141.534	66.566	-	66.566	1.727	0.547	0.564	-	Continuing	Continuing
• RDTE 05 PE 0604800M 3350: *F-35B Sustainment/ Capability Enhancements (STOVL), BPAC 3350*	23.435	11.400	-	-	-	-	-	-	-	Continuing	Continuing
• International 1: *International SDD*	0.000	27.450	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

This is a joint program with no executive service. Service Acquisition Executive (SAE) authority alternates between the Department of the Navy and the Department of the Air Force and currently resides with the Navy. Program Element 0604800N/0604800M continues USN development efforts budgeted in 0603800N prior to FY2002. The United Kingdom, Italy, Netherlands, Turkey, Canada, Australia, Denmark, and Norway are participants in the SDD phase of JSF.

Note: The USAF/USN/USMC procurement lines include Aircraft Procurement and Advanced Procurement only. Initial Spares and Repair Parts for all Services are reflected in separate lines. International Partner Funding also includes funds provided under the Italy and Netherlands Bilateral agreements.

RELATED RDT&E: Funding prior to JSF SDD (FY94-FY01): USN PE 0603800N $1,950,617; USAF PE 0603800F $1,907,352; DARPA PE 0603800E $118,056; and International Partner contributions of $253,921 for a total of $4,229,946.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653832 / *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*

D. Acquisition Strategy

Implement JSF Joint Executive Steering Board (JESB)/Configuration Steering Board (CSB) approved enhancements through existing contracts using the engineering change proposal process. When appropriate, new cost type contracts may be established.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653832 / *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Primary Hardware Development - 3002 SDD	SS/CPFF	Lockheed Martin : Fort Worth, TX	44.233	45.572	Mar 2017	23.655	Mar 2018	4.957	Mar 2019	-		4.957	4.995	123.412	105.824
Primary Hardware Development - 3002 ALIS	SS/CPFF	Lockheed Martin : Fort Worth, TX	144.378	40.768	Mar 2017	33.740	Mar 2018	-		-		-	0.000	218.886	209.271
Primary Hardware Development - 14-C-0002 Band 2/5	SS/CPFF	Lockheed Martin : Fort Worth, TX	98.639	34.526	Mar 2017	2.375	Mar 2018	-		-		-	0.000	135.540	122.925
		Subtotal	287.250	120.866		59.770		4.957		-		4.957	4.995	477.838	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Support	Various	AFLCMC : Eglin AFB, FL	33.501	-		-		-		-		-	0.000	33.501	-
Various	Various	Various : Various, NV	12.368	2.410	Mar 2017	1.000	Mar 2018	-		-		-	0.000	15.778	-
		Subtotal	45.869	2.410		1.000		-		-		-	0.000	49.279	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test & Evaluation	WR	Various : Various, NV	2.010	0.976	Mar 2017	0.500	Mar 2018	-		-		-	0.000	3.486	-
		Subtotal	2.010	0.976		0.500		-		-		-	0.000	3.486	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653832 / *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Other Service Funding Adjustment	TBD	Not specified. : TBD	-	0.000		0.000		-		-		-	0.000	0.000	-
Program Management	Various	Various : Various, NV	3.316	1.610	Mar 2017	-		-		-		-	0.000	4.926	-
		Subtotal	3.316	1.610		0.000		-		-		-	0.000	4.926	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Subtotals	338.445	125.862		61.270		4.957		-		4.957	4.995	535.529	N/A
Other Service Funding Adjustment	-	78.900		24.068		4.957		-		4.957			-
Project Cost Totals	338.445	46.962		37.202		0.000		-		0.000	4.995	535.529	-

Remarks

NOTE: Prior Years reflect $154.435M USAF/$68.518M USN/$58.740M USMC/$56.752M International/Total $338.445M
FY 2017 reflects $46.962M USAF/$23.518M USN/$23.435M USMC/$31.947M International/Total $125.8622M
FY 2018 reflects $37.202M USAF/$ 5.787M USN/$11.400M USMC/$ 6.881M International/Total $ 61.270M
FY 2019 reflects $ 0.000M USAF/$ 4.957M USN/$ 0.000M USMC/$ 0.000M International/Total $4.957M

R-2A (section B)/R-3 displays total combined program (i.e. not Service-specific), including International partners.

JSF EMD Includes:
USAF PE 0604800F BPAC 653831
USN PE 0604800N Project Unit 2261
USMC PE 0604800M Project Unit 2262

D&S Includes:
USAF PE 0604800F BPAC 653832
USN PE 0604800N Project Unit 3352
USMC PE 0604800M Project Unit 3350

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653832 / *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
F-35 Deployability and Suitability																												
D&S: Standard Operating Unit (SOUv2)																												
D&S: Band 2/5																												
D&S: Security Architecture																												
D&S: Offboard Mission Support (OMS) Redesign																												
D&S: Distributed Mission Training/Distributed Mission Operations (DMT/DMO)																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604800F / *F-35 - EMD*	**Project (Number/Name)** 653832 / *JSF DEPLOYABILITY AND SUITABILITY ENHANCEMENT*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
F-35 Deployability and Suitability				
D&S: Standard Operating Unit (SOUv2)	1	2017	4	2018
D&S: Band 2/5	2	2017	3	2018
D&S: Security Architecture	3	2018	3	2019
D&S: Offboard Mission Support (OMS) Redesign	3	2018	3	2019
D&S: Distributed Mission Training/Distributed Mission Operations (DMT/DMO)	1	2017	4	2019

Note

Schedule details reflect fiscal years

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604853F / *Evolved Expendable Launch Vehicle Program (SPACE) - EMD*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	381.360	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
650006: *Next Generation Liquid Rocket Engine*	-	381.360	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0604853F, Evolved Expendable Launch Vehicle Program (SPACE) efforts were transferred to PE 1206853F, Evolved Expendable Launch Vehicle Program (SPACE) due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206853F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	296.572	0.000	0.000	0.000	0.000
Current President's Budget	381.360	0.000	0.000	0.000	0.000
Total Adjustments	84.788	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-1.399	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	100.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-13.813	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604932F / *Long Range Standoff Weapon*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	26.417	102.350	451.290	614.920	0.000	614.920	722.539	475.297	359.301	396.032	1,394.375	4,542.521
657011: *LONG RANGE STAND-OFF*	26.417	102.350	451.290	614.920	0.000	614.920	722.539	475.297	359.301	396.032	1,394.375	4,542.521
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 489

A. Mission Description and Budget Item Justification

The Long Range Standoff (LRSO) Cruise Missile is a long range survivable standoff weapon capable of delivering lethal nuclear effect on strategic targets. LRSO will replace the currently fielded Air Launched Cruise Missile (ALCM) and will be integrated on both legacy and future bomber aircraft. The LRSO weapon system will be capable of penetrating and surviving advanced Integrated Air Defense Systems (IADS) from significant stand-off range to prosecute strategic targets in support of the Air Force's global attack capability and strategic deterrence core function.

Funds may be used to address emerging or short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issues.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver LRSO weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

This program is in Budget Activity 5, System Development and Demonstration (SDD), because it is conducting technology maturation and risk reduction (TMRR) development tasks aimed at meeting validated requirements prior to the engineering & manufacturing phase.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604932F / *Long Range Standoff Weapon*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	95.604	451.290	619.547	0.000	619.547
Current President's Budget	102.350	451.290	614.920	0.000	614.920
Total Adjustments	6.746	0.000	-4.627	0.000	-4.627
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	10.000	0.000			
• SBIR/STTR Transfer	-3.254	0.000			
• Other Adjustments	0.000	0.000	-4.627	0.000	-4.627

Change Summary Explanation

FY17: Below Threshold Reprogrammings totaling $10M; - $3.254M for Small Business Innovative Research (SBIR)
FY19: -$4.627M inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: LRSO Materiel Solution Analysis (MSA) ***Description:*** Conduct LRSO Weapon Milestone A and pre-TMRR activities ***FY 2018 Plans:*** Material solution analysis efforts conclude in FY17. N/A ***FY 2019 Plans:*** Material solution analysis efforts conclude in FY17. N/A	31.083	0.000	0.000
Title: LRSO Weapon Development ***Description:*** Conduct LRSO Weapon Development activities ***FY 2018 Plans:*** Continue Prime TMRR contracts. LRSO will continue to design, develop, integrate and test the LRSO system. System requirements reviews and functional reviews will be conducted to ensure the design adequately meets the warfighter's performance requirements in the draft Capabilities Development Document, System Requirements document, and TMRR	40.000	352.888	560.751

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604932F / *Long Range Standoff Weapon*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
contracts. Robust systems engineering will ensure the USAF owns the technical baseline for requirements traceability as well as reliability, manufacturability, and maintainability. ***FY 2019 Plans:*** Continue Prime TMRR contracts. LRSO will continue to design, develop, integrate and test the LRSO system. System requirements reviews and functional reviews will be conducted to ensure the design adequately meets the warfighter's performance requirements in the draft Capabilities Development Document, System Requirements document, and TMRR contracts. Robust systems engineering will ensure the USAF owns the technical baseline for requirements traceability as well as reliability, manufacturability, and maintainability. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increase due to Technology Maturation and Risk Reduction ramp up.			
Title: All-Up-Round ***Description:*** Conduct All-Up-Round activities to support weapon development ***FY 2018 Plans:*** Continue program practices that ensure the following are met: requirements flow down, requirement allocation to hardware and software, requirements compliance matrix, system performance, reliability, maintainability, product assurance, testability, producibility and supportability. Continue facility and security infrastructure upgrades to enable secure connectivity and communication between Department of Defense (DoD), Department of Energy (DOE), and industry. Continue efforts to conduct parallel development, design, and test activities with the DOE to ensure the LRSO adequately integrates the DOE designed warhead into the system. Continue to perform Aircraft Integration efforts including activities associated with integration on threshold aircraft and aircraft mission planning system upgrades to accommodate the new weapon. Furthermore, these efforts include activities related to weapon design compatibility with both threshold and objective aircraft. Other activities falling under these efforts include: developing mission planning upgrade needs, OFP development and integration to deliver the OFP test tapes, planning activities necessary to integrate LRSO with aircraft using MIL STD 1760D based aircraft/store interface, and ensuring the logical, electrical, and physical interfaces of the LRSO as defined in the ICD. ***FY 2019 Plans:*** Continue program practices that ensure the following are met: requirements flow down, requirement allocation to hardware and software, requirements compliance matrix, system performance, reliability, maintainability, product assurance, testability, producibility and supportability. Continue facility and security infrastructure upgrades to enable secure connectivity and communication between Department of Defense (DoD), Department of Energy (DOE), and industry. Continue efforts to conduct parallel development, design, and test activities with the DOE to ensure the LRSO adequately integrates the DOE designed warhead into the system. Continue to perform Aircraft Integration efforts including activities associated with integration on	14.797	33.685	24.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604932F / *Long Range Standoff Weapon*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
threshold aircraft and aircraft mission planning system upgrades to accommodate the new weapon. Furthermore, these efforts include activities related to weapon design compatibility with both threshold and objective aircraft. Other activities falling under these efforts include: developing mission planning upgrade needs, OFP development and integration to deliver the OFP test tapes, planning activities necessary to integrate LRSO with aircraft using MIL STD 1760D based aircraft/store interface, and ensuring the logical, electrical, and physical interfaces of the LRSO as defined in the ICD. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to Technology Maturation and Risk Reduction focus on other major thrusts.			
Title: Test Support ***Description:*** Conduct Test Support activities to support weapon development ***FY 2018 Plans:*** Continue to perform Test Support efforts, including test activities and support for design validation and verification and nuclear certification, as well as system qualification (includes design and operational certification activities). Furthermore, these efforts will continue test planning and execution activities to support LRSO weapon development, All-Up-Round technical integration, and aircraft integration. ***FY 2019 Plans:*** Continue to perform Test Support efforts, including test activities and support for design validation and verification and nuclear certification, as well as system qualification (includes design and operational certification activities). Furthermore, these efforts will continue test planning and execution activities to support LRSO weapon development, All-Up-Round technical integration, and aircraft integration. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increase due to Technology Maturation and Risk Reduction ramp up.	16.470	64.717	30.169
Accomplishments/Planned Programs Subtotals	102.350	451.290	614.920

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• MILCON PE 0604932: *Long Range Standoff Weapon*	-	38.000	0.000	-	0.000	0.000	0.000	9.628	-	Continuing	Continuing

Remarks

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604932F / *Long Range Standoff Weapon*	

E. Acquisition Strategy

The acquisition strategy focuses on the development and integration of subsystem technologies with a robust reliability and manufacturing approach in a competitive environment. The program obtained a successful MS A decision in July 2016 and subsequently released a Request for Proposals. The program competitively selected two prime contractors in August 2017 to execute a 54-month Technology Maturation and Risk Reduction (TMRR) phase. The selected prime contractors will execute cost-plus-fixed-fee contracts during TMRR with activities focused on developing and maturing subsystem and system designs culminating in a final TMRR design review, delivery of Controlled Test Vehicles and conducting a vehicle configuration audit. A follow-on source selection for Engineering and Manufacturing Development (EMD) and Production phases will be conducted near the end of TMRR to select a single prime contractor to execute the EMD and Production phases of the program.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604932F / *Long Range Standoff Weapon*	**Project (Number/Name)** 657011 / *LONG RANGE STAND-OFF*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Long Range Standoff Weapon Development	C/CPFF	Various : TBD	-	40.000	Aug 2017	331.004	Jan 2018	533.943	Jan 2019	-		533.943	2,328.905	3,233.852	-
		Subtotal	-	40.000		331.004		533.943		-		533.943	2,328.905	3,233.852	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Materiel Solution Analysis Support	Various	Various : TBD	11.384	12.033	Nov 2016	0.000		0.000		-		0.000	0.000	23.417	-
Aircraft Integration Planning	Various	Various : TBD	0.872	6.284	Jan 2017	23.136	Jan 2018	13.454	Jan 2019	-		13.454	347.837	391.583	-
All-Up-Round Activities	Various	Various : TBD	0.000	8.513	May 2017	10.549	Jan 2018	10.546	Jan 2019	-		10.546	90.108	119.716	-
		Subtotal	12.256	26.830		33.685		24.000		-		24.000	437.945	534.716	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Support	Various	Various : TBD	-	16.470	May 2017	64.717	Jan 2018	30.169	Jan 2019	-		30.169	207.900	319.256	-
		Subtotal	-	16.470		64.717		30.169		-		30.169	207.900	319.256	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	Various	Various : TBD	14.161	19.050	Oct 2016	21.884	Oct 2017	26.808	Oct 2018	-		26.808	372.794	454.697	-
		Subtotal	14.161	19.050		21.884		26.808		-		26.808	372.794	454.697	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604932F / *Long Range Standoff Weapon*	**Project (Number/Name)** 657011 / *LONG RANGE STAND-OFF*

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	26.417	102.350		451.290		614.920		-		614.920	3,347.544	4,542.521	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604932F / *Long Range Standoff Weapon*	**Project (Number/Name)** 657011 / *LONG RANGE STAND-OFF*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604932F / *Long Range Standoff Weapon*	**Project (Number/Name)** 657011 / *LONG RANGE STAND-OFF*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Long Range StandOff Weapon				
Materiel Solution Analysis Phase	1	2017	3	2017
Technology Maturation and Risk Reduction Phase	4	2017	2	2022
Technology Maturation and Risk Reduction Contract Award	4	2017	4	2017
Milestone B Decision	2	2022	2	2022
Engineering and Manufacturing Development Phase	2	2022	4	2023
Engineering and Manufacturing Development Contract Award	2	2022	2	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604933F / *ICBM Fuze Modernization*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	342.385	172.946	178.991	172.902	0.000	172.902	161.199	132.926	60.016	2.035	0.000	1,223.400
655082: *ICBM FUZE SUPPORT*	342.385	172.946	178.991	172.902	0.000	172.902	161.199	132.926	60.016	2.035	0.000	1,223.400
Quantity of RDT&E Articles	15	10	7	16	-	16	24	16	-	-		

Program MDAP/MAIS Code: 0498

A. Mission Description and Budget Item Justification

The ICBM Fuze Modernization Program is designing and developing a form, fit and functionally equivalent replacement for the Mk21 fuze. The legacy Mk21 fuze is three times past its design life and ongoing Mk21 fuze refurbishment does not meet Nuclear Weapon Stockpile Plan requirements. The Mk21 Reentry Vehicle and fuze will be deployed on the current Minuteman III (MM III) and future Ground Based Strategic Deterrent (GBSD). Previous plans to integrate and test the Mk21 replacement fuze with the U.S. Department of Energy (DOE) National Nuclear Security Administration (NNSA) W78/88-1 Life Extension Program warhead were deferred.

The US Air Force (USAF) will develop the Mk21 fuze utilizing the NNSA complex consisting of Sandia National Labs-California (SNL-CA), Sandia National Labs-New Mexico (SNL-NM), and Kansas City National Security Campus (KCNSC), formerly Kansas City Plant; as well as a USAF weapons system integration contractor. The ICBM Fuze Modernization program will leverage technologies, parts, components and development/production capabilities resulting from extensive fuze work performed by the US Navy (USN) and NNSA on the Mk5 Alt 370 Fuze program. Common USN & USAF fuze components include the Radar Module (RM), Thermal Battery Assembly (TBA) and Path Length Module (PLM). USN & USAF fuze components that are partially common and use common technologies include the Missile Interface and Controller Module (MICM), Launch Safety Device (LSD), Firing Set Integration Module (FSIM) and Terminal Protection Device (TPD).

The ICBM Fuze Modernization Program will integrate the replacement fuze into MM III weapon system to include, support/test equipment, data, flight test hardware, and training materials. The program will also conduct required system testing (including ground and flight tests). The program is coordinating Mk21 fuze replacement development efforts with the DOE to synchronize USAF arming and fuze development activities with DOE warhead requirements. When prudent, the program will conduct trade studies and initiate conceptual designs to address operational system issues and meet future requirements.

As a cooperative USAF, USN and NNSA acquisition, the USAF is executing the program using Department of Defense (DoD)-DOE Instruction 5030.55 Joint Nuclear Weapons Life Cycle Activities (Phase 6.X process) while meeting Major Defense Acquisition Program (MDAP) statutory requirements.

The FY19 budget request continues cooperative efforts with the USN to leverage common components; continues design efforts for AF unique components; and continues development of lab, ground and flight test assets. This program also includes any needed nuclear surety and certification and system vulnerability assessments.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604933F / *ICBM Fuze Modernization*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver ICBM Fuze weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605833F, and 0605898F.

This program is in Budget Activity 5, System Development and Demonstration (SDD), and continues to execute Phase 6.3 "Development Engineering" of the 6.X process. The program is conducting engineering development tasks aimed at meeting validated requirements prior to Phase 6.4 "Production Engineering", scheduled for FY19 (Objective).

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	189.751	178.991	168.101	0.000	168.101
Current President's Budget	172.946	178.991	172.902	0.000	172.902
Total Adjustments	-16.805	0.000	4.801	0.000	4.801
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-9.999	0.000			
• SBIR/STTR Transfer	-6.806	0.000			
• Other Adjustments	0.000	0.000	4.801	0.000	4.801

Change Summary Explanation

FY17 funding reflects a -$9.999M realignment to higher Air Force priorities.
FY17 funding reflects a -$6.806M adjustment for Small Business Innovative Research (SBIR).
FY19 funding reflects a $4.801M increase to match the updated cost estimate.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Fuze Design and Development	149.620	139.357	128.992
Description: Design and develop the Mk21 fuze required to support the ICBM W87 warhead. Coordinate design and development efforts with the ICBM weapon system integrator and support flight testing.			
FY 2018 Plans: • Continue assessing, testing and qualifying the common components (RM, PLM, TBA) with the unique AF environments to ensure compliance to AF requirements • Accomplish engineering and design work for the AF unique components			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604933F / *ICBM Fuze Modernization*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
• Conduct Design Reviews • Prepare and complete all planning and coordination for Flight Test 1 • Continue to mature surveillance strategy plan in order to finalize the requirements for assessing the aging trends, reliability and service life estimate during fuze operational and sustainment phase • Begin preparations for AFA final design review • Begin flight test planning for Flight Test Unit 2 ***FY 2019 Plans:*** • Continue assessing, testing and qualifying the common components (RM, PLM, TBA) with the unique AF environments to ensure compliance to AF requirements • Continue to refine engineering and design work for the AF unique components • Conduct AF unique component Final Design Reviews • Execute and conduct post test analysis of Flight Test 1 and Ground Test Unit (GTU) 2 • Prepare and complete all planning and coordination for Flight Test 2 • Finalize surveillance and sustainment strategy plans • Continue preparations for AFA Final Design Review • Begin planning for GTU 3 • Conduct Trainer Fuze Final Design Review • Begin AFA Production Process Prove-In • Prepare and conduct Lab Test Unit 3 • Baseline Design Review of JTA4a • Begin preparations for JTA4a developmental flight test ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to ramp down as the program prepares for Production and Deployment			
Title: Weapon System Integration/Systems Engineering ***Description:*** Integrate Mk21 fuze into the MMIII weapon system. Validate designs through ground tests on an Integrated Test Bed (ITB). Plan and conduct necessary ground and flight testing. Coordinate design, development and test efforts. ***FY 2018 Plans:*** • Perform test and integration on Ground Test Unit (GTU) 1 for mechanical environmental, electrical integration, and performance • Perform integration testing of Application Specific Integrated Circuit (ASIC) • Finalize GTU 1 and GTU 1B test data • Analyze test data for continued design confidence	23.326	39.634	43.910

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604933F / *ICBM Fuze Modernization*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
• Provide integration support ***FY 2019 Plans:*** • Perform test and integration on GTU 2 for mechanical environmental, electrical integration, and performance • Conduct 80% In-Process Technical Order Review • Conduct Pathfinder 1 testing • Conduct Electrical Compatibility Test 2 • Provide integration support ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to integration efforts in FY19 as the program executes Flight Test Unit 1.			
Accomplishments/Planned Programs Subtotals	172.946	178.991	172.902

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• MPAF 05 Line Item M30MLG: *Minuteman III Modifications*	-	-	-	-	-	-	-	-	-	0.000	0.000
• MPAF 03 Line Item M30FLH: *ICBM Fuze Mod*	17.095	6.334	19.867	-	19.867	19.497	45.727	100.627	112.433	474.447	796.027

Remarks

Other Program Funding Summary reflects equipment buys in FY15-19 as part of life of type buys, enabling the ICBM Fuze Modernization program to continue leveraging the USN design, development and production activities.

E. Acquisition Strategy

The USAF ICBM Fuze Modernization program is executing a full cost reimbursable Work for Others (WFO) agreement with the NNSA complex using SNL as the design agent and KCNSC as the production agent. The program is a collaborative effort with the USN reducing total program cost and development time by leveraging commonality between the ICBM and Submarine Launched Ballistic Missile fuze components. The USN Mk5 Alt 370 fuze is being developed first, with the USAF Mk21 fuze effort following. The USN Mk5 Alt 370 fuze entered Phase 6.3 Development Engineering in October 2012. USAF Mk21 fuze entered Phase 6.3 in August 2013. Both services participate in all design and development efforts to ensure maximum use of common components, subassemblies and technologies. Both services are using NNSA/SNL to perform fuze design and development. The USAF, as lead systems integrator for the Mk21 fuze, competed a separate Weapon System Integration Contract (WSIC) for integration support to assist the government with MM III unique modifications and fuze integration efforts. Both services are using KCNSC to produce fuzes.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0604933F / *ICBM Fuze Modernization*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0604933F / *ICBM Fuze Modernization*	Project (Number/Name) 655082 / *ICBM FUZE SUPPORT*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fuze Preliminary Design Development	MIPR	Sandia National Labs : Albuquerque, NM	222.866	117.970	Nov 2016	112.447	Nov 2017	100.500	Nov 2018	-		100.500	233.135	786.918	750.625
Fuze EMD	Various	Various : Various	0.660	1.086	Dec 2016	-		1.115	Dec 2018	-		1.115	1.649	4.510	4.510
Fuze Engineering Change Orders	TBD	TBD : TBD	-	-		4.175	May 2018	3.106	May 2019	-		3.106	13.421	20.702	20.702
Fuze National Security Campus (formerly Kansas City Plant)	MIPR	National Security Campus : Kansas City, MO	21.350	31.650	Nov 2016	22.735	Nov 2017	25.386	Nov 2018	-		25.386	42.844	143.965	139.005
Fuze Weapon System Integration - ICBM Prime	C/CPAF	Northrop Grumman : Clearfield, UT	25.937	-		-		-		-		-	0.000	25.937	25.937
Fuze Weapon System Integration - RS/RV Sub-System Contract (SSC)	SS/CPAF	Lockheed Martin : Valley Forge, PA	35.386	17.556	Jan 2017	20.885	Jan 2018	20.407	Jan 2019	-		20.407	0.000	94.234	96.210
Fuze Nuclear Safety Cross-Check Analysis (NSCCA)	TBD	TBD : TBD	-	-		-		-		-		-	7.945	7.945	7.945
		Subtotal	306.199	168.262		160.242		150.514		-		150.514	298.994	1,084.211	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fuze Engineering Support - BAH	C/FP	Booz Allen Hamilton : Clearfield, UT	2.757	-		-		-		-		-	0.000	2.757	2.757
Fuze Engineering Support - BAE	C/FFP	BAE : Clearfield, UT	7.070	2.451	Jul 2017	4.000	Jul 2018	1.843	Jul 2019	-		1.843	30.947	46.311	47.506
		Subtotal	9.827	2.451		4.000		1.843		-		1.843	30.947	49.068	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604933F / *ICBM Fuze Modernization*	**Project (Number/Name)** 655082 / *ICBM FUZE SUPPORT*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fuze Lead Project Office Support	MIPR	AFNWC : Albuquerque, NM	10.480	-		-		-		-		-	0.000	10.480	10.480
Fuze Finite Element Model Validation	C/CPFF	LMTF : Little Mountain, UT	1.843	-		-		-		-		-	0.000	1.843	1.843
Fuze Flight Test Hardware	TBD	TBD : TBD	-	-		-		8.000	Dec 2018	-		8.000	0.000	8.000	8.000
Fuze Flight Test Support and Evaluation	Various	Various : Various	-	0.360	Aug 2017	8.502	Feb 2018	9.208	Feb 2019	-		9.208	18.849	36.919	36.919
		Subtotal	12.323	0.360		8.502		17.208		-		17.208	18.849	57.242	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fuze Cost and Financial Management	C/FFP	Tecolote : Salt Lake City, UT	3.302	0.393	Dec 2016	1.950	Dec 2017	-		-		-	0.000	5.645	5.637
Fuze FFRDC Support	MIPR	Aerospace : Los Angeles, CA	3.590	-		2.100	Dec 2017	-		-		-	0.000	5.690	5.690
Fuze Program Support	C/FFP	BAE : Clearfield, UT	-	0.250	Feb 2017	1.400	Feb 2018	0.816	Jul 2019	-		0.816	3.491	5.957	5.957
Fuze Program Management Administration	Various	Various : Various	7.144	1.230	Mar 2017	0.797	Mar 2018	2.521	Mar 2019	-		2.521	3.895	15.587	15.347
		Subtotal	14.036	1.873		6.247		3.337		-		3.337	7.386	32.879	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	342.385	172.946		178.991		172.902		-		172.902	356.176	1,223.400	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604933F / *ICBM Fuze Modernization*	**Project (Number/Name)** 655082 / *ICBM FUZE SUPPORT*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0604933F / *ICBM Fuze Modernization*	**Project (Number/Name)** 655082 / *ICBM FUZE SUPPORT*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
AF ICBM Fuze Modernization Program				
Phase 6.3 Developmental Engineering	1	2017	1	2019
Phase 6.4 Production Engineering Mk21	2	2019	4	2022
Phase 6.5 Low Scale Production	4	2022	3	2023
Phase 6.6 Full Scale Production	3	2023	4	2023
Baseline Design Review (BDR) (May 2017)	3	2017	3	2017
Final Design Review (FDR) (Dec 2019)	1	2020	1	2020
Complete Engineering Release (Jun 2020)	3	2020	3	2020
Production Readiness Review (Feb 2022)	2	2022	2	2022
First Production Unit (Sep 2022)	4	2022	4	2022
Required Assets Available (Jul 2023)	4	2023	4	2023
Flight Test 1 (Oct 2018)	1	2019	1	2019
Flight Test 2 (Oct 2019)	1	2020	1	2020
Flight Test 3 (Jul 2021)	4	2021	4	2021
Flight Test 4 (Mar 2022)	2	2022	2	2022
Life of Type Buy (LOTB)	1	2017	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605030F / *Joint Tactical Network Center (JTNC)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	1.131	12.736	0.000	0.000	0.000	8.038	8.182	8.353	8.504	Continuing	Continuing
655068: *Joint Tactical Radio System (JTRS)*	-	1.131	12.736	0.000	0.000	0.000	8.038	8.182	8.353	8.504	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Joint Tactical Radio System (JTRS) development program is a joint program managed through the Navy's PEO for Joint Tactical Networks (PEO JTN). The JTN was formed upon the descoping of the Joint Tactical Radio System development program (PE 0604280F). JTN will provide interoperable, secure Joint Tactical Networking applications capable of operating in a variety of radio solutions to maintain and sustain an affordable, government-controlled open architecture, in support of Combatant Commanders', Services' and Coalition mission network requirements. JTN is responsible for the continuous development, delivery, and maintenance of networking waveforms and modified legacy radio waveforms that are Software Communications Architecture (SCA) compliant. SCA compliant waveforms enable interoperability and support Net-Centric operational warfare at sea, in the air and on the ground. Networking waveforms extend the Global Information Grid (GIG) to the first tactical mile and to the warfighter.

The JTN team is responsible for (1) the overall management and oversight of the Waveforms contained in the JTN repository; (2) development, validation, and evolution of a common JTN SCA; (3) development and evolution of waveform software applications for tactical radios; (4) development of software cryptographic algorithms and equipment applications (Information Assurance); (5) development and evolution of the JTN networking and network management software components, Joint Enterprise Network Manager (JENM); (6) testing and certification of JTN waveforms, network services, and network management; and, (7) full lifecycle support of waveforms and networking applications in order to maintain a robust industry base of radio vendors.

The individual services provide 1/3 each of funding to support activities of the JTNC.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605030F / *Joint Tactical Network Center (JTNC)*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	1.131	12.736	8.093	0.000	8.093
Current President's Budget	1.131	12.736	0.000	0.000	0.000
Total Adjustments	0.000	0.000	-8.093	0.000	-8.093
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-8.093	0.000	-8.093

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Joint Tactical Network Center (JNTC)	1.131	12.736	0.000	0.000	0.000
Description: Ensure interoperable, secure, and affordable waveform and wireless communications by recommending standards, conducting compliance and certification analysis in accordance with Department of Defense (DoD) policies and maintaining a DoD Waveform Information Repository (IR) ***FY 2018 Plans:*** Funding provided by the Air Force is being used to support activities of the Joint Tactical Networking Center (JTNC). ***FY 2019 Base Plans:*** Funding provide by the Air Force will be used to support activities of the Joint Tactical Network Center (JTNC) ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased because JTNC support activities cost was reduced					
Accomplishments/Planned Programs Subtotals	1.131	12.736	0.000	0.000	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605030F / *Joint Tactical Network Center (JTNC)*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 03 Line item 837100: *Tactical C-E Equipment*	10.397	6.485	5.955	-	5.955	6.344	6.459	6.575	6.694	Continuing	Continuing

Remarks

E. Acquisition Strategy

The JTNC Budget Item Justification is located in the Navy's FY 2019 President's Budget under Joint Tactical Radio System Program (PE 0605030N, BA 5). The JTRS development program is a joint program managed through the Navy's PEO for Joint Tactical Networks (PEO JTN). The JTN was formed upon the descoping of the Joint Tactical Radio System development program (PE 0604280F) in FY 2012.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605030F / *Joint Tactical Network Center (JTNC)*	**Project (Number/Name)** 655068 / *Joint Tactical Radio System (JTRS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Navy JTRS Development	C/CPAF	TBD : NV	-	1.131	Nov 2016	12.736	Dec 2017	-		-		-	Continuing	Continuing	-
		Subtotal	-	1.131		12.736		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.131		12.736		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605030F / *Joint Tactical Network Center (JTNC)*	**Project (Number/Name)** 655068 / *Joint Tactical Radio System (JTRS)*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
No project title.																												
TBD Navy JTRS Development																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605030F / *Joint Tactical Network Center (JTNC)*	**Project (Number/Name)** 655068 / *Joint Tactical Radio System (JTRS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
No project title.				
TBD Navy JTRS Development	1	2017	4	2022

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605031F / *Joint Tactical Network (JTN)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	9.319	0.000	0.000	0.000	3.676	3.735	3.813	3.883	Continuing	Continuing
655068: *Joint Tactical Radio System (JTRS)*	-	0.000	9.319	0.000	0.000	0.000	3.676	3.735	3.813	3.883	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Joint Tactical Radio System (JTRS) development program is a joint program managed through the Navy's PEO for Joint Tactical Networks (PEO JTN). The JTN was formed upon the descoping of the Joint Tactical Radio System development program (PE 0604280F). JTN will provide interoperable, secure Joint Tactical Networking applications capable of operating in a variety of radio solutions to maintain and sustain an affordable, government-controlled open architecture, in support of Combatant Commanders', Services' and Coalition mission network requirements. JTN is responsible for the continuous development, delivery, and maintenance of networking waveforms and modified legacy radio waveforms that are Software Communications Architecture (SCA) compliant. SCA compliant waveforms enable interoperability and support Net-Centric operational warfare at sea, in the air and on the ground. Networking waveforms extend the Global Information Grid (GIG) to the first tactical mile and to the warfighter.

The JTN team is responsible for (1) the overall management and oversight of the Waveforms contained in the JTN repository; (2) development, validation, and evolution of a common JTN SCA; (3) development and evolution of waveform software applications for tactical radios; (4) development of software cryptographic algorithms and equipment applications (Information Assurance); (5) development and evolution of the JTN networking and network management software components, Joint Enterprise Network Manager (JENM); (6) testing and certification of JTN waveforms, network services, and network management; and, (7) full lifecycle support of waveforms and networking applications in order to maintain a robust industry base of radio vendors.

The individual services provide 1/3 each of funding to support activities of the JTN.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605031F / *Joint Tactical Network (JTN)*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	9.319	3.690	0.000	3.690
Current President's Budget	0.000	9.319	0.000	0.000	0.000
Total Adjustments	0.000	0.000	-3.690	0.000	-3.690
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-3.690	0.000	-3.690

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Joint Tactical Networks (JTN)	-	9.319	0.000	0.000	0.000

Description: The Joint Tactical Radio System (JTRS) development program is a joint program managed through the Navy's PEO for Joint Tactical Networks (PEO JTN). The JTN was formed upon the descoping of the Joint Tactical Radio System development program (PE 0604280F). JTN will provide interoperable, secure Joint Tactical Networking applications capable of operating in a variety of radio solutions to maintain and sustain an affordable, government-controlled open architecture, in support of Combatant Commanders', Services' and Coalition mission network requirements. JTN is responsible for the continuous development, delivery, and maintenance of networking waveforms and modified legacy radio waveforms that are Software Communications Architecture (SCA) compliant. SCA compliant waveforms enable interoperability and support Net-Centric operational warfare at sea, in the air and on the ground. Networking waveforms extend the Global Information Grid (GIG) to the first tactical mile and to the warfighter

FY 2018 Plans:
Funding provided by the Air Force is used to support activities of the Joint Tactical Networking (JTN).

FY 2019 Base Plans:
N/A

FY 2019 OCO Plans:
N/A

FY 2018 to FY 2019 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605031F / *Joint Tactical Network (JTN)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Funding decreased due to annual RMD actions to transfer from the Air Force to Navy.					
Accomplishments/Planned Programs Subtotals	-	9.319	0.000	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 03 837100: *Tactical C-E Equipment*	10.397	6.485	5.913	-	5.913	6.297	6.412	11.487	11.604	Continuing	Continuing

Remarks

E. Acquisition Strategy

The JTRS Budget Item Justification is located in the Navy's FY 2019 President's Budget under Joint Tactical Radio System Program (PE 0605031N, BA 5). The JTRS development program is a joint program managed through the Navy's PEO for Joint Tactical Networks (PEO JTN). The JTN was formed upon the descoping of the Joint Tactical Radio System development program (PE 0604280F) in FY 2012.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605031F / *Joint Tactical Network (JTN)*	**Project (Number/Name)** 655068 / *Joint Tactical Radio System (JTRS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Joint Tactical Networks	C/CPAF	TBD : NV	-	-		9.319	Apr 2018	-		-		-	Continuing	Continuing	-
		Subtotal	-	-		9.319		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		9.319		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605031F / *Joint Tactical Network (JTN)*	**Project (Number/Name)** 655068 / *Joint Tactical Radio System (JTRS)*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Joint Tactical Network																												
Joint Tactical Network (JTN)																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605031F / *Joint Tactical Network (JTN)*	**Project (Number/Name)** 655068 / *Joint Tactical Radio System (JTRS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Joint Tactical Network				
Joint Tactical Network (JTN)	3	2018	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605213F / *F-22 Modernization Increment 3.2B*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	470.897	67.717	13.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	552.214
654785: *F-22 INCREMENT 3.2B*	470.897	67.717	13.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	552.214
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 474

Note

All Increment 3.2B efforts and associated funding prior to FY 2013 are included in the F-22A Squadrons budget documentation, PE 0207138F and other outside funding Program Elements (PE). Prior year funding includes: PE 0207138F (FY 2004-FY 2012) $422.4M; PE 0207163F (FY 2010-FY 2013) $39.8M; PE 0207445F (FY 2007-FY 2010) $39.6M; PE 0200001F (FY 2007) $32.9M

A. Mission Description and Budget Item Justification

Increment 3.2B will integrate the newest air-to-air intercept missiles (i.e., AIM-9X and AIM-120D), further improve the Electronic Protection (EP) capability over Increment 3.2A, and enhance the F-22's geolocation capability from the Increment 3.1 baseline with the addition of Geolocation 2. Increment 3.2B will include the Enhanced Stores Management System (ESMS), as well as Common Weapon Engagement Zone (WEZ), and an Intra-Flight Datalink (IFDL) improvement to increase IFDL bandwidth and enable cooperative functions required to realize Increment 3.2B capabilities.

Increment 3.2B will develop, certify and integrate a new platform operational flight program to ensure the system interoperability and performance of all increment-level developments.

The development program includes development, studies, and analysis to enhance the air vehicle and training system to improve/enhance F-22 weapons, communications, Electronic Warfare, and Intelligence Surveillance Reconnaissance (ISR) capabilities.

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill Federal Aviation Administration (FAA) or other mandates necessary to ensure continued aircrew safety and mission effectiveness. Additionally, this program element may include necessary civilian pay expenses required to manage, execute, and deliver F-22 weapon system capability.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver F-22 Increment 3.2B weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

BA5 - This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has pass Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605213F / *F-22 Modernization Increment 3.2B*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	70.290	13.600	0.000	0.000	0.000
Current President's Budget	67.717	13.600	0.000	0.000	0.000
Total Adjustments	-2.573	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.573	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

FY17 reduction of -$2.573M for Small Business Innovative Research (SBIR)

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: F-22 Increment 3.2B	38.707	1.148	0.000
Description: The F-22 Increment 3.2B Modernization Program consists of the studies, analysis, demonstrations, and hardware/software development necessary to provide Intra-Flight Data Link improvements, Electronic Protection, AIM-9X and AIM-120D integration with Common Weapon Engagement Zone, Geolocate 2.0 and Stores Management System Common Split Bus. The Enhanced Stores Management System (ESMS) program is a hardware development program required to integrate any new weapons on the F-22 beyond Increment 3.1. Includes mission support of the F-22 Program Office: travel, computer costs, and other miscellaneous contract support. ***FY 2018 Plans:*** F-22 Increment 3.2B will complete its software development, coding integration, and testing. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** n/a			
Title: Combined Test Force (CTF)	21.100	12.452	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605213F / *F-22 Modernization Increment 3.2B*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: The F-22 Combined Test Force (CTF), located at Edwards Air Force Base, conducts testing to assess performance and military utility of Increment 3.2B. The CTF uses operationally relevant ground and flight test scenarios to identify Increment 3.2B performance deficiencies. This funds Inc 3.2B unique test costs. ***FY 2018 Plans:*** The CTF will complete final developmental flight test for Increment 3.2B Flight Test execution. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A			
Title: Lab Test & Operations ***Description:*** Increment 3.2B Lab Test & Operations plans and conducts system integration and testing of software builds within the suite of F-22 system integration laboratories: the Agile Integration Lab (AIL); the Raptor Integration Lab (RaIL); the Air Combat Simulation (ACS) Lab; the Vehicle Management System (VMS); Vehicle Integration Facility (VIF); and the Vehicle System Simulator (VSS). ***FY 2018 Plans:*** N/A ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	7.910	0.000	0.000
Accomplishments/Planned Programs Subtotals	67.717	13.600	0.000

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 07 PE 0207138F: *F-22A Squadrons, RDT&E**	286.270	413.149	315.587	-	315.587	423.296	485.152	476.668	-	Continuing	Continuing
• APAF 05 Line Item F2232B: *Increment 3.2B***	78.410	105.756	13.081	-	13.081	20.373	6.013	-	-	0.000	340.617

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605213F / *F-22 Modernization Increment 3.2B*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APAF 05 Line Item F02200: *F-22A****	163.008	176.630	257.891	-	257.891	257.310	347.665	457.265	-	Continuing	Continuing
• APAF 000999: *Initial Spares*	4.431	7.732	0.000	-	0.000	0.000	-	-	-	0.000	14.973
• RDTE 07 PE 0207163F: *AIM-120D, AMRAAM T&E, RDT&E*****	-	-	0.000	-	0.000	0.000	0.000	-	-	0.000	50.450

Remarks

NOTES:

*F-22A Squadrons, RDT&E/PE 0207138F includes F-22A Squadrons modernization and development. Both PEs 0207138F and 0605213F share lab and Combined OTF Test Force infrastructure support costs across the F-22 enterprise.

**Increment 3.2B, APAF/PE 0207138F, F2232B includes BP11 (Aircraft Modifications) for Increment 3.2B only.

***F-22A Squadrons, APAF/PE 0207138F, F02200 includes BPs 11 (Aircraft Modifications), 13 (Post-Production Support), 16 (Initial Spares), and 19 (Depot Activation) for F-22 Squadrons only.

****AIM-120D, AMRAAM RDT&E/PE 0207163F, funding provides for the AIM-120D development as a part of the F-22 Increment 3.2B effort.

E. Acquisition Strategy

The Raptor Enhancement Development & Integration II (REDI II) contract is an Indefinite Delivery/Indefinite Quantity Ordering (ID/IQ) contract that maximizes flexibility to start, stop, accelerate and decelerate projects as required. The REDI II contract is a follow-on to the initial REDI contract. REDI II provides maximum flexibility to manage various modernization projects. The REDI II contract allows for the issuance of orders for efforts associated with the planning, analysis, design, development, qualification, test and documentation of F-22 weapon system performance enhancements, life-cycle improvements, Operational Flight Program (OFP) upgrades, and associated efforts essential to accomplishing the F-22 mission.

Overall the F-22 program is managed with the F-22 SPO leveraging Department of Defense and Air Force guidance and policies to evaluate impacts to performance, schedule, and cost, working closely with key stakeholders to affirm the baseline schedule supporting the initial Increment 3.2B program Initial Operational Capability (IOC) in FY 2019. The F-22 SPO, prime contractors, supporting program offices, and Air Combat Command (ACC) are key stakeholders in risk management.

The F-22 program is transitioning to organic management of major sustainment functions to include: customer services, field support, and fleet management.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605213F / *F-22 Modernization Increment 3.2B*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605213F / *F-22 Modernization Increment 3.2B*	**Project (Number/Name)** 654785 / *F-22 INCREMENT 3.2B*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Increment 3.2B	Various	Lockheed Martin : Ft. Worth, TX	445.607	38.707	Nov 2016	1.148	Nov 2017	-		-		-	0.000	485.462	488.035
		Subtotal	445.607	38.707		1.148		-		-		-	0.000	485.462	N/A

Remarks

Target Value of Contract includes only active REDI/REDI II delivery orders DO 0070, DO 0071, and DO 0004. Target Value of Contract and Total cost do not match due to prior year costs executed in F-22 Squadrons PE 0207138F and other outside funded PE's as documented in the R-2A.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Combined Test Force	Various	Various : Various	25.290	21.100	Dec 2016	12.452	Oct 2017	-		-		-	0.000	58.842	-
Laboratory Test Operations	SS/ Various	Lockheed Martin : Fort Worth, TX	-	7.910	Dec 2016	-		-		-		-	0.000	7.910	-
		Subtotal	25.290	29.010		12.452		-		-		-	0.000	66.752	N/A

Remarks

FY12 and prior year costs for Increment 3.2B are shown under PE 0207138F. FY13 and later are shown under PE 0605213F.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	470.897	67.717		13.600		-		-		-	0.000	552.214	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605213F / *F-22 Modernization Increment 3.2B*	**Project (Number/Name)** 654785 / *F-22 INCREMENT 3.2B*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
F-22 Increment 3.2B																												
FY17: Continue to develop software capabilities, fix software related issues, and perform ground lab tests to support Developmental Test & Operational Test																												
FY18: Continue to resolve software relates issues, complete Air Combat Simulation accreditation, perform live fire and weapons flight tests for Operational Test																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605213F / *F-22 Modernization Increment 3.2B*	**Project (Number/Name)** 654785 / *F-22 INCREMENT 3.2B*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
F-22 Increment 3.2B				
FY17: Continue to develop software capabilities, fix software related issues, and perform ground lab tests to support Developmental Test & Operational Test	1	2017	3	2017
FY18: Continue to resolve software relates issues, complete Air Combat Simulation accreditation, perform live fire and weapons flight tests for Operational Test	4	2017	3	2018

Note

~ Increment 3.2B efforts funded prior to FY13 are reflected in the F-22A Sqadrons documentation, PE 0207138F.

~ Increment 3.2B HW Development/Risk Reduction/Lab Equipment began FY2006.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605214F / *Ground Attack Weapons Fuze Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.903	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
655313: *Hard Target Void Sensing Fuze*	-	0.903	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program was created to include the whole spectrum of general purpose and specialized fuze development and integration of advanced precision, navigation, and timing (PNT) capabilities (i.e., GPS, non-GPS, optical, passive, active, etc.), resulting in commodity fuzes for use with air-to-ground weapons.

The Hard Target Void Sensing Fuze (HTVSF) is an advanced system designed to provide fuzing and void sensing functions for legacy and advanced penetrator weapons to destroy hardened targets protected by multiple layers of soil and/or reinforced concrete. The HTVSF will also provide in-flight cockpit programmability, safing and arming, multi- function (time delay and void sensing) and multi-delay arming. Program Element funding currently supports the Engineering, Manufacturing, and Development (EMD) effort for HTVSF.

HTVSF completed Milestone C in May 2015, Low-Rate Initial Production (LRIP 1) was awarded in Jul 2015, Low-Rate Initial Production (LRIP II) was awarded in Sept 2016, and Full Rate Production (FRP) is projected to award in Sept 2017. EMD funding is currently needed in FY16-FY17 to complete BLU-109/113 follow-on testing and post-Milestone C development requirements as derived from the Milestone C Decision.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver HTVSF weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F,0605832F,and 0605898F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605214F / *Ground Attack Weapons Fuze Development*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.937	0.000	0.000	0.000	0.000
Current President's Budget	0.903	0.000	0.000	0.000	0.000
Total Adjustments	-0.034	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.034	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

No Significant Program Changes

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: HTVSF Test Support	0.903	0.000	0.000	0.000	0.000
Description: BLU-113 follow-on testing; post-Milestone C (MS C) development.					
FY 2018 Plans: N/A					
FY 2019 Base Plans: N/A					
FY 2019 OCO Plans: N/A					
FY 2018 to FY 2019 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	0.903	0.000	0.000	0.000	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605214F / *Ground Attack Weapons Fuze Development*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• PAAF 01 Line Item 356120: *Fuzes*	22.243	31.537	0.000	44.000	44.000	0.000	0.000	-	-	0.000	97.780

Remarks

- Navy PE 050120 to fund 50/450 units FY15 and FY17.

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605214F / *Ground Attack Weapons Fuze Development*	**Project (Number/Name)** 655313 / *Hard Target Void Sensing Fuze*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Target build and sled/flight test	Various	Eglin AFB (96 TW) / Holloman AFB / White Sands Missile Range : Various	-	0.903	Sep 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	0.903		-		-		-		-	Continuing	Continuing	N/A

Remarks

Various locations to include: Eglin AFB, Fort Walton Beach FL: Holloman AFB, Alamogordo NM; White Sands Missile Range, Las Cruces NM.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.903		0.000		-		-		-	Continuing	Continuing	N/A

Remarks

HTVSF Completed Milestone C in Apr 2015 and Low-Rate Initial Production (LRIP) was awarded in Jul 2015. $3.598M in FY16 EMD funding and $.937M in FY17 funding is needed to complete BLU-113 follow-on testing and post Milestone C development requirements as derived from the Milestone C Decision.

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605214F / *Ground Attack Weapons Fuze Development*	**Project (Number/Name)** 655313 / *Hard Target Void Sensing Fuze*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
HTVSF																												
Follow-on Testing/Development																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605214F / *Ground Attack Weapons Fuze Development*	**Project (Number/Name)** 655313 / *Hard Target Void Sensing Fuze*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
HTVSF				
Follow-on Testing/Development	1	2017	4	2017

Note

HTVSF Completed Milestone C in Apr 2015 and Low-Rate Initial Production 2 (LRIP) was awarded in Sep 2016. $.937M in FY17 funding is needed to complete BLU-/113 follow-on testing and post Milestone C development requirements as derived from the Milestone C Decision.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	5,380.881	211.509	93.845	88.170	0.000	88.170	79.722	20.660	13.419	13.662	0.000	5,901.868
651120: *Pegasus Capability Improvements*	0.000	0.000	0.000	13.503	0.000	13.503	15.074	0.000	0.000	0.000	0.000	28.577
655271: *KC-46 RDT&E*	5,380.881	211.509	93.845	74.667	0.000	74.667	64.648	20.660	13.419	13.662	0.000	5,873.291

Program MDAP/MAIS Code: 387

Note

This program, BA 5, PE 0605221F, project 651120, Avionics Enhancements, is a new start.

A. Mission Description and Budget Item Justification

Replacement of the legacy tanker fleet will take place in several stages. The initial tanker replacement increment of KC-46s will replace roughly a third of the current capability. Future programs will ultimately recapitalize the entire tanker fleet over a period of more than 30 years. The Air Force completed an Analysis of Alternatives (AoA) in Apr 2006 to determine the most appropriate strategy to recapitalize the aging fleet of aerial refueling aircraft. Based on this analysis, the Air Force concluded a strategy of full and open competition to select a commercial derivative replacement tanker aircraft would result in a best value tanker contract. To initiate the first phase of the tanker replacement, the KC-46 program released a final Request for Proposal (RFP) on 24 Feb 2010, and entered source selection on 9 Jul 2010. The KC-46 program held a Milestone B (MS B) Defense Acquisition Board (DAB) on 23 Feb 2011, received approval to enter Engineering and Manufacturing Development (EMD) from the Undersecretary of Defense (Acquisition, Technology and Logistics) (USD(AT&L)) on 24 Feb 2011, and awarded the KC-46 EMD contract to Boeing on 24 Feb 2011 to develop and procure 179 KC-46 aircraft. The program is procuring four RDT&E aircraft for integration and demonstration of capability which will ultimately be operationally fielded. During production, the program plans to procure 175 aircraft throughout 13 lots. The KC-46 program held a MS C DAB on 12 Aug 2016 and received approval to enter Low Rate Initial Production (LRIP). The program awarded LRIP Lots 1 and 2 on 18 Aug 2016 and LRIP Lot 3 on 27 Jan 2017, totaling 34 aircraft. KC-46 funding also supports Training Systems, Direct Mission Support, Program Management Administration (PMA) activities, government developmental and operational test support, mission planning capability development, various studies and analyses, engineering changes, and future tanker replacement planning activities.

The KC-46 will provide the capability to fuel joint and coalition receivers via a boom or drogue system on every mission and will also augment the airlift fleet with cargo, passenger, and aeromedical evacuation capabilities. The KC-46 will operate in day/night and adverse weather conditions to enable deployment, employment, sustainment, and redeployment of U.S. joint, allied, and coalition forces. The KC-46 will have communication, navigation, and surveillance equipment for worldwide operations; the capability to perform missions in chemical and biological environments; the ability to operate in up to medium threat environments with self-defense/ protection (both active and passive) capabilities; and the necessary battlespace awareness to mitigate survivability threats.

The Aircrew Training System (ATS) and the Maintenance Training System (MTS) are being developed and procured using KC-46 funding. The ATS contract was awarded on 1 May 2013 to FlightSafety Services Corporation. The ATS contract will provide Aircrew Training Devices (ATDs), to include Weapon System Trainers (WSTs), Boom Operator Trainers (BOTs), Fuselage Trainers (FuTs), and Part-Task Trainers (PTTs) at each Main Operating Base (MOB) and the Formal Training Unit

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*

(FTU). The ATS contract will also support Distributed Mission Operations (DMO), provide aircrew instruction, develop courseware, provide logistics support, acquire a technical data package to support future competition efforts, and manage training device concurrency with the aircraft.

The MTS contract was awarded 6 Jul 2016 to The Boeing Company. The MTS acquisition focuses on designing, developing, testing, producing, and fielding an optimized training system for KC-46 maintainers by integrating various forms of training media and Maintenance Training Devices (MTDs) into a "blended" solution. This blended solution includes the appropriate mix of hardware and software, "high-fidelity" Augmented Hardware Training Devices (AHTDs), PTTs, Interactive Multimedia Instruction (IMI), and emerging technologies to meet validated Air Mobility Command (AMC) maintenance training requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver KC-46 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

This program is in Budget Activity 05, System Development and Demonstration (SDD), because it passed MS C approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	261.724	93.845	47.740	0.000	47.740
Current President's Budget	211.509	93.845	88.170	0.000	88.170
Total Adjustments	-50.215	0.000	40.430	0.000	40.430
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	-31.800	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-10.000	0.000			
• SBIR/STTR Transfer	-8.415	0.000			
• Other Adjustments	0.000	0.000	40.430	0.000	40.430

Change Summary Explanation

The FY 2017 budget authority reflects a Congressional rescission of $31.8M, Reprogramming actions of $10.0M, and Small Business Innovation Research (SBIR) amount of $8.4M.

The FY 2019 budget authority reflects $41.1M Zero Balance Transfer (ZBT) from KC-46 Procurement and -$0.5M non-pay/non-fuel inflation adjustment.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600 / 5					R-1 Program Element (Number/Name) PE 0605221F / *KC-46*				Project (Number/Name) 651120 / *Pegasus Capability Improvements*			
COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
651120: *Pegasus Capability Improvements*	0.000	0.000	0.000	13.503	0.000	13.503	15.074	0.000	0.000	0.000	0.000	28.577
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 0605221F, project 651120, Avionics Enhancements, is a new start.

A. Mission Description and Budget Item Justification

The KC-46 will provide the capability to fuel joint and coalition receivers via a boom or drogue system on every mission and will also augment the airlift fleet with cargo, passenger, and aeromedical evacuation capabilities. The KC-46 will operate in day/night and adverse weather conditions to enable deployment, employment, sustainment, and redeployment of U.S. joint, allied, and coalition forces. The KC-46 will have communication, navigation, and surveillance equipment for worldwide operations; the capability to perform missions in chemical and biological environments; the ability to operate in up to medium threat environments with self-defense/ protection (both active and passive) capabilities; and the necessary battlespace awareness to mitigate survivability threats.

The dynamics and mission urgency of the post-production environment requires the program to maintain flexible and responsive posture to support a broad range of mission support needs. The KC-46 will continue to identify, design, develop, integrate, verify, certify, produce, install, field, and sustain a comprehensive range of non-recurring and recurring post-production, air vehicle enhancements and field support needs. These needs may originate from programmed Mobility Air Force (MAF) requirements, Combatant Commander Joint or Urgent Operational Needs (JUON/UON), non-programmed Federal Aviation Administration (FAA) directives, requirements identified and supported by HHQ Enterprise Capability Collaboration Teams (i.e. High Value Airborne Asset [HVAA], Air Superiority 2030, and Multi-Domain Command and Control [MDC2]), or correction of deficiency reports.

The KC-46 will continue to develop, field, and sustain warfighter capabilities to meet evolving threats and mission support requirements through Block or discrete modification or modernization programs depending on mission urgency, available funding, and programmatic and technical risks. Post-production requirements can include, but will not be limited to, avionics and structural systems/ architecture and subsystem updates, general mission equipment updates and procurement, general sustainment support, studies and analyses, and correction of field deficiencies.

Public Law 111-383 (7 JAN 2011) and CJCSI 6130.01E states no funds maybe be obligated or expended to purchase user equipment for the Global Position System during the fiscal years after fiscal year 2017 unless the equipment is capable of receiving military code from the Global Positioning System. To comply, KC-46 plans to replace the current GPS receiver to provide M-Code capability.

Project 651120 funding will also support Program Management Administration (PMA) activities, test support, mission planning capability development and various studies and analyses.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 651120 / *Pegasus Capability Improvements*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Avionics Enhancements ***Description:*** Advanced Communication Enhancements ***FY 2019 Plans:*** Upgrades to communication avionics capabilities to include but not limited to Multifunctional Information Distribution Systems (MIDS), Beyond Line-of Sight (BLOS/LOS) enabled through MUOS and SATURN ARC-210 capabilities, and Communications Gateway Enhancements. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The FY19 PB is the first year of funding for Pegasus Capability Improvements.	-	-	13.403
Title: Support ***Description:*** Studies and analysis to support planning activities for future initiatives for upgrades and miscellaneous Program Office support and planning. Also includes requirements such as travel and training. ***FY 2019 Plans:*** Program Office Support and Planning. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The FY19 PB is the first year of funding for Pegasus Capability Improvements.	-	-	0.100
Accomplishments/Planned Programs Subtotals	-	-	13.503

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APAF 05 41221F/ KC046A: *KC-46A Tanker*	-	6.213	8.547	-	8.547	39.394	71.694	85.541	88.749	Continuing	Continuing

Remarks

D. Acquisition Strategy

The KC-46 Post-Production Change Management (PPCM) construct is comprised of processes and tools, specifically tailored to a broad spectrum of post-production requirements. PPCM is designed to leverage competition as applicable, and emphasize configuration management and discrete cost accounting methodologies. KC-46 PPCM oversight will promote competition throughout the life cycle of the KC-46A fleet. All KC-46 post-production requirements and associated acquisition strategies will be carefully managed, reviewed, and approved at the appropriate levels by the KC-46 Division and/or Tanker Directorate senior functional leaders. PPCM requirements will employ multiple contract-types, tailored to the requirement and documented in discrete Acquisition Strategy Panel briefings, to minimize cost, technical,

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 651120 / *Pegasus Capability Improvements*

and schedule execution risks and ensure on-time deliverables. In addition, all ACAT-level programs, deriving from the PPCM process, will follow Department of Defense (DoD) Directive 5000.01 and DoD Instruction 5000.02 guidelines and directives, as applicable, to ensure management controls--commensurate with the scope and cost of the supported requirement.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 651120 / *Pegasus Capability Improvements*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Capability Upgrades (to include modification and modernization)	C/CPFF	TBD : TBD	-	-		-		13.403	Jun 2019	-		13.403	Continuing	Continuing	-
		Subtotal	-	-		-		13.403		-		13.403	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration - Support	Various	Not specified. : TBD	-	-		-		0.100	Jan 2019	-		0.100	Continuing	Continuing	-
		Subtotal	-	-		-		0.100		-		0.100	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		13.503		-		13.503	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 651120 / *Pegasus Capability Improvements*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Pegasus Capability Improvements																												
Avionics Enhancements Contract Award																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 651120 / *Pegasus Capability Improvements*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Pegasus Capability Improvements				
Avionics Enhancements Contract Award	3	2019	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600 / 5					R-1 Program Element (Number/Name) PE 0605221F / *KC-46*				Project (Number/Name) 655271 / *KC-46 RDT&E*			
COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
655271: *KC-46 RDT&E*	5,380.881	211.509	93.845	74.667	0.000	74.667	64.648	20.660	13.419	13.662	0.000	5,873.291
Quantity of RDT&E Articles	4	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Replacement of the legacy tanker fleet will take place in several stages. The initial tanker replacement increment of KC-46s will replace roughly a third of the current capability. Future programs will ultimately recapitalize the entire tanker fleet over a period of more than 30 years. The Air Force completed an Analysis of Alternatives (AoA) in Apr 2006 to determine the most appropriate strategy to recapitalize the aging fleet of aerial refueling aircraft. Based on this analysis, the Air Force concluded a strategy of full and open competition to select a commercial derivative replacement tanker aircraft would result in a best value tanker contract. To initiate the first phase of the tanker replacement, the KC-46 program released a final Request for Proposal (RFP) on 24 Feb 2010, and entered source selection on 9 Jul 2010. The KC-46 program held a Milestone B (MS B) Defense Acquisition Board (DAB) on 23 Feb 2011, received approval to enter Engineering and Manufacturing Development (EMD) from the Undersecretary of Defense (Acquisition, Technology and Logistics) (USD(AT&L)) on 24 Feb 2011, and awarded the KC-46 EMD contract to Boeing on 24 Feb 2011 to develop and procure 179 KC-46 aircraft. The program is procuring four RDT&E aircraft for integration and demonstration of capability which will ultimately be operationally fielded. During production, the program plans to procure 175 aircraft throughout 13 lots. The KC-46 program held a MS C DAB on 12 Aug 2016 and received approval to enter Low Rate Initial Production (LRIP). The program awarded LRIP Lots 1 and 2 on 18 Aug 2016 and LRIP Lot 3 on 27 Jan 2017, totaling 34 aircraft. KC-46 funding also supports Training Systems, Direct Mission Support, Program Management Administration (PMA) activities, government developmental and operational test support, mission planning capability development, various studies and analyses, engineering changes, and future tanker replacement planning activities.

The KC-46 will provide the capability to fuel joint and coalition receivers via a boom or drogue system on every mission and will also augment the airlift fleet with cargo, passenger, and aeromedical evacuation capabilities. The KC-46 will operate in day/night and adverse weather conditions to enable deployment, employment, sustainment, and redeployment of U.S. joint, allied, and coalition forces. The KC-46 will have communication, navigation, and surveillance equipment for worldwide operations; the capability to perform missions in chemical and biological environments; the ability to operate in up to medium threat environments with self-defense/ protection (both active and passive) capabilities; and the necessary battlespace awareness to mitigate survivability threats.

The Aircrew Training System (ATS) and the Maintenance Training System (MTS) are being developed and procured using KC-46 funding. The ATS contract was awarded on 1 May 2013 to FlightSafety Services Corporation. The ATS contract will provide Aircrew Training Devices (ATDs), to include Weapon System Trainers (WSTs), Boom Operator Trainers (BOTs), Fuselage Trainers (FuTs), and Part-Task Trainers (PTTs) at each Main Operating Base (MOB) and the Formal Training Unit (FTU). The ATS contract will also support Distributed Mission Operations (DMO), provide aircrew instruction, develop courseware, provide logistics support, acquire a technical data package to support future competition efforts, and manage training device concurrency with the aircraft.

The MTS contract was awarded 6 Jul 2016 to The Boeing Company. The MTS acquisition focuses on designing, developing, testing, producing, and fielding an optimized training system for KC-46 maintainers by integrating various forms of training media and Maintenance Training Devices (MTDs) into a "blended" solution. This blended solution includes the appropriate mix of hardware and software, "high-fidelity" Augmented Hardware Training Devices (AHTDs), PTTs, Interactive Multimedia Instruction (IMI), and emerging technologies to meet validated Air Mobility Command (AMC) maintenance training requirements.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 655271 / *KC-46 RDT&E*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: KC-46 Aircraft Product Development ***Description:*** EMD activities will be conducted to include the following types of activities: develop a commercial 767-2C aircraft upon which the KC-46 is based; develop the KC-46 military capability and integrate it into the aircraft; build four EMD aircraft; procure live fire assets; procure required Government Furnished Equipment (GFE); procure simulator and maintenance data; develop technical manuals and Type 1 training; and conduct development and operational testing. ***FY 2018 Plans:*** Support start of Initial Operational Test and Evaluation (IOT&E). Complete certification/qualification ground and flight testing and IOT&E. ***FY 2019 Plans:*** Complete certification/qualification ground and flight testing and IOT&E. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to completion of various contract studies.	55.994	21.866	13.461
Title: KC-46 Trainer Product Development - Aircrew Training System (ATS) ***Description:*** Trainer development activities will be conducted to include the following types of activities: development and procurement of ATDs, courseware, and associated support equipment. ***FY 2018 Plans:*** Achieve Ready for Training (RFT) at Altus and McConnell Air Force Bases (AFBs). Complete final system level CDR for Increment 2. Complete software integration of all appropriate ATDs. Complete Increment 2 CBT/IBT courseware development. ***FY 2019 Plans:*** The FY18 PB approved budget position for ATS increased slightly to fund contract to ceiling and associated test support in the FY19 PB.	1.362	0.000	0.000
Title: KC-46 Support ***Description:*** Development, integration, and demonstration of the KC-46 mission planning capability. In addition, studies and analysis to support planning activities for future efficiency initiatives, business case analyses, future tanker replacement planning, and miscellaneous Program Office support and planning. Also includes requirements such as travel, office supplies, training courses, and service contracts. ***FY 2018 Plans:***	43.283	24.555	5.624

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 655271 / *KC-46 RDT&E*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Complete Mission Planning Environment (MPE) maintenance and updates through IOT&E. Continue program support. ***FY 2019 Plans:*** Continue Program Office Support and Planning. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to program office support transitioning to Production.			
Title: KC-46 Test & Evaluation ***Description:*** Test & Evaluation (T&E) activities will be conducted to include the following types of activities: Development Test & Evaluation, Operational Test & Evaluation, Tanker Qualification, Receiver Certifications, Live Fire Test & Evaluation (LFT&E), Federal Aviation Administration (FAA) support, and other test planning and organizational support. ***FY 2018 Plans:*** Continue T&E activities using EMD, pre-delivery production, and/or LRIP aircraft to support airworthiness certification, specification compliance, and military utility evaluations. Complete planning and preparations for IOT&E. Continue AR tanker-receiver certification testing and begin IOT&E. ***FY 2019 Plans:*** Continue using EMD, pre-delivery production, and/or LRIP aircraft to support AR tanker-receiver certification testing, initial Aerial Refueling Simulator Qualifications data collection, and other T&E activities for the KC-46. Complete IOT&E in support of the Full Rate Production decision. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased due to schedule changes and extending Government test support.	21.069	47.424	55.582
Title: Adjustments not yet reflected in FY19 PB ***Description:*** $85.0M of program Budget Authority withdrawn pending rescission in the FY 2018 Appropriation. In addition, the Program Office has identified a $4.801M source for a AF reprogramming action. ***FY 2018 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	89.801	0.000	-
Accomplishments/Planned Programs Subtotals	211.509	93.845	74.667

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 655271 / *KC-46 RDT&E*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APAF 02 Line Item KC046A: *KC-46A Tanker*	2,567.191	2,545.674	2,559.911	-	2,559.911	2,855.685	2,946.218	2,794.926	2,829.095	9,519.362	28,618.062
• APAF 06 Line Item 000999: *Initial Spares*	322.383	413.373	365.028	-	365.028	240.623	128.421	216.556	252.178	858.284	2,796.846

Remarks

D. Acquisition Strategy

The KC-46 Program acquisition strategy is to procure an existing commercial, FAA certified aircraft modified to meet USAF requirements. The KC-46 program released a final RFP on 24 Feb 2010, and entered source selection on 9 Jul 2010. The KC-46 program held a MS B DAB on 23 Feb 2011, received approval to enter EMD from the USD(AT&L) on 24 Feb 2011, and awarded the KC-46 contract to Boeing on 24 Feb 2011 to develop and procure 179 KC-46 aircraft. The KC-46 contract procurement was conducted via a full and open competition per Federal Acquisition Regulation (FAR) Part 15, and resulted in a FY 2011 EMD Fixed Price Incentive Firm (FPIF) contract. The EMD phase will develop, build, and test four KC-46 aircraft, and will qualify the KC-46 as a tanker and certify pairings with receiver aircraft.

The MS B acquisition strategy planned for two LRIP lots followed by 11 Full Rate Production (FRP) lots for a total aircraft procurement of 175 production aircraft. An update to the acquisition strategy occurred in support of Milestone C (MS C) that increased LRIP from two to five lots and the remaining eight to be FRP lots with the total aircraft buy remaining at 175 Production aircraft (+4 EMD aircraft, with a grand total of 179 aircraft).

LRIP began with two Firm Fixed Price (FFP) and two FFP Not to Exceed (NTE) options (LRIP-1 Qty 7, LRIP-2 Qty 12, LRIP-3 Qty 15, and LRIP-4 Qty 15) followed by nine FFP FRP options [via NTE values + Economic Price Adjustment (EPA)]. LRIP Lots 1 and 2 were awarded on 18 Aug 2016 and LRIP Lot 3 was awarded on 27 Jan 2017. The FRP options will be exercised following successful completion of IOT&E.

The ATS acquisition strategy is to provide ATDs, and associated support structure, to each MOB and the FTU. The ATS contract was awarded on 1 May 2013 to FlightSafety Services Corporation. The ATS contract procurement was conducted via a full and open competition per FAR Part 15, and resulted in an FY 2013 EMD FPIF contract. The ATS EMD phase will develop and procure ATDs; and will be supported with courseware, Training System Support Center, the technical data package, and support equipment to ensure system availability and concurrency with the aircraft. The ATS initial production options were exercised in Aug 2015.

The MTS acquisition strategy is to acquire MTDs, and associated support structure, for two AMC active duty Regional Maintenance Training Facilities. The MTS contract was awarded 6 Jul 2016 to The Boeing Company. The MTS procurement was conducted via a full and open competition per FAR Part 15, and resulted in an FY 2016 EMD FFP contract. The MTS EMD phase will develop and procure MTDs; and will be supported with courseware, Training System Support Center, the technical data package, and support equipment to ensure system availability and concurrency with the aircraft.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 655271 / *KC-46 RDT&E*

The KC-46 Program is responsible for the development, testing, and production of a drogue-equipped, wing-mounted refueling system to meet Capability Development Document (CDD) thresholds and objectives for simultaneous refueling of two probe-equipped receivers. The system can be installed or removed from the KC-46 as mission needs dictate.

The long-term support concept for the KC-46 is organic two-level maintenance (2LM): organization level (O-level) and depot level (D-level). For the purposes of this program, all maintenance other than O-level shall be referred to as D-level. The product support strategy will initially employ Interim Contractor Support (ICS) before transitioning to a 100% organically-managed maintenance and supply support capability. Performance Based Logistics (PBL) solutions will be evaluated during EMD as viable approaches to facilitate the transition.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 655271 / *KC-46 RDT&E*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
KC-46A aircraft non-recurring development, integration, and testing; 4 RDT&E tanker aircraft; and support	C/FPIF	The Boeing Company : Seattle, WA	4,954.069	55.994	Mar 2018	21.866	Mar 2019	13.460	Mar 2020	-		13.460	56.031	5,101.420	5,046.892
KC-46A Aircrew Training System	C/FPIF	FlightSafety Services Corp. : Centennial, CO	86.049	1.362	Jan 2018	-		-		-		-	0.000	87.411	87.411
KC-46A Maintenance Training System	C/FFP	The Boeing Company : St. Louis, MO	45.840	-		-		-		-		-	0.000	45.840	45.840
		Subtotal	5,085.958	57.356		21.866		13.460		-		13.460	56.031	5,234.671	N/A

Remarks

The KC-46 EMD contract was awarded 24 Feb 2011. The contract ceiling price of $4.9B is the government's maximum financial liability on the prime contract. The "Total Cost" value represents the MS C Service Cost Position (SCP), which accounts for the ceiling price of the contract plus the financial and schedule risk of potential design changes for the KC-46 aircraft.

FINANCIAL PERFORMANCE: The KC-46 is evaluated against traditional Research and Development (R&D) program expenditure benchmarks. Unlike many traditional R&D programs, the KC-46 EMD contract is a FPIF contract with progress payments. Twenty percent of incurred costs are withheld until the end of the contract, when they are liquidated. Mandatory funding obligations and progress payment withholds will cause the program to lag traditional expenditure benchmarks, painting an inaccurate portrait of overall program health.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
KC-46A studies and analysis associated with the development, integration, and demonstration of KC-46 capability & future planning	C/CPAF	Not specified. : TBD	58.569	23.130	Mar 2018	13.871	Mar 2019	3.638	Mar 2020	-		3.638	2.036	101.244	112.636
		Subtotal	58.569	23.130		13.871		3.638		-		3.638	2.036	101.244	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0605221F / *KC-46*	Project (Number/Name) 655271 / *KC-46 RDT&E*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

These contracts are on an as needed basis, with various contract types and performing activities.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
KC-46A testing and planning support of development & operational test, FAA & military certification, and aircraft qualification activities	Various	Various : Various	141.958	21.069	Mar 2018	47.424	Mar 2019	55.582		-		55.582	40.328	306.361	308.047
		Subtotal	141.958	21.069		47.424		55.582		-		55.582	40.328	306.361	N/A

Remarks

Integrated testing and planning activities are performed by government organizations, with some contractor technical subject matter experts and teaming with the prime contractor.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
KC-46A Program Management Administration - Program A&AS Support	C/FFP	US Falcon : Dayton, OH	52.477	10.518	Mar 2018	3.019	Mar 2019	-		-		-	0.000	66.014	82.650
KC-46A Program Management Administration - Trainer A&AS Support	C/CPFF	HX5 : Fort Walton Beach, FL	9.103	3.242	Aug 2017	0.000		-		-		-	0.000	12.345	12.345
KC-46A Program Management Administration - Other	Various	KC-46 Program Office : Dayton, W-P AFB, OH	32.816	6.393	Oct 2017	7.665	Oct 2018	1.987	Oct 2019	-		1.987	0.332	49.193	59.639

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 655271 / *KC-46 RDT&E*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Adjustments not reflected in the FY19 PB ABIDES	C/CPAF	Not specified. : TBD	-	89.801		-		-		-		-	0.000	89.801	-
		Subtotal	94.396	109.954		10.684		1.987		-		1.987	0.332	217.353	N/A

Remarks

Two Advisory and Assistance (A&AS) contracts over $1M. Other PMA funding includes, but is not limited to, travel, supplies, and training.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	5,380.881	211.509		93.845		74.667		-		74.667	98.727	5,859.629	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 655271 / *KC-46 RDT&E*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605221F / *KC-46*	**Project (Number/Name)** 655271 / *KC-46 RDT&E*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
KC-46				
EMD: KC-46 Aircraft	1	2017	2	2020
Automated Performance Tool (APT) Phase II	3	2019	4	2022
Developmental Test & Evaluation to support aircraft delivery	1	2017	4	2018
Receiver Certification	1	2017	3	2020
Initial Operational Test & Evaluation	4	2018	2	2019
Supply Support	1	2017	1	2020
Depot Maintenance Inter-servicing (DMI), Source of Repair Assignment Process (SORAP), Activation Planning, & FAA Certifications	1	2017	2	2020
Aircrew Training System Development & Updates	1	2017	3	2020
Maintenance Training System Development & Updates	1	2017	2	2019

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605223F / *Advanced Pilot Training*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	11.879	7.107	105.999	265.465	0.000	265.465	363.473	317.783	201.478	96.373	48.521	1,418.078
655340: *Advanced Trainer Replacement T-X*	11.879	7.107	105.999	265.465	0.000	265.465	363.473	317.783	201.478	96.373	48.521	1,418.078
Quantity of RDT&E Articles	-	-	3	2	-	2	-	-	-	-		

Program MDAP/MAIS Code: 436

Note

Prior Years Funding $4.994M was executed in PE 0604233F.

A. Mission Description and Budget Item Justification

The Advanced Pilot Training (APT) program will replace the Air Education Training Command's (AETC) aging T-38C fleet with new aircraft, Ground Based Training System (simulators, training devices, computer based training systems, academics, etc.), Maintenance Training System, and support infrastructure currently used in the fighter/bomber advanced Specialized Undergraduate Pilot Training track as well as in the Introduction to Fighter Fundamentals program. The APT program acquisition strategy was approved by OSD (AT&L) in early FY 2017 (December 2016). At the same time, the APT Team completed their Development Request for Proposal (RFP) Release Defense Acquisition Board and subsequently released the RFP to industry on 30 Dec 16. The Program began source selection evaluations in mid 2017 and seeks Milestone B entry in FY 2018.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the APT weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

Funding contained in this platform's documentation directly aids AETC flying training enterprise to continue its overall Future Years Defense Program pilot production increase starting in FY 2020, thus reducing the USAF Pilot Shortage.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it will pass Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605223F / *Advanced Pilot Training*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	12.377	105.999	323.463	0.000	323.463
Current President's Budget	7.107	105.999	265.465	0.000	265.465
Total Adjustments	-5.270	0.000	-57.998	0.000	-57.998
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-5.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.270	0.000			
• Other Adjustments	0.000	0.000	-57.998	0.000	-57.998

Change Summary Explanation

FY17 -$5.000M due to Congressional reduction
FY17 -$0.270M due to Small Business Innovative Research Transfer
FY19 -$57.998M due to source selection delay

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Advanced Pilot Training (APT) Program	7.107	105.999	265.465

Description: The Advanced Pilot Training program office is developing an acquisition strategy and related documentation to meet the requirements of the Capabilities Development Document for Milestone B entry. This includes studies, analysis, acquisition documentation, and market research activities to reduce risk and support the acquisition strategy and engineering and manufacturing development. Includes Program Management Administration (PMA) such as travel, Other Government Costs (OGC), and Advisory and Assistance Services (A&AS).

FY 2018 Plans:
Program plans to complete Milestone B, Contract award completion and contract kickoff activities to include System Requirements Review/System Functional Review, and documentation updates post Milestone B. Plans also includes APT PMA costs such as travel, OGC, and A&AS.

FY 2019 Plans:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605223F / *Advanced Pilot Training*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Program plans to conduct a Preliminary Design Review (PDR), a Post-PDR, Aircraft and Ground Based Training System Critical Design Reviews, along with completion of the first operational assessment. The Maintenance Training System Request for Proposal will also be released. Plans also include Advanced Pilot Training PMA costs such as travel, OGC, and A&AS. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** See above for details.			
Accomplishments/Planned Programs Subtotals	7.107	105.999	265.465

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APAF 03 APT000: *T-X (Advanced Pilot Trainer) Procurement*	-	-	-	-	-	-	-	538.644	601.486	13,680.196	14,820.326
• APAF 03 APT000 Adv Proc: *T-X (Advanced Pilot Trainer) Procurement*	-	-	-	-	-	-	63.500	71.046	100.848	1,945.911	2,181.305
• APAF 06 APT000: *T-X (Advanced Pilot Trainer) Procurement*	-	-	-	-	-	-	-	29.908	28.537	817.180	875.625
• APAF 07 ATP000: *T-X (Advanced Pilot Trainer) Procurement*	-	-	-	-	-	-	-	-	21.415	312.922	334.337

Remarks

E. Acquisition Strategy

This Advanced Pilot Training (APT) Program will develop, test, acquire, and sustain an affordable, agile, and integrated APT System consisting of 350 aircraft, Ground Based Training System, Maintenance Training System, support, infrastructure, and personnel to meet Air Education and Training Command's initial need date of FY 2024.

The APT Program has conducted extensive market research, concluding multiple interested and capable offerors exist supporting a vigorous competition. The program's acquisition strategy leverages market conditions by competing and awarding development, production, and initial sustainment in a single contract award. A single award Indefinite Delivery Indefinite Quantity contract will be awarded to provide for development, integration, and testing needed to meet existing APT requirements. Additional contract options are available for Low Rate Initial Production, Full Rate Production and initial sustainment transition.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605223F / *Advanced Pilot Training*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605223F / *Advanced Pilot Training*	**Project (Number/Name)** 655340 / *Advanced Trainer Replacement T-X*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Pilot Training Future Contracts	Various	TBD : TBD	0.000	-		88.161	Jul 2018	251.133	Nov 2018	-		251.133	731.331	1,070.625	-
		Subtotal	0.000	-		88.161		251.133		-		251.133	731.331	1,070.625	N/A

Remarks

As the acquisition strategy is developed and cost estimates mature, the amount in cost to complete will be allocated to the appropriate categories.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Pilot Training Studies and Analysis	Various	Various : Various	2.799	0.000	Jan 2017	4.090	Jan 2018	0.158	Jan 2019	-		0.158	64.313	71.360	-
		Subtotal	2.799	0.000		4.090		0.158		-		0.158	64.313	71.360	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Pilot Training Test Support	MIPR	Edwards AFB : Edwards AFB, CA	0.233	0.209	May 2017	0.855	Nov 2017	1.172	Nov 2018	-		1.172	206.379	208.848	-
		Subtotal	0.233	0.209		0.855		1.172		-		1.172	206.379	208.848	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Pilot Training PMA Other Government Costs	Various	AFLCMC : Dayton, OH	1.888	2.015	Jan 2017	3.837	Oct 2017	4.188	Oct 2018	-		4.188	6.537	18.465	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605223F / *Advanced Pilot Training*	**Project (Number/Name)** 655340 / *Advanced Trainer Replacement T-X*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advanced Pilot Training A&AS	Various	AFLCMC : Dayton, OH	6.959	4.883	Feb 2017	9.056	Mar 2018	8.814	Mar 2019	-		8.814	26.494	56.206	-
		Subtotal	8.847	6.898		12.893		13.002		-		13.002	33.031	74.671	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	11.879	7.107		105.999		265.465		-		265.465	1,035.054	1,425.504	N/A

Remarks

Prior years amounts under Program 0604233F, Specialized Undergraduate Flight Training.
Advanced Pilot Training Studies and Analysis: $0.935M
Advanced Pilot Training PMA Government Costs: $1.383M
Advanced Pilot Training A&AS: $2.676M

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605223F / *Advanced Pilot Training*	**Project (Number/Name)** 655340 / *Advanced Trainer Replacement T-X*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605223F / *Advanced Pilot Training*	**Project (Number/Name)** 655340 / *Advanced Trainer Replacement T-X*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Advanced Pilot Training				
Pre Milestone B (RFP Release) Decision Point	1	2017	1	2017
RFP Release	1	2017	1	2017
Source Selection	2	2017	4	2018
Milestone B	4	2018	4	2018
Engineering and Manufacturing Development Phase	4	2018	3	2022
Government Preliminary Design Review (PDR)	1	2019	1	2019
Post PDR Review	2	2019	2	2019
Government Critical Design Review (CDR)	3	2019	3	2019
Development, Test and Evaulation	2	2020	2	2022
Milestone C	3	2022	3	2022
Operational Test Readiness Review (OTRR)	1	2023	4	2023
Initial Operational Test & Evaluation (IOT&E)	3	2023	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605229F / *Combat Rescue Helicopter*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	622.875	263.327	354.485	457.652	0.000	457.652	232.047	37.711	21.488	21.879	0.000	2,011.464
654364: *Combat Rescue Helicopter*	622.875	263.327	354.485	457.652	0.000	457.652	232.047	37.711	21.488	21.879	0.000	2,011.464
Quantity of RDT&E Articles	4	5	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 479

A. Mission Description and Budget Item Justification

The Combat Rescue Helicopter (CRH) program will replace the aging HH-60G. The HH-60G currently supports the Air Force's core function of Personnel Recovery. The primary mission of the HH-60G is to conduct day / night / marginal weather Combat Search and Rescue (CSAR) in order to recover downed aircrew or other isolated personnel in hostile or non-permissive environments.

The CRH will be capable of employment day or night, in adverse weather, and in a variety of threat spectrums from terrorist attacks to chemical, biological, radiological, and nuclear threats. Onboard defensive capabilities will permit the CRH system to operate in an increased threat environment. An in-flight air refueling capability will provide an airborne alert capability and extend its combat mission range. The CRH system may conduct combat search and rescue airborne mission commander duties. The aircraft will be self-supporting to the maximum extent practical. The CRH system may also conduct other collateral missions inherent in their capabilities to conduct Personnel Recovery, such as non-conventional assisted recovery, non-conventional evacuation operations, defense support to civil authorities, civil search and rescue, international aid, emergency aeromedical evacuation, disaster/humanitarian relief, counterdrug activities, support for National Aeronautics and Space Administration flight operations, and insertion/extraction of combat forces.

The CRH development effort will procure a total of four Engineering & Manufacturing Development (EMD) aircraft and other necessary ground and flight assets. The exercised portion of the CRH contract also includes development of the complete CRH training system to include CRH Weapon System Trainer (WST), Operational Flight Trainer (OFT), Airframe Systems Trainer (AST), other maintenance training devices, as well as Type 1 training and courseware required to perform aircrew and maintenance training. Other efforts include, but are not limited to, development of a systems integration laboratory and an avionics integration support facility, as well as procurement of data rights and licenses, spares, procuring five System Demonstration Test Article (SDTA) aircraft, and product support for the Engineering, Manufacturing, and Development effort.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Combat Rescue Helicopter weapon system capability. The use of such program funds will be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F and 0605833F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605229F / *Combat Rescue Helicopter*

This program is expected to receive approval to enter Milestone C Production and Deployment phase and to initiate Low Rate Initial Production of aircraft in FY19.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	319.331	354.485	461.096	0.000	461.096
Current President's Budget	263.327	354.485	457.652	0.000	457.652
Total Adjustments	-56.004	0.000	-3.444	0.000	-3.444
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-46.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-10.004	0.000			
• Other Adjustments	0.000	0.000	-3.444	0.000	-3.444

Change Summary Explanation

The FY17 funding was reduced by ($46M) due to a Congressional Mark and ($10M) for SBIR transfer. FY19 funding was reduced by ($3.44M) to account for inflation adjustments.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Combat Rescue Helicopter (CRH)	258.158	345.485	439.752

Description: Develop a new helicopter, associated training system and support elements that leverage fielded, non-developmental technologies to recapitalize the HH-60G fleet.

FY 2018 Plans:
Conduct development work on Combat Rescue Helicopter aircraft, training systems and associated product support. Continue to develop the EMD and SDTA Aircrafts and conduct required testing. Initiate pre-operational support, aircrew training, and maintenance support for integration and support facilities. Initiate facilities design and equipment purchase for Electronic Warfare Integrated Reprogramming (EWIR) capability. Management services including studies and analyses, miscellaneous program office support, travel, office supplies, training courses and service contracts. Plan to award Training Systems Acquisition (TSA) III Delta Training Device task order in August 2018.

FY 2019 Plans:
Continue development work on Combat Rescue Helicopter aircraft, training systems and associated product support. Continue to develop the EMD and SDTA Aircrafts and conduct required testing. Continue pre-operational support, aircrew training, and

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605229F / *Combat Rescue Helicopter*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
maintenance support for support and integration facilities. Stabilize facilities expansion and equipment purchase for Electronic Warfare Integrated Reprogramming (EWIR) capability. Management services including studies and analyses, miscellaneous program office support, travel, office supplies, training courses and service contracts. This program is expected to receive approval to enter Milestone C Production and Deployment phase and to initiate Low Rate Initial Production of aircraft in FY19. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase in funding due to additional activities to complete development of EMD and SDTA aircraft.			
Title: Combat Rescue Helicopter Government Test and Evaluation ***Description:*** Conduct test and evaluation on the Combat Rescue Helicopter and associated training systems to support Developmental Test and Evaluation planning, Operational Test and Evaluation planning, Live Fire Test and Evaluation, and other test planning and organizational support. ***FY 2018 Plans:*** Continue Developmental Test and Evaluation planning, Operational Test and Evaluation planning, Live Fire Test and Evaluation, and other test planning and organizational support. Continue to witness contractor qualification testing on subcomponents. Support contractor's Test Readiness Review and First Flight Readiness Reviews in preparation for test conduct. ***FY 2019 Plans:*** Continue to witness contractor qualification testing on subcomponents. Continue Operational Test and Evaluation Planning. Conduct Developmental Test and Evaluation and Life Fire Test and Evaluation. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase in funding due to end EMD phase activities to include a surge in testing activities in preparation for approval and planned entrance into Milestone C Production and Deployment Phase in FY19.	5.169	9.000	17.900
Accomplishments/Planned Programs Subtotals	263.327	354.485	457.652

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APAF 04 Line Item H060WH: *Combat Rescue Helicopter*	-	-	680.201	-	680.201	908.935	1,014.782	876.340	847.399	2,722.200	7,049.857
• MILCON Line Item 0207229F: *Combat Rescue Helicopter*	7.300	-	5.900	-	5.900	-	4.050	-	-	26.600	43.850

Remarks

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605229F / *Combat Rescue Helicopter*	

E. Acquisition Strategy

Procure a new helicopter and associated training systems, and support elements that leverage fielded non-developmental technologies to recapitalize the HH-60G fleet. The CRH development effort will procure four Engineering, Manufacturing, and Development (EMD) aircraft & five System Demonstration Test Article (SDTA) aircraft for a total of nine developmental test aircraft and other necessary ground and flight assets, to be utilized for both DT and IOT&E.

The exercised portion of the CRH contract also includes development of the complete CRH training system to include CRH Weapon System Trainer (WST), Operational Flight Trainer (OFT), Avionics Desktop Trainer (AVDTT), Airframe Systems Trainer (AST), other maintenance Part Task Trainers, as well as Type 1 training and courseware required to perform aircrew and maintenance training. There is a single prime contractor delivering the aircraft, associated training systems and support elements under a single contract. Other efforts include, but are not limited to, development of a systems integration laboratory and an avionics integration support facility, as well as procurement of data rights and licenses, spares, SDTA, and product support for the EMD effort.

The contract type for this effort is Fixed Price Incentive Firm through Low Rate Initial Production.

As originally planned following source selection, a formal HH-60W Training System Requirements Analysis (TSRA) was conducted in Sep 2015. This analysis identified some additional training requirements not accounted for in the original contract. Current approach is to acquire two additional training devices and initial contractor support via the AFLCMC Simulator Program Office's Multiple Award Indefinite Delivery Indefinite Quantity contract called Training Systems Acquisition III.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605229F / *Combat Rescue Helicopter*	**Project (Number/Name)** 654364 / *Combat Rescue Helicopter*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRH aircraft development, integration, test articles, trainers, support and contractor test	C/FPIF	Sikorsky Aircraft Corporation : Stratford, CT	590.129	251.367	Aug 2017	333.739	Dec 2017	420.425	Dec 2018	-		420.425	283.242	1,878.902	1,878.902
Acquisition of additional CRH training devices	C/FFP	TBD : TBD	-	-		3.600	Aug 2018	10.800	Aug 2018	-		10.800	3.600	18.000	18.000
		Subtotal	590.129	251.367		337.339		431.225		-		431.225	286.842	1,896.902	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRH product support related to the aircraft development, integration, test articles, trainers, and contractor test.	Various	Various : TBD	4.673	0.273	Jun 2017	0.745	Jun 2018	0.569	Jun 2019	-		0.569	0.689	6.949	6.949
		Subtotal	4.673	0.273		0.745		0.569		-		0.569	0.689	6.949	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRH planning and testing to support developmental and operational test, live fire test and other weapon system testing and support	PO	413th Test Squadron : Eglin AFB, FL	5.892	5.469	Jan 2017	9.000	Dec 2017	17.900	Dec 2018	-		17.900	16.200	54.461	54.461
		Subtotal	5.892	5.469		9.000		17.900		-		17.900	16.200	54.461	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605229F / *Combat Rescue Helicopter*	**Project (Number/Name)** 654364 / *Combat Rescue Helicopter*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CRH A&AS Support	C/CPFF	EPASS : Dayton, OH	18.381	5.291	Mar 2017	5.396	Mar 2018	5.558	Mar 2019	-		5.558	4.881	39.507	39.507
CRH Other PMA	Various	Various : Various	3.800	0.927	Dec 2016	2.005	Dec 2017	2.400	Dec 2018	-		2.400	4.513	13.645	13.645
		Subtotal	22.181	6.218		7.401		7.958		-		7.958	9.394	53.152	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	622.875	263.327		354.485		457.652		-		457.652	313.125	2,011.464	N/A

Remarks

FINANCIAL PERFORMANCE: CRH is evaluated against traditional Research and Development (R&D) program expenditure benchmarks. Unlike many traditional R&D programs, however, the CRH EMD contract is a FPIF contract with progress payments. Twenty percent of incurred costs are withheld until the end of the contract, when they are liquidated. Mandatory funding obligations, progress payment restrictions and DFAS withholds will cause the program to lag traditional expenditure benchmarks, painting an inaccurate portrait of overall program health.

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605229F / *Combat Rescue Helicopter*	**Project (Number/Name)** 654364 / *Combat Rescue Helicopter*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605229F / *Combat Rescue Helicopter*	**Project (Number/Name)** 654364 / *Combat Rescue Helicopter*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Combat Rescue Helicopter EMD Schedule				
CRH EMD Development	1	2017	4	2020
Air Vehicle Critical Design Review	3	2017	3	2017
CRH Training System EMD Development	1	2017	4	2020
Training Systems Critical Design Review	4	2017	4	2017
CRH Test and Evaluation	1	2017	4	2020
Developmental Test and Evaluation	4	2018	1	2020
Milestone C	3	2019	3	2019
Required Assets Available for Initial Operational Capability	2	2020	2	2020

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605278F / *HC/MC-130 Recap RDT&E*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	8.707	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.001	0.000	8.710
655249: *HC-130Recap*	-	8.707	0.000	0.000	0.000	0.000	0.001	0.000	0.001	0.001	0.000	8.710
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

FY17 funds in BA5 is an Database error. These funds should be under BA7 (same PEC/BPAC).

FY17 funds in BA5 is an Database error. These funds should be under BA7 (same PEC/BPAC).

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	8.707	0.000	0.000	0.000	0.000
Total Adjustments	8.707	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	8.707	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Database Error	8.707	0.000	0.000
Description: Database ERROR: This funding belongs under BA7 (same PEC/BPAC and major thrust: HC/MC-130 Block 8.1). Current Program for FY17 is $2.722M.			
FY 2018 Plans: Database ERROR: This funding belongs under BA7 (same PEC/BPAC and major thrust: HC/MC-130 Block 8.1)			
FY 2019 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605278F / *HC/MC-130 Recap RDT&E*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Database ERROR: There should not be any funding on BA05 for PE: 65278F BPAC: 675006. The FY17 funds on this document belongs under BA7 (same PEC/BPAC and major thrust: HC/MC-130 Block 8.1).			
Accomplishments/Planned Programs Subtotals	8.707	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Database ERROR: This funding belongs under BA7 (same PEC/BPAC)

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605278F / *HC/MC-130 Recap RDT&E*	**Project (Number/Name)** 655249 / *HC-130Recap*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Database ERROR: There should not be any funding on BA05 for PE: 65278F BPAC: 675006. The FY17 funds on this document belongs under BA7 (same PEC/BPAC and major thrust: HC/MC-130 Block 8.1).	TBD	Not specified. : TBD	-	8.707	Dec 2016	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	8.707		-		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	8.707		0.000		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605278F / *HC/MC-130 Recap RDT&E*	**Project (Number/Name)** 655249 / *HC-130Recap*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Database ERROR																												
Database ERROR: Funding should be on BA07 rather than BA05 for PE: 65278F BPAC: 675006.																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605278F / *HC/MC-130 Recap RDT&E*	**Project (Number/Name)** 655249 / *HC-130Recap*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Database ERROR				
Database ERROR: Funding should be on BA07 rather than BA05 for PE: 65278F BPAC: 675006.	1	2017	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605431F / *Advanced EHF MILSATCOM (SPACE)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	221.584	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
657103: *Advanced MILSATCOM*	-	30.241	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
657104: *Evolved AEHF MILSATCOM (EAM)*	-	191.343	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

In FY2018, PE 0605431F, ADVANCED EHF MILSATCOM (SPACE) efforts were transferred to PE 1206431F, ADVANCED EHF MILSATCOM (SPACE) due to the creation of a new Major Force Program for Space. FY2017 funding is documented in the exhibits for PE 1206431F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	259.131	0.000	0.000	0.000	0.000
Current President's Budget	221.584	0.000	0.000	0.000	0.000
Total Adjustments	-37.547	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-30.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-7.547	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657103: *Advanced MILSATCOM*	-	30.241	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission Description not provided.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *Evolved AEHF MILSATCOM (EAM)*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657104: *Evolved AEHF MILSATCOM (EAM)*	-	191.343	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission Description not provided.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605432F / *Polar MILSATCOM (SPACE)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	44.306	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
657105: *Polar Satellite Communications*	-	44.306	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0605432F, Polar MILSATCOM efforts were transferred to PE 1206432F, Polar MILSATCOM, due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206432F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	50.815	0.000	0.000	0.000	0.000
Current President's Budget	44.306	0.000	0.000	0.000	0.000
Total Adjustments	-6.509	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-5.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.509	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

FY2017: -$5.000M Congressional Reduction

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605433F / *Wideband Global SATCOM (SPACE)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	73.901	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
657102: *Command & Control Sys-Consolidated (CCS-C)*	-	11.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
657107: *WGS Space Systems Resiliency Upgrade*	-	62.101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

In FY2018, PE 0605433F, Wideband Global SATCOM (SPACE) efforts were transferred to PE 1206433F, Wideband Global SATCOM (SPACE), due to the creation of a new Major Force
Program for Space. FY2017 funding is documented in the exhibits for PE 1206433F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	41.632	0.000	0.000	0.000	0.000
Current President's Budget	73.901	0.000	0.000	0.000	0.000
Total Adjustments	32.269	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	35.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.731	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657102 / *Command & Control Sys-Consolidated (CCS-C)*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657102: *Command & Control Sys-Consolidated (CCS-C)*	-	11.800	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission Description not provided.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657107: *WGS Space Systems Resiliency Upgrade*	-	62.101	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Mission Description not provided.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605458F / *Air & Space Ops Center 10.2 RDT&E*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	141.787	21.109	119.745	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	282.641
654945: *AOC 10.2 Development*	141.787	21.109	119.745	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	282.641
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: N42

Note

In FY 2019, PE 0605458F, Air & Space Ops Center 10.2 RDT&E, Project 654945, AOC 10.2 Development, terminated 16 Jan 18.

A. Mission Description and Budget Item Justification

The Air Operations Center Weapon System (AOC WS), AN/USQ-163 Falconer, the senior element of the Theater Air Control System (TACS), is the weapon system the Commander, Air Force Forces (COMAFFOR) provides the Combined/Joint Force Air Component Commander (C/JFACC) for planning, executing, and assessing theater-wide air and space operations. The C/JFACC provides air, space and cyber support to the Combined/Joint Forces Commander (C/JFC) by coordinating, deconflicting and assessing the progress of various weapon systems to advance the C/JFC's campaign. The AOC WS develops operations strategy and planning documents. The weapon system also disseminates tasking orders; executes day-to-day peacetime and combat air, space and cyber operations; and provides rapid reaction to immediate situations by exercising positive control of friendly forces.

The AOC WS Increment 10.2 set of requirements keeps the AOC interoperable, certified, supportable, and compliant through the integration, testing and fielding of new capabilities and upgrades to the AOC WS baseline. The program supports mission requirements at Geographic and Global (formerly known as Functional) AOCs, as well as Support and Manpower Augmentation units. To keep the AOC current and interoperable with the Combatant Commands (CCMD), cyber requirements, and fifth generation weapon system/weapons, the AOC WS program plans to evolve the AOC through the integration and test of progressively improving capabilities by incremental and rapid delivery of requirements using commercial software development best practices. These activities ensure a system of systems engineering perspective for the AOC WS, and include weapon system standardization activities as defined by AOC WS requirements documents. AOC WS Increment 10.2 received a Milestone B decision 11 October 2013. This project intended to provide for design, development, integration of 3rd Party capabilities, and testing; as well as, build-up and fielding of the Help Desk (HD), Formal Training Unit (FTU), Combined Air Operations Center-experimental (CAOC-X) suite, and one geographic site. The use of lengthy legacy acquisition methodologies resulting in multi-year period before delivery drove the AF to change acquisition approaches and terminate the Prime Contract in July 2017 in order to pursue evolutionary industry best-practiced approaches.

In FY 2019, no funding is requested and no funding is required due to AOC WS Increment 10.2 contract termination and Program of Record cancellation.

BA5 - This program is in Budget Activity 5, System Development and Demonstration (SDD) because the program passed Milestone B and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full fielding decision.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605458F / *Air & Space Ops Center 10.2 RDT&E*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	28.911	119.745	103.441	0.000	103.441
Current President's Budget	21.109	119.745	0.000	0.000	0.000
Total Adjustments	-7.802	0.000	-103.441	0.000	-103.441
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	-7.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.802	0.000			
• Other Adjustments	0.000	0.000	-103.441	0.000	-103.441

Change Summary Explanation

FY 2017 funding decreased $7.0M due to AOC 10.2 program delays.

FY 2019 funding decreased $103.411M due to AOC WS Increment 10.2 contract termination and Program of Record cancellation.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: AOC WS Inc 10.2 Development	20.420	119.745	0.000	0.000	0.000

Description: AOC 10.2 infrastructure development and mission capability integration. Development of a robust, open, Net-Centric infrastructure with a Service Oriented Architecture (SOA). Conduct system maintenance and interoperability updates.

FY 2018 Plans:
- Continue work on termination closing out of 10.2 Prime Contract.

FY 2019 Base Plans:
N/A

FY 2019 OCO Plans:
N/A

FY 2018 to FY 2019 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605458F / *Air & Space Ops Center 10.2 RDT&E*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Funding decreased due to program no longer requiring RDTE funds starting in FY 2019 due to program termination/cancellation.					
Title: AOC WS Inc 10.2 Test and Evaluation ***Description:*** Test and Evaluation ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	0.689	0.000	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	21.109	119.745	0.000	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 03 Line Item 834560: *Air Operations Center (AOC) 10.2*	8.180	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	8.180

Remarks

E. Acquisition Strategy

The acquisition strategy builds on existing capabilities using evolutionary acquisition to standardize, modernize and sustain the AOC. With the termination of the AOC 10.2 Prime Contract on 13 Jul 17 and official cancellation on 16 Jan 18, the Air Force is undergoing the orderly shutdown to cancel the AOC 10.2 Program of Record. Additionally, Raytheon was awarded the Long-Term Modification and Sustainment (LTM&S) contract for the AOC WS on 24 Apr 17, with official hand-off as of 30 Jun 17. This means the Air Force will leverage Raytheon for sustainment of the existent AOC 10.1 baseline as well as modifications to that baseline in pursuit of a modernized AOC. The Air Force is also pursuing the AOC Pathfinder effort designed to mirror commercial software best practices to incrementally deliver capability to the warfighter at a rapid and efficient pace using Agile DevOps. Partnered with Defense Digital Service (DDS) and Defense Innovation Unit Experimental (DIUx),

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605458F / *Air & Space Ops Center 10.2 RDT&E*

and using the AOC 10.1 baseline as the starting point, the Air Force will leverage AOC 10.2 components piecemeal as applicable to agile software develop the existing backlog.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605458F / *Air & Space Ops Center 10.2 RDT&E*	**Project (Number/Name)** 654945 / *AOC 10.2 Development*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AOC 10.2 Modernization Government Furnished Equipment	Various	Various : Various	2.027	0.000		0.000		-		-		-	0.000	2.027	-
AOC 10.2 Modernization Contract	C/CPIF	Northrop Grumman : Herndon, VA	114.387	15.560	Nov 2016	119.345	Mar 2018	-		-		-	0.000	249.292	212.958
AOC 10.2 Training	C/Various	Various : Various	2.936	0.000		0.000		-		-		-	0.000	2.936	-
		Subtotal	119.350	15.560		119.345		-		-		-	0.000	254.255	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test	Various	Various : Various	4.673	0.212	Apr 2017	0.000		-		-		-	0.000	4.885	-
		Subtotal	4.673	0.212		0.000		-		-		-	0.000	4.885	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering	C/Various	MITRE : Bedford, MA	9.436	3.720	Oct 2016	0.000		-		-		-	0.000	13.156	-
Program Management Adminstration	C/Various	Various : Hanscom AFB, MA	8.328	1.617	Dec 2016	0.400	Nov 2017	-		-		-	0.000	10.345	-
		Subtotal	17.764	5.337		0.400		-		-		-	0.000	23.501	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	141.787	21.109		119.745		-		-		-	0.000	282.641	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605458F / *Air & Space Ops Center 10.2 RDT&E*	**Project (Number/Name)** 654945 / *AOC 10.2 Development*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
AOC 10.2																												
AOC Increment 10.2 Termination/ Cancellation																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605458F / *Air & Space Ops Center 10.2 RDT&E*	**Project (Number/Name)** 654945 / *AOC 10.2 Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
AOC 10.2				
AOC Increment 10.2 Termination/Cancellation	1	2018	4	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605830F / *Acq Workforce- Global Battle Mgmt*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	3.617	0.000	3.617	3.686	0.000	0.000	0.000	0.000	7.303
65830A: *f-acq workforce-global battle mgmt (direct)*	-	0.000	0.000	3.617	0.000	3.617	3.686	0.000	0.000	0.000	0.000	7.303
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 0605830F, project 65830A, Acquisition Support, is a new start.

A. Mission Description and Budget Item Justification

This program element is one of eight direct funded AFLCMC acquisition workforce program elements. The other seven acquisition workforce civilian pay program elements are 0605826F Global Power, 0605827 Global Vigilance and Combat Systems, 0605828F Global Reach, 0605829F Global Cyber, Network, and Business Systems, 0605831F Capability Integration, 0605832F Advanced Program Technology, and 0605898F Management Headquarters.

The Air Force Life Cycle Management Center (AFLCMC) equips U.S. and allied forces with operational weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. These program elements support both civilian pay and non-pay support requirements.

This program is in Budget Activity 5, System Demonstration and Evaluation and will fund direct acquisition workforce management and support costs in direct support of development efforts.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605830F / *Acq Workforce- Global Battle Mgmt*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	3.617	0.000	3.617
Total Adjustments	0.000	0.000	3.617	0.000	3.617
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	3.617	0.000	3.617

Change Summary Explanation

In FY19, the additional $3.617M supports the realignment of authorizations per mission requirements.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Acquisition Support	-	0.000	3.617	0.000	3.617

Description: The acquisition and product support workforce provides cutting edge weapon systems sustainment capabilities and is charged with providing management, tools, and technical and business capabilities need to oversee acquisition programs throughout their life cycle.

FY 2018 Plans:

N/A

FY 2019 Base Plans:

FY19 includes costs associated with the acquisition and product support workforce; provides cutting edge weapon systems sustainment capabilities and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle.

FY 2019 OCO Plans:

N/A

FY 2018 to FY 2019 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605830F / *Acq Workforce- Global Battle Mgmt*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
The increase of $3.617M supports the realignment of authorizations per mission requirements.					
Accomplishments/Planned Programs Subtotals	-	0.000	3.617	0.000	3.617

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 PE 0608526F: *Acq Workforce Global Power*	0.000	219.809	233.924	0.000	233.924	228.689	234.310	240.107	245.111	Continuing	Continuing
• RDTE 06 PE 0608527F: *Acq Workforce Global Vigilance and Combat Systems*	0.000	223.179	263.488	0.000	263.488	275.405	281.564	288.304	294.219	Continuing	Continuing
• RDTE 06 PE 0608528F: *Acq Workforce Global Reach*	0.000	138.556	153.591	0.000	153.591	165.310	169.285	173.383	176.942	Continuing	Continuing
• RDTE 06 PE 0608529F: *Acq Workforce Cyber, Network, and Business Systems*	0.000	221.393	232.315	0.000	232.315	235.178	244.125	255.878	261.184	Continuing	Continuing
• RDTE 06 PE 0608530F: *Acq Workforce Global Battle Management*	0.000	152.577	169.868	0.000	169.868	154.608	162.149	166.117	169.548	Continuing	Continuing
• RDTE 06 PE 0608531F: *Acq Workforce Capability Integration*	0.000	196.561	226.219	0.000	226.219	208.122	213.035	218.216	222.723	Continuing	Continuing
• RDTE 06 PE 0608532F: *Acq Workforce Advanced Program Technology*	0.000	28.322	38.400	0.000	38.400	37.697	38.595	39.515	40.336	Continuing	Continuing
• RDTE 06 PE 0608598F: *Management HQ - R&D*	0.000	5.510	5.987	0.000	5.987	6.692	6.850	7.014	7.155	Continuing	Continuing

Remarks

N/A

E. Acquisition Strategy

N/A

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605830F / *Acq Workforce- Global Battle Mgmt*

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605830F / *Acq Workforce- Global Battle Mgmt*	**Project (Number/Name)** 65830A / *f-acq workforce-global battle mgmt (direct)*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Acquisition Support	Various	Not specified. : TBD	-	-		-		3.617	Oct 2018	-		3.617	Continuing	Continuing	-
		Subtotal	-	-		-		3.617		-		3.617	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		3.617		-		3.617	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605830F / *Acq Workforce- Global Battle Mgmt*	**Project (Number/Name)** 65830A / *f-acq workforce-global battle mgmt (direct)*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Acquisition Support																												
Acquisition Support																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605830F / *Acq Workforce- Global Battle Mgmt*	**Project (Number/Name)** 65830A / *f-acq workforce-global battle mgmt (direct)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Acquisition Support				
Acquisition Support	1	2019	4	2020

Note

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605931F / *B-2 Defensive Management System*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	988.971	278.437	194.570	261.758	0.000	261.758	135.684	20.654	0.180	0.184	0.000	1,880.438
653844: *B-2 DMS*	988.971	278.437	194.570	261.758	0.000	261.758	135.684	20.654	0.180	0.184	0.000	1,880.438
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 431

A. Mission Description and Budget Item Justification

The Defensive Management System Modernization (DMS-M) program enhances the B-2 direct attack capability by addressing emerging and future 21st century threats and robust modern Integrated Air Defense Systems (IADS). By leveraging "state-of-the-art" electronic warfare antennae, processors, controllers and displays, B-2 aircrews will realize unprecedented situational battlespace awareness and dynamic, real-time threat avoidance in the most complex radio frequency emitter environments. The inherent increased sensitivity of the modernized DMS over the legacy system, with increased processing power, will build a battlespace picture that could be shared with joint force platforms by on-board communication systems. The current B-2 DMS was designed in the 1980s and has not received any upgrades to date. Also, many components of the legacy DMS are not supportable and will severely impact aircraft availability without significant investment in reliability and maintainability upgrades.

During development, the engineering baseline will be finalized and four production representative kits will be procured to support integrated development/operational test and a pre-Milestone C Operational Assessment, as well as B-2 Nuclear Certification testing. Diminishing manufacturing sources and materiel shortages for affected components and subassemblies, will be addressed to protect the planned production program by mitigating unplanned part redesign and requalification risks.

Funds may be used to resolve emerging safety of flight and diminishing manufacturing sources issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver B-2 DMS-M weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

BA5 - This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605931F / *B-2 Defensive Management System*

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	315.615	194.570	213.844	0.000	213.844
Current President's Budget	278.437	194.570	261.758	0.000	261.758
Total Adjustments	-37.178	0.000	47.914	0.000	47.914
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-26.600	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-10.578	0.000			
• Other Adjustments	0.000	0.000	47.914	0.000	47.914

Change Summary Explanation

FY 2017 reduction was a Congressional reduction of $26.600M due to excess funding in EMD, and $10.578M for SBIR reductions. FY 2019 increased $47.914M due to program delays; DMS-M production funding was reduced by the same amount in FY 2019.

C. Accomplishments/Planned Programs ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019**
Title: B-2 Defensive Managment System Modernization (DMS-M) EMD	278.437	194.570	261.758
Description: DMS Modernization program develops improved aircrew situational awareness through replacement of passive antennas, receiver/processors, and display processors. DMS-M also addresses critical system shortfalls, and improves legacy DMS component repair issues. ***FY 2018 Plans:*** Hold system CDR and start modification and instrumentation of the test aircraft. ***FY 2019 Plans:*** Continue working EMD efforts, complete PD7.1 software certification and begin ground/flight test. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** B-2 DMS-M funding increased from FY 2018 to FY 2019 in accordance with program execution. FY 2018 had previously been reduced based on funds early to need.			
Accomplishments/Planned Programs Subtotals	278.437	194.570	261.758

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0605931F / *B-2 Defensive Management System*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APAF 05 Line Item b2dms0: *B-2 DMS*	-	-	0.000	-	0.000	278.263	362.507	79.517	80.962	0.000	801.249
• APAF 06 Line Items 000999: *Acft Initial Spares & Repairs*	-	-	-	-	-	-	14.831	15.129	15.404	0.000	45.364
• APAF 07 Line Item 000075: *Other Production Charges*	-	-	-	-	-	1.503	12.418	12.665	12.895	0.000	39.481

Remarks

E. Acquisition Strategy

Key elements of the overall acquisition strategy include: use of sole source contract with a prime/integrating contractor (Northrop Grumman) who will perform subsystem and component competitions where appropriate, use of Firm Fixed Price (FFP) development contract, and the combination of developmental upgrades with software sustainment blocks to minimize the number of software releases, aircraft downtime, and differences in fielded configurations. The government will encourage the prime contractor to compete susbsystems and key components to reduce cost and risk.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605931F / *B-2 Defensive Management System*	**Project (Number/Name)** 653844 / *B-2 DMS*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Air Vehicle - Technology Development	SS/CPFF	Various : Various, NV	726.260	-		-		-		-		-	0.000	726.260	-
Air Vehicle - Engineering and Manufacturing Development (EMD)	SS/FFP	Various : Various, NV	221.648	255.438	Dec 2016	162.771	Oct 2017	199.925	Oct 2018	-		199.925	83.626	923.408	-
		Subtotal	947.908	255.438		162.771		199.925		-		199.925	83.626	1,649.668	N/A

Remarks

Northrop-Grumman, El Segundo, CA is the prime contractor and integrator.

The Air Vehicle EMD contract was signed in March 2016 with an early effective date of February 2016.

Major subsystem vendors are:
Electronic Support Measures: BAE, Nashua NH
Advanced Graphics Processor: Lockheed-Martin, Owego, NY
Band 1 - 3 antennas: Randtron, Menlo Park CA
Band 4 antenna: Ball Aerospace, Westminster, CO

The acquisition phase formerly known as Technology Development (TD) is now referred to as Technology Maturation and Risk Reduction (TMRR)

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Trainers	C/CPIF	WPAFB : Dayton, OH	-	-		6.500	Dec 2017	15.000	Oct 2018	-		15.000	24.663	46.163	-
Mission Planning	C/CPIF	Hanscom : Boston, MA	-	-		5.203	Nov 2017	16.406	Feb 2019	-		16.406	4.391	26.000	-
		Subtotal	-	-		11.703		31.406		-		31.406	29.054	72.163	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605931F / *B-2 Defensive Management System*	**Project (Number/Name)** 653844 / *B-2 DMS*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Test	MIPR	AFFTC : Various, NV	8.364	13.062	Jan 2017	8.139	Oct 2017	11.107	Oct 2018	-		11.107	37.065	77.737	-
		Subtotal	8.364	13.062		8.139		11.107		-		11.107	37.065	77.737	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA	Various	Various : Various, NV	32.699	9.937	Dec 2016	11.957	Nov 2017	19.320	Nov 2018	-		19.320	6.957	80.870	-
		Subtotal	32.699	9.937		11.957		19.320		-		19.320	6.957	80.870	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	988.971	278.437		194.570		261.758		-		261.758	156.702	1,880.438	N/A

Remarks

Northrop-Grumman, the prime contractor for the B-2 weapon system, is the integrator and major contractor for B-2 DMS activities.

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605931F / *B-2 Defensive Management System*	**Project (Number/Name)** 653844 / *B-2 DMS*

B-2 DMS	
DMS-M EMD	
DMS-M Critical Design Review	
DMS-M Combined Developmental Test / Operational Test (DT/OT)	
DMS-M Milestone C - Low Rate Initial Production (LRIP) Decision	
DMS-M Full Rate Production (FRP) Decision	
DMS-M Certification of Airworthiness	

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0605931F / *B-2 Defensive Management System*	**Project (Number/Name)** 653844 / *B-2 DMS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
B-2 DMS				
DMS-M EMD	1	2017	1	2021
DMS-M Critical Design Review	4	2018	4	2018
DMS-M Combined Developmental Test / Operational Test (DT/OT)	4	2019	1	2021
DMS-M Milestone C - Low Rate Initial Production (LRIP) Decision	3	2020	3	2020
DMS-M Full Rate Production (FRP) Decision	1	2021	1	2021
DMS-M Certification of Airworthiness	2	2021	3	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0101125F / *Nuclear Weapons Modernization*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	489.629	131.063	91.237	91.907	0.000	91.907	36.164	0.000	0.000	0.000	0.000	840.000
657007: *B61 LIFE EXTENSION PROGRAM*	489.629	131.063	91.237	91.907	0.000	91.907	36.164	0.000	0.000	0.000	0.000	840.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 468

A. Mission Description and Budget Item Justification

The purpose of this program element is to conduct and support United States Air Force (USAF) and Joint Department of Defense (DoD) / Department of Energy (DOE) acquisition activities for the modernization of nuclear weapons.

B61-12 Life Extension Program (LEP): The B61-12 LEP will integrate DOE efforts to extend the service life of the warhead with DoD efforts to develop a guided Tail Kit Assembly (TKA) required to maintain current B61 mission characteristics. Programmatic integration of the Air Force-led, joint DoD-DOE program is accomplished through the B61 LEP Project Officers Group (POG) and its subgroups. In accordance with Air Force Materiel Command mission assignment memo (dated 17 Feb 11) and National Nuclear Security Administration (NNSA)-Air Force Nuclear Weapons Center (AFNWC) Memorandum of Understanding (MOU dated 28 Jun 12), the USAF is responsible for development, acquisition and delivery of a guided TKA and All Up Round (AUR) technical integration, system qualification and fielding of the B61-12 variant on multiple platforms.

Funds may be used to address emerging and short-notice Diminishing Manufacturing Sources and Material Shortage (DMSMS) issues.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver B-61 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

This program is in Budget Activity 5, System Development and Demonstration (SDD), because it is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0101125F / *Nuclear Weapons Modernization*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	137.909	91.237	120.598	0.000	120.598
Current President's Budget	131.063	91.237	91.907	0.000	91.907
Total Adjustments	-6.846	0.000	-28.691	0.000	-28.691
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-2.000	0.000			
• SBIR/STTR Transfer	-4.846	0.000			
• Other Adjustments	0.000	0.000	-28.691	0.000	-28.691

Change Summary Explanation

FY17 adjustment for -$2M reprogramming for higher AF priorities and Small Business Innovative Research (SBIR)
FY19 $15M for additional test requirements to meet STRATCOM needs; -$39.74M to fund B-2 Radar Aided Targeting System required for B61 integration on the B2; -$3.26M transfer to O&M sustainment; -$0.691M for inflation adjustment.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Engineering & Manufacturing Development Contract (B61)	63.437	15.517	34.104

Description: Prime contract to develop, test, integrate and nuclear certify a guided TKA in support of the B61-12 LEP.

FY 2018 Plans:
Continues B61-12 TKA development, design, test, integration, qualification and nuclear certification activities in support of the B61-12 LEP. Continues design, integration and testing of the B61-12 system and verification of requirements and validation of TKA performance. Continues flight testing to verify aircraft flight environments in support of weapon development. Continues B61-12 TKA program practices that ensure the following are met: requirements flow down, requirement allocation to hardware and software, requirements compliance matrix, system performance, reliability, maintainability, product assurance, testability, producibility and supportability. Provides support to aircraft Operational Flight Plan (OFP) development and integration to deliver the OFP test tapes in support of flight testing. Continues TKA Developmental Test (DT) drops, and provides support to the FY18 System Qualification drops.

FY 2019 Plans:
Continues B61-12 TKA development, design, test, integration, qualification and nuclear certification activities in support of the B61-12 LEP. Continues design, integration and testing of the B61-12 system and verification of requirements and validation of TKA performance. Continues flight testing to verify aircraft flight environments in support of weapon development. Continues

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0101125F / *Nuclear Weapons Modernization*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
B61-12 TKA program practices that ensure the following are met: requirements flow down, requirement allocation to hardware and software, requirements compliance matrix, system performance, reliability, maintainability, product assurance, testability, producibility and supportability. Provides support to aircraft Operational Flight Plan (OFP) development and integration to deliver the OFP test tapes in support of flight testing. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased to align to overall program schedule, including test activities.			
Title: All Up Round (AUR) Technical Integration (B61) ***Description:*** Covers all system engineering tasks in support of AUR technical integration, qualification & fielding, including program support to the B61 LEP POG. ***FY 2018 Plans:*** Continues B61-12 system qualification plan, warhead component qualification, TKA qualifications, and B61-12 AUR integration activities. Continues support to maintain technical and programmatic schedules and program documents that support the AUR technical integration. Continues maintenance of warhead-to-TKA interface requirements and design. Continues to provide technical expertise to maintain B61-12 aircraft compatibility with platforms through completion of the test and evaluation program. Continues to develop test assets to support integration efforts at the aircraft system integration laboratories. Includes B61-12 AUR technical and programmatic reviews, including design reviews, systems reviews, technical interchange meetings, and test reviews. Also includes test assessments to validate modeling and simulation results in support of system qualification; configuration management of B61-12 AUR drawings, interface control documents, and system specifications; and support of trainers and other USAF configurations. Provides for management of system security requirements. Provides AUR integration support to the DOE in support of System Qualification drops. Efforts support Final Design Review in 4QFY18. ***FY 2019 Plans:*** Continues B61-12 system qualification plan, warhead component qualification, TKA qualifications, and B61-12 AUR integration activities. Continues support to maintain technical and programmatic schedules and program documents that support the AUR technical integration. Continues maintenance of warhead-to-TKA interface requirements and design. Continues to provide technical expertise to maintain B61-12 aircraft compatibility with platforms through completion of the test and evaluation program. Continues to develop test assets to support integration efforts at the aircraft system integration laboratories. Includes B61-12 AUR technical and programmatic reviews, including design reviews, systems reviews, technical interchange meetings, and test reviews. Also includes test assessments to validate modeling and simulation results in support of system qualification; configuration management of B61-12 AUR drawings, interface control documents, and system specifications; and support of trainers and other USAF configurations. Provides for management of system security requirements. Provides AUR integration	15.986	10.094	7.914

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0101125F / *Nuclear Weapons Modernization*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
support to the DOE in support of System Qualification drops. Efforts support the AUR Design Review and Acceptance Group (DRAAG). ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased to align to overall program schedule, including test activities.			
Title: Aircraft Integration (B61) ***Description:*** B61-12 activities associated with integration on threshold aircraft, including mission planning system upgrades to accommodate the new weapon variant. Also includes activities related to weapon design compatibility with both threshold and objective aircraft. ***FY 2018 Plans:*** Continues aircraft integration activities. Continues test tape development and demonstration/validation of the OFP. Continues design compatibility with aircraft. Continues mission planning upgrades. Continues OFP development and integration to deliver the OFP test tapes in support of flight testing. Continues B-2 integration. Continues F-15E integration. ***FY 2019 Plans:*** Continues aircraft integration activities. Completes B-2 integration. Continues F-15E integration. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased to align to overall program schedule, including test activites.	35.054	53.906	21.916
Title: Test Support (B61) ***Description:*** Test activities and support for TKA design validation & verification and nuclear certification, as well as B61-12 AUR system qualification (includes design and operational certification activities). ***FY 2018 Plans:*** Continues test planning and execution activities to support B61-12 weapon development, AUR technical integration and aircraft integration. Continues flight testing to verify aircraft flight environments and TKA and AUR design verification, including initial TKA DT drops and preparation for TKA Operational Test (OT) drops and AUR System Qualification drops. Continues development and delivery of necessary Bomb Assemblies (BA) to accomplish TKA test and trainer activities. Provides support to the DOE flight tests for the bomb assembly. Continues execution of F-15E and F-16 system qualification testing for B61-12 AUR. Starts B-2 planning and execution of B61-12 AUR system qualification testing. ***FY 2019 Plans:*** Continues test planning and execution activities to support B61-12 weapon development, AUR technical integration and aircraft integration. Continues flight testing to verify aircraft flight environments and TKA and AUR design verification, including initial TKA	16.586	11.720	27.973

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0101125F / *Nuclear Weapons Modernization*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
DT drops and preparation for TKA Operational Test (OT) drops and AUR System Qualification drops. Continues development and delivery of necessary BAs to accomplish TKA test and trainer activities. Continues providing support to the DOE flight tests for the bomb assembly. Continues execution of F-15E and F-16 system qualification testing for B61-12 AUR. Continues B-2 planning and execution of B61-12 AUR system qualification testing. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increased to align to overall program schedule, including test activities.			
Accomplishments/Planned Programs Subtotals	131.063	91.237	91.907

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• PAAF 01 11125F/354040: *B61*	-	88.307	162.023	-	162.023	110.073	18.720	-	-	0.000	379.123

Remarks

E. Acquisition Strategy

The Milestone Decision Authority directed a three-fold competitive acquisition strategy at the 30 April 2012 Materiel Development Decision. 1) A single prime contractor was chosen to develop the B61-12 TKA through Engineering Manufacturing and Development (EMD) using full and open competition. EMD consists of two phases; 2) the prime contractor is to maintain competition at the subcomponent level; and 3) a sole source contract will be awarded for production to the EMD contractor. B61-12 AUR integration, qualification and acceptance will be conducted through the joint DoD-DOE/NNSA Phase 6.X process and managed through the B61 LEP POG. Sandia National Laboratory will conduct the TKA/BA technical integration on behalf of the Air Force.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0101125F / *Nuclear Weapons Modernization*	**Project (Number/Name)** 657007 / *B61 LIFE EXTENSION PROGRAM*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
B61 LEP EMD Contracts	C/CPIF	Boeing : St Charles, MO	276.165	53.988	Nov 2016	11.571	Jan 2018	32.898	Nov 2018	-		32.898	13.611	388.233	0.000
		Subtotal	276.165	53.988		11.571		32.898		-		32.898	13.611	388.233	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AUR Technical Integration	MIPR	Various : various	41.900	15.986	Jan 2017	10.094	Jan 2018	7.914	Jan 2019	-		7.914	0.000	75.894	-
Aircraft Integration	MIPR	Various : various	104.779	35.054	Nov 2016	53.906	Nov 2017	21.916	Nov 2018	-		21.916	20.502	236.157	-
		Subtotal	146.679	51.040		64.000		29.830		-		29.830	20.502	312.051	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Support for B61 LEP Development	PO	96 TW : Eglin, FL	43.427	16.586	Nov 2016	11.720	Nov 2017	12.973	Nov 2018	-		12.973	1.960	86.666	-
526.1 Assets	MIPR	Various : Various	-	-		-		15.000	Nov 2018	-		15.000	0.000	15.000	-
		Subtotal	43.427	16.586		11.720		27.973		-		27.973	1.960	101.666	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PMA	Various	various : various	23.358	9.449	Oct 2016	3.946	Oct 2017	1.206	Oct 2018	-		1.206	0.364	38.323	-
		Subtotal	23.358	9.449		3.946		1.206		-		1.206	0.364	38.323	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0101125F / *Nuclear Weapons Modernization*	**Project (Number/Name)** 657007 / *B61 LIFE EXTENSION PROGRAM*

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	489.629	131.063		91.237		91.907		-		91.907	36.437	840.273	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0101125F / *Nuclear Weapons Modernization*	**Project (Number/Name)** 657007 / *B61 LIFE EXTENSION PROGRAM*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0101125F / *Nuclear Weapons Modernization*	**Project (Number/Name)** 657007 / *B61 LIFE EXTENSION PROGRAM*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
B61 LIFE EXTENSION PROGRAM				
Engineering & Manufacturing Development Phase 1	1	2017	1	2018
Engineering & Manufacturing Development Phase 2	1	2017	2	2019
All-Up-Round Developmental/System Qualification Testing	1	2017	3	2020
Ground Test/WTT/Flight Test	1	2017	3	2020
Aircraft Integration	1	2017	3	2020
TKA Milestone C Decision	1	2019	1	2019
TKA Production	1	2018	2	2022

Note

USD AT&L directed B61-12 TKA to enter acquisition process at Milestone B based on maturity of the technology required for this program. Therefore, a separate Technology Development phase is not required. (Source: Materiel Development Decision (MDD) Acquisition Decision Memorandum (ADM), signed 30 April 2012)

TKA Production line added for overall program clarity. Appropriation funding for TKA Production is 3011, not 3600 funds.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207171F / *F-15 EPAWSS*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	174.437	241.495	209.847	137.095	0.000	137.095	67.322	1.275	2.360	22.572	0.000	856.403
657108: *EPAWSS DEVELOPMENT*	174.437	241.495	209.847	137.095	0.000	137.095	67.322	1.275	2.360	22.572	0.000	856.403
Quantity of RDT&E Articles	-	-	1	3	-	3	-	-	-	-		

Program MDAP/MAIS Code: 485

Note

Quantity of RDT&E Articles represents the 4 F-15C model test aircraft kits required to support flight test activities. The 4 kits required for the F-15E model test aircraft are accounted for in the procurement totals as the test kits will be upgraded to production kits when flight test activities are completed.

In FY 2016, PE 0207171F, F-15 EPAWSS, Project 676038, EPAWSS, Budget Activity 07, Operational Systems Development was transferred to PE 0207171F, F-15 EPAWSS, Project 657108, EPAWSS Development, Budget Activity 05, System Development and Demonstration to align the program in the correct budget activity.

In FY 2015, PE 0207134F, F-15E Squadrons, Project 670131, Initial Operational Test and Evaluation, F-15 EPAWSS development efforts were transferred to PE 0207171F, F-15 EPAWSS, Project 676038, EPAWSS in order to provide budget transparency.

Prior Years funding in FY 2013 and FY 2014 of $15.100M was executed in PE 0207134F. Prior Year funding in FY 2015 of $37.726M was executed in PE 0207171F, Project 676038.

A. Mission Description and Budget Item Justification

The F-15 is the most versatile fighter in the world today. The F-15C continues to provide air superiority with an undefeated and unmatched aerial combat record. The F-15E retains this air superiority capability and adds systems, such as advanced imaging and targeting systems, to meet the requirement for all-weather, deep penetration, and night / under-the-weather, air-to-surface attack. A mainstay in operations both domestic and abroad, upgrades to the F-15 (avionics, armament, airframe and engines) are critical to maintaining combat viability (lethality, survivability and supportability). Projected to remain in service past 2040, avionics modernization is key to long-term weapon system viability. This modernization is built on a foundation of technical and acquisition support studies (both internal to the Air Force and through outside contractors). The proliferation of fourth generation enemy aircraft, sophisticated "double-digit" anti-aircraft missile systems and other enemy systems pose a significant threat to F-15 survivability. The F-15 Eagle Passive Active Warning and Survivability System (EPAWSS) will replace the F-15's functionally obsolete self-defense Tactical Electronic Warfare System (TEWS) to enhance weapon system situational awareness and survivability against enemy threats. F-15 EPAWSS will also improve reliability and sustainability. F-15 EPAWSS is linked to an aircraft operational flight program update schedule that works to integrate new capabilities with the airframe. Incorporation of corresponding spiral and / or phased technology / equipment improvements that include support equipment, mission planning systems, and training device upgrades will improve performance, supportability and aircrew training.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207171F / *F-15 EPAWSS*

The F-15 EPAWSS upgrade will significantly improve the F-15's capability to autonomously and automatically detect, identify and locate radio frequency (RF) threats as well as provide the ability to deny, degrade, deceive, disrupt and defeat RF and electro-optical / infrared (EO / IR) threat systems in contested and unplanned operations within highly contested environments through 2040. The F-15 EPAWSS will provide indication, type and position of ground-based RF threats as well as the indication, type and bearing of airborne threats with the situational awareness needed to avoid, engage or negate the threat. The F-15 EPAWSS will prevent RF and IR threat systems from detecting or acquiring accurate targeting information prior to threat engagement to complicate and / or negate an enemy threat targeting solution--and effectively counter enemy missiles / weapons if adversary threat systems engage and employ weapons against friendly forces--through components such as chaff, flares, decoys / angle countermeasures and jamming.

Increment 1 replaces the obsolete TEWS. Increment 2 adds a towed decoy/angled countermeasure capability. Increment 2 development begins in FY 2021.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver F-15 EPAWSS capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F."

This program is in Budget Activity 5, System Development and Demonstration, passed Milestone B approval, and has begun engineering and manufacturing development activities. This program element provides funding for the development of the F-15 EPAWSS to address current and future threats.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	256.669	209.847	138.127	0.000	138.127
Current President's Budget	241.495	209.847	137.095	0.000	137.095
Total Adjustments	-15.174	0.000	-1.032	0.000	-1.032
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	-6.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-9.174	0.000			
• Other Adjustments	0.000	0.000	-1.032	0.000	-1.032

Change Summary Explanation

FY 2017: Congressional Rescission of $6M - early to need funding; $9.174 SBIRs withhold

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Eagle Passive/Active Warning Survivability System (EPAWSS)	241.495	209.847	137.095	0.000	137.095

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207171F / *F-15 EPAWSS*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Planned replacement of the existing F-15 self-protection, Tactical Electronic Warfare System (TEWS). This includes technical and acquisition- related studies. ***FY 2018 Plans:*** Continue acquisition planning for Milestone C. Execute Increment 1 EMD. Produce EMD test assets and continue integration testing. Execute risk reduction, development test activities, and continue acquisition and technical-related studies for Increments 1. Funds may be used to resolve emerging safety of flight issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness. ***FY 2019 Base Plans:*** Continue acquisition planning for Milestone C. Execute Increment 1 EMD. Execute Increment 1 flight tests. Continue to execute risk reduction, development test activities, and continue acquisition and technical-related studies for Increment 1. Funds may be used to resolve emerging safety of flight issues, accommodate technology insertion and fulfill FAA or other mandates necessary to ensure continued aircrew safety and mission effectiveness. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2018 to 2019 decrease $71.720M see above for details.					
Accomplishments/Planned Programs Subtotals	241.495	209.847	137.095	0.000	137.095

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APAF 05 Line Item F15EWS: *Aircraft Modification*	-	-	147.685	-	147.685	149.047	142.443	308.818	258.982	1,122.507	2,129.482
• APAF 07 Line Item 000999: *Aircraft Spares and Repair Parts*	-	-	4.034	-	4.034	4.184	8.046	10.214	10.400	35.321	72.199

Remarks

FY 2019 - FY 2023 funding is for F-15 E Increment 1 Procurement.

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207171F / *F-15 EPAWSS*

E. Acquisition Strategy

The MDA approved acquisition approach is to design a solution that leverages mature non-developmental components that integrate into the existing footprint on the F-15 aircraft left behind by the legacy F-15 electronic warfare system. To further improve schedule, affordability and program risk outcomes, and consistent with the JROC approved CDD, the F-15 EPAWSS program will pursue a two-increment acquisition approach. Increment 1 replaces the existing Radar Warning Receiver, Internal Countermeasures System and Countermeasures Dispenser System. Increment 2 adds a towed decoy / angle countermeasure capability.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207171F / *F-15 EPAWSS*	**Project (Number/Name)** 657108 / *EPAWSS DEVELOPMENT*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
F-15 EPAWSS TMRR	SS/ Various	Boeing : St. Louis, MO	111.702	32.927	Oct 2016	-		-		-		-	0.000	144.629	175.860
F-15 EPAWSS EMD	SS/ Various	Boeing : St. Louis, MO	56.790	152.203	Nov 2016	138.630	Oct 2017	91.567	Oct 2018	-		91.567	39.596	478.786	478.786
F-15 EPAWSS	Various	Various : Various	4.207	42.409	Dec 2017	30.218	Dec 2017	20.653		-		20.653	18.367	115.854	115.854
		Subtotal	172.699	227.539		168.848		112.220		-		112.220	57.963	739.269	N/A

Remarks

FY16PB- EPAWSS efforts were transferred from Budget Activity 7, Operational Systems Development, PE 0207171F, Project Number 676038 to Budget Activity 5, Engineering and Manufacturing Development, PE 0207171F, Project Number 657108 per OSD direction.

The individual program reference to "various" contract methods addresses other government costs for trainers, hardware, special studies, etc., that are required to meet F-15 EPAWSS program objectives. The execution vehicles between these DoD entities vary by effort.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Flight Test	Various	Various : Various	1.738	8.153	Jan 2017	21.531	Jan 2018	21.655	Jan 2019	-		21.655	19.658	72.735	72.735
		Subtotal	1.738	8.153		21.531		21.655		-		21.655	19.658	72.735	N/A

Remarks

The individual program reference to "various" contract methods addresses other government costs for trainers, test, hardware, special studies, etc. that are required to meet F-15 EPAWSS program objectives. The execution vehicles between these DoD entities vary by effort.

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Support Costs	Various	Various : Various	-	5.803	Dec 2016	19.468	Oct 2017	3.220		-		3.220	15.908	44.399	44.399
		Subtotal	-	5.803		19.468		3.220		-		3.220	15.908	44.399	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207171F / *F-15 EPAWSS*	**Project (Number/Name)** 657108 / *EPAWSS DEVELOPMENT*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

The individual program reference to "various" contract methods addresses other government costs for trainers, test, hardware, special studies, etc. that are required to meet F-15 EPAWSS program objectives. The execution vehicles between these DoD entities vary by effort.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	174.437	241.495		209.847		137.095		-		137.095	93.529	856.403	N/A

Remarks

Prior Years funding in FY 2013 and FY 2014 of $15.100M was executed in PE 0207134F.

Prior Year funding in FY 2015 of $37.726M was executed in PE 0207171F, Project 676038.

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207171F / *F-15 EPAWSS*	**Project (Number/Name)** 657108 / *EPAWSS DEVELOPMENT*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207171F / *F-15 EPAWSS*	**Project (Number/Name)** 657108 / *EPAWSS DEVELOPMENT*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
F-15 EPAWSS				
EPAWSS EMD Contract Award	1	2017	1	2017
EPAWSS MS C	4	2019	4	2019
EPAWSS Increment 1 testing	1	2019	3	2021

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207328F / *Stand In Attack Weapon*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	3.400	43.175	0.000	43.175	87.840	142.725	165.303	218.950	Continuing	Continuing
653133: *Stand In Attack Weapon*	-	0.000	3.400	43.175	0.000	43.175	87.840	142.725	165.303	218.950	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides a strike capability to defeat rapidly relocatable targets that create the Anti-Access/Area Denial environment. Initial aircrafts to integrate are F-35, B-21. MDD approved in Apr 2017, currently in the Materiel Solution Analysis phase. AFLCMC/EBZ is currently conducting the Analysis of Alternatives which is scheduled to be complete in 3Q18. Currently working documentation for Milestone-A which is scheduled for FY19. In CY18 Stand in Attack Weapon was a new start.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SiAW weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F

BA05 - This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	3.400	0.000	0.000	0.000
Current President's Budget	0.000	3.400	43.175	0.000	43.175
Total Adjustments	0.000	0.000	43.175	0.000	43.175
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	43.175	0.000	43.175

Change Summary Explanation

No significant changes

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207328F / *Stand In Attack Weapon*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Stand In Attack Weapon ***Description:*** Stand-up program office to include facility upgrades and other program support. ***FY 2018 Plans:*** Stand-up program office to include facility upgrades, program office support, milestone documentation support and other analysis support to include initial studies for F-35 integration. ***FY 2019 Plans:*** Continue with program office stand-up, facility upgrades, program office support, milestone documentation support and other analysis support to include UAI, M-Code, OSA requirements, Test Planning and Range Infrastructure requirements ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase required as Analysis of Alternatives is completed in FY18 and program office continues to ramp-up in preparation for an FY19 Defense Acquisition Board.	-	3.400	43.175
Accomplishments/Planned Programs Subtotals	-	3.400	43.175

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Planning for competitive prototyping through MS-B EMD phase with a down-select to one contractor for MS-C production phase. Analysis of Alternatives, to be completed 3Q18, will aid in shaping the formal acquisition strategy.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207328F / *Stand In Attack Weapon*	**Project (Number/Name)** 653133 / *Stand In Attack Weapon*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Stand-up: Stand-up program office to include facility upgrades and other program support.	Various	Various : Eglin AFB, FL	-	-		0.800	Apr 2018	6.575	Jan 2019	-		6.575	Continuing	Continuing	-
		Subtotal	-	-		0.800		6.575		-		6.575	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Risk reduction effort and studies in support of program office stand up	C/CPAF	Various : Eglin AFB, FL	-	-		1.000	Jun 2018	35.000	Nov 2018	-		35.000	Continuing	Continuing	-
		Subtotal	-	-		1.000		35.000		-		35.000	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration (PMA) Provides program office oversight of development and upgrade activities	C/CPAF	Various : Eglin AFB, FL	-	-		1.600	Apr 2018	1.600	Apr 2019	-		1.600	Continuing	Continuing	-
		Subtotal	-	-		1.600		1.600		-		1.600	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		3.400		43.175		-		43.175	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207328F / *Stand In Attack Weapon*	**Project (Number/Name)** 653133 / *Stand In Attack Weapon*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Program Stand-Up																												
Materiel Solution Analysis: Analysis of Alternatives																												
Milestone A Documentation																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207328F / *Stand In Attack Weapon*	**Project (Number/Name)** 653133 / *Stand In Attack Weapon*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Program Stand-Up				
Materiel Solution Analysis: Analysis of Alternatives	1	2017	3	2018
Milestone A Documentation	1	2017	3	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207423F / *Advanced Communications Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	14.888	0.000	14.888	14.888	0.000	0.000	0.000	Continuing	Continuing
655068: *Joint Tactical Radio System (JTRS)*	-	0.000	0.000	14.888	0.000	14.888	14.888	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Protected Tactical Waveforms (PTW) development is a new start in FY19 under PE 0207423F

A. Mission Description and Budget Item Justification

Protected Tactical Waveform (PTW) is a waveform designed to mitigate the effects of advanced jamming in Anti-Access/Area Denial environments. PTW provides worldwide, beyond line of sight, Anti-Jam (AJ), Low Probability of Intercept communications, via military and commercial satellite systems for tactical users in all Services. This effort funds PTW modem development and aperture development on suitable platforms like (but not limited to) RQ-4 Global Hawk and EQ-4B/E-11A Battlefield Airborne Communications Node (BACN). PTW provides communications path diversity by increasing SATCOM resilience through satellite, spectral, and waveform diversity. This effort continues work started in Protected Tactical Service Field Demonstration (PTSFD) to complete PTW maturity and modem development, leveraging TALON Tacet Avis aperture work to develop PTW antenna and radome. It includes terminal certification efforts (Information Assurance (IA), NSA and MIL-STD). This effort funds continued development of PTW components, protected tactical terminal modems that will be capable of being fully integrated into existing wideband terminals and will ensure delivery of protected tactical SATCOM to the joint and coalition warfighters in contested, degraded environments. PTW development activities may also include technical and acquisition related studies, analysis, and early systems engineering and risk reduction activities addressing all subsystems to support both current program planning/execution and future AF program planning.

BA-5- This program is in Budget Activity 5, Advanced System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207423F / *Advanced Communications Systems*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	14.888	0.000	14.888
Total Adjustments	0.000	0.000	14.888	0.000	14.888
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	14.888	0.000	14.888

Change Summary Explanation

FY2019 Increase due to new start

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Protected Tactical Waveform (PTW)	-	0.000	14.888	0.000	14.888

Description: Protected Tactical Waveform (PTW) is a waveform designed to mitigate the effects of advanced jamming in Anti-Access/Area Denial environments. PTW provides worldwide, beyond line of sight, Anti-Jam (AJ), Low Probability of Intercept communications, via military and commercial satellite systems for tactical users in all Services. This effort funds PTW modem development and aperture development on suitable platforms like (but not limited to) RQ-4 Global Hawk and EQ-4B/E-11A Battlefield Airborne Communications Node (BACN). PTW provides communications path diversity by increasing SATCOM resilience through satellite, spectral, and waveform diversity. This effort continues work started in Protected Tactical Service Field Demonstration (PTSFD) to complete PTW maturity and modem development, leveraging TALON Tacet Avis aperture work to develop PTW antenna and radome.

FY 2018 Plans:

N/A

FY 2019 Base Plans:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207423F / *Advanced Communications Systems*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue PTW modem development and aperture development on suitable platforms like (but not limited to) RQ-4 Global Hawk and EQ-4B/E-11A Battlefield Airborne Communications Node (BACN). ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding increase due to new start					
Accomplishments/Planned Programs Subtotals	-	0.000	14.888	0.000	14.888
Other Service Funding Adjustment	-	-	0.000	0.000	0.000
Air Force Subtotals	-	0.000	14.888	0.000	14.888

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

TBD

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207423F / *Advanced Communications Systems*	**Project (Number/Name)** 655068 / *Joint Tactical Radio System (JTRS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Protected Tactical Waveform (PTW)	TBD	Not specified. : TBD	-	0.000		0.000		14.888		0.000		14.888	Continuing	Continuing	-
		Subtotal	-	0.000		0.000		14.888		0.000		14.888	Continuing	Continuing	N/A

Remarks

PTW development TBD is a new start beginning in FY 19.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Subtotals	-	0.000		0.000		14.888		0.000		14.888	Continuing	Continuing	N/A
Other Service Funding Adjustment	-	-		-		0.000		0.000		0.000			-
Project Cost Totals	-	0.000		0.000		14.888		0.000		14.888	0.000	0.000	-

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207423F / *Advanced Communications Systems*	**Project (Number/Name)** 655068 / *Joint Tactical Radio System (JTRS)*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Protected Tactical Waveform Development																												
PTW Development																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207423F / *Advanced Communications Systems*	**Project (Number/Name)** 655068 / *Joint Tactical Radio System (JTRS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Protected Tactical Waveform Development				
PTW Development	1	2019	4	2020

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	10.809	16.727	1.015	0.000	1.015	9.797	9.846	7.010	7.138	Continuing	Continuing
655012: *Full Combat Mission Training*	-	2.673	6.851	1.015	0.000	1.015	9.797	9.846	7.010	7.138	Continuing	Continuing
655354: *F-16 Block 40/50 MTC*	-	8.136	9.876	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

F-16 Block 40/50 Mission Training Center (MTC) supports the development, acquisition, fielding and integration of high fidelity, Distributed Mission Operations (DMO) capable flight simulators for F-16 Block 40 and 50 weapon systems. Each MTC includes multiple high fidelity Simulator Cockpits, Instructor Operator Stations, a Threat Server and Brief/Debrief and Mission Observation capability. Each is capable of linking to geographically distributed high-fidelity combat and combat support training devices including Command and Control (C2) and Intelligence, Surveillance, and Reconnaissance (ISR) systems. This capability allows the warfighters at home station to exercise and train at the operational and strategic levels of war as well as conduct networked unit-level training. Funds may be used to address emerging and short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issues. DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implement requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Full Combat Mission Training capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

In FY 2019, PE 0207701F, Full Combat Mission Training, Project 655354, F-16 Blk 40/50 MTC efforts were transferred to PE 0207133F, F-16, Project 672671, F-16 Blk 40/50 MTC, in order to transfer programmatic responsibilities and funding to the F-16 weapon system team.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	12.051	16.727	19.480	0.000	19.480
Current President's Budget	10.809	16.727	1.015	0.000	1.015
Total Adjustments	-1.242	0.000	-18.465	0.000	-18.465
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.442	0.000			
• Other Adjustments	-0.800	0.000	-18.465	0.000	-18.465

Change Summary Explanation

The FY 2017 funding request was adjusted by removing $0.442M for SBIR and $0.800 to account for the availability of prior year execution balances.

The FY 2019 funding request was reduced by $5.9M to account for the availability of prior year execution balances.

The FY 2019 funding request was reduced by $12.6M because the funding request was transferred to F-16, Project 672671, F-16 Blk 40/50 MTC.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
655012: *Full Combat Mission Training*	-	2.673	6.851	1.015	0.000	1.015	9.797	9.846	7.010	7.138	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Full Combat Mission Training (FCMT) supports Air Force Distributed Mission Operations (DMO) and Live-Virtual-Constructive (LVC) integration. DMO is an operational readiness initiative enabling the USAF to exercise and train at the operational and strategic levels of war while facilitating unit-level training. FCMT funding provides research in areas benefiting the AF DMO/LVC environment as a whole. Provides research and development to facilitate integration of fielded and newly acquired, Air Force owned training devices into DMO/LVC networks. Enhances the quality of training for the systems added to the network. Enables aircrews to network with LVC components to form the integrated DMO battlespace. Links geographically distributed high-fidelity combat and combat support training devices including Command and Control (C2) and Intelligence, Surveillance, and Reconnaissance (ISR) systems. Develops, demonstrates and inserts multi-level security capability. This capability allows the warfighters at home station to exercise and train at the operational and strategic levels of war as well as conduct networked unit-level training.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: FCMT Cross Domain Solutions (CDS)	1.629	2.237	0.286	-	0.286
Description: Development, demonstration and insertion of multi-level security capability.					
FY 2018 Plans: - Complete Multi Level Security (MLS) research testbed development and support for MLS testing for fourth and fifth generation trainers. - Continue fourth to fifth generation Cross Domain Solution (CDS) rule set prototype development. - Conclude evaluation of commercial and government off-the-shelf CDS devices and capabilities. - Begin accreditation for cross-domain rule sets. - Continue fourth to fifth generation MLS rule development for routine Live, Virtual and Constructive (LVC) environment integration.					
FY 2019 Base Plans: - Complete fourth to fifth generation Cross Domain Solution (CDS) rule set prototype development. - Continue accreditation for coalition rule sets. - Complete fourth to fifth generation MLS rule development for routine Live, Virtual and Constructive (LVC) environment integration.					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Develop updates for cross domain rule sets ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 funding request was reduced by $1.951M due to funds early to need.					
Title: FCMT Develop DMO Capabilities ***Description:*** Development, demonstrations, studies and insertions of DMO/LVC related technologies and proficiency based continuation training strategies. ***FY 2018 Plans:*** - Continue validation of training environment credibility assessments for an identified set of ACC Virtual and Constructive environments. - Complete integration of performance evaluation and After Action Review (AAR) tools for the operational Mission Training Centers (MTCs) - Develop metrics and tools to measure training proficiency gained during live, virtual, constructive events - Demonstrate persistent performance measurement and readiness assessment in fourth to fifth LVC training events. ***FY 2019 Base Plans:*** - Complete validation of training environment credibility assessments for an identified set of ACC Virtual and Constructive environments. - Continue to develop metrics and tools to measure training proficiency gained during live, virtual, constructive events - Conclude demonstration of persistent performance measurement and readiness assessment in fourth to fifth LVC training events. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 funding request was reduced by $2.175M due to funds early to need.	0.672	2.398	0.223	-	0.223
Title: FCMT Validation of warfighter seasoning and development of objective performance enhancements ***Description:*** Studies to assess and validate warfighter seasoning in continuation training and accreditation of portions of this process; studies to develop objective enhancement and measurement tools for the DMO/LVC environment. ***FY 2018 Plans:***	0.172	1.258	0.253	-	0.253

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue research and development for the integration of F-35, Joint and Coalition Trainers into the Combat Air Forces (CAF) Distributed Mission Operations (DMO) network. - Continue interoperability studies to evaluate the training value of fifth generation interoperable coalition training on the CAF DMO network - Continue evaluation of the integration of different data management and tracking methods to support large scale, secure and persistent Joint and Coalition LVC events. - Continue evaluation of network architectures and typologies for distributed secure, live, virtual, constructive events. ***FY 2019 Base Plans:*** - Continue research and development for the integration of F-35, Joint and Coalition Trainers into the Combat Air Forces (CAF) Distributed Mission Operations (DMO) network. - Continue interoperability studies to evaluate the training value of fifth generation interoperable coalition training on the CAF DMO network. - Develop common Joint and Coalition data standards for secure, interoperable training at joint and coalition levels of analysis. - Conclude evaluation of the integration of different data management and tracking methods to support large scale, secure and persistent Joint and Coalition live, virtual, constructive events. - Begin demonstrations of persistent performance measurement and readiness assessment in fourth to fifth generation live, virtual, constructive events. - Conclude evaluation of network architectures and typologies for distributed secure, live, virtual, constructive events. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 funding request was reduced by $1.005M due to funds early to need.					
Title: FCMT Other Network Studies ***Description:*** Research and development to provide for the integration of fielded and newly introduced, Air Force, Joint and Coalition high-fidelity flight and mission trainers. ***FY 2018 Plans:*** - Continue research and development for the integration of F-35, Joint and Coalition Trainers into the Combat Air Forces (CAF) Distributed Mission Operations (DMO) network.	0.200	0.958	0.253	-	0.253

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Continue interoperability studies to evaluate the training value of fifth generation interoperable coalition training on the CAF DMO network - Continue evaluation of the integration of different data management and tracking methods to support large scale, secure and persistent Joint and Coalition LVC events. - Continue evaluation of network architectures and typologies for distributed secure, live, virtual, constructive events. ***FY 2019 Base Plans:*** - Continue research and development for the integration of F-35, Joint and Coalition Trainers into the Combat Air Forces (CAF) Distributed Mission Operations (DMO) network. - Continue interoperability studies to evaluate the training value of fifth generation interoperable coalition training on the CAF DMO network. - Develop common Joint and Coalition data standards for secure, interoperable training at joint and coalition levels of analysis. - Conclude evaluation of the integration of different data management and tracking methods to support large scale, secure and persistent Joint and Coalition live, virtual, constructive events. - Begin demonstrations of persistent performance measurement and readiness assessment in fourth to fifth generation live, virtual, constructive events. - Conclude evaluation of network architectures and typologies for distributed secure, live, virtual, constructive events. - Develop gateways and cross domain solutions to integrate high-fidelity trainers with Air Force, joint, and coalition networks ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 funding request was reduced by $0.705M due to funds early to need.					
Accomplishments/Planned Programs Subtotals	2.673	6.851	1.015	-	1.015

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*

D. Acquisition Strategy

Each platform joining the Distributed Mission Operations (DMO)/Live-Virtual-Constructive (LVC) environment selects its own acquisition strategy based on using Command needs, Economic Analysis (EA) and the magnitude of the training system changes required to provide DMO capability. The initial systems in the DMO/LVC environment; F-15C, AWACS, F-16 Block 40/50 and F-15E, all required new training systems. In addition, the Operations and Integration capability was created. The Training Simulation Service (TSS) acquisition strategy was used to meet a portion of these requirements. In the TSS approach, the contractor owns and provides the simulator equipment, maintains simulator concurrency with weapon systems, and has incentives to keep the equipment up to date with simulator and network technologies. Currently fielded and projected Air Force-owned Flight and Mission Training Systems without DMO/LVC capability will be modified using Full Combat Mission Training (FCMT) funds to ensure compatibility with the DMO-LVC environment. To accomplish this, AFRL will conduct research/studies to Develop/implement Cross Domain Solutions, develop DMO capabilities, Validate warfighter seasoning and develop objective performance enhancements and conduct other network studies.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Full Combat Mission Training: Development, Testing and insertion of Mufti-level-security protocols, Cross Domain rule set development and accreditation	Various	Air Force Research Lab, 711 Human Performance Wing, Human : Dayton, OH	-	1.629	Dec 2016	2.237	Jan 2018	0.285	Jan 2019	-		0.285	Continuing	Continuing	-
Full Combat Mission Training: Development, demonstration, studies and insertion of distributed mission ops related technologies and proficiency based continuation training	Various	Air Force Research Lab, 711 Human Performance Wing : Dayton, OH	-	0.672	Dec 2016	2.398	Jan 2018	0.223	Jan 2019	-		0.223	Continuing	Continuing	-
Full Combat Mission Training: Validation of warfighter seasoning and development of objective performance enhancements for DMO/ LVC environment	Various	Air Force Research Lab, 711 Human Performance Wing : Dayton, OH	-	0.172	Dec 2016	1.258	Jan 2018	0.254	Jan 2019	-		0.254	Continuing	Continuing	-
Full Combat Mission Training: Research and Development to support integration of newly fielded high-fidelity training systems and networks	Various	Air Force Research Lab, 711 Human Performance Wing : Dayton, OH	-	0.200	Dec 2015	0.958	Jan 2018	0.253	Jan 2019	-		0.253	Continuing	Continuing	-
		Subtotal	-	2.673		6.851		1.015		-		1.015	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	2.673		6.851		1.015		-		1.015	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Develop gateways and cross domain solutions to integrate high-fidelity trainers with Air Force, joint, and coalition networks																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Full Combat Mission Training				
Develop Multi-Level Security testbed and support testing on 5th Gen systems	1	2017	4	2018
Develop 4th to 5th generation rule sets for coalition integration	1	2017	4	2019
Evaluate and assess commerical and government off-the-shelf cross domain solution devices	1	2017	2	2018
Perform accreditation for cross domain solution rule sets	3	2018	3	2020
Develop rule sets for routine live, virtual, and constructive environment integration	4	2017	3	2020
Continue to develop cross domain solution rule sets	1	2017	1	2019
Integrate scenarios and syllabi across DMO environments	1	2017	1	2019
Develop metrics for routine proficiency evaluations and determine standard format for storing/analyzing proficiency data	1	2017	2	2018
Create and evaluate alternative data formats for routinely tracking and storing performance and proficiency data	1	2017	1	2020
Demonstrate learning managed distributed mission operations scenario	3	2017	2	2018
Refine learning managed scenario and integrate with live, virtual, constructive events	3	2018	4	2023
Develop training assessment and performance measurement tools	1	2017	4	2017
Validate training environment credibility assessments for an identified set of ACC Virtual and Constructive Environments	1	2017	1	2019
Develop and integrate After Action Review tools for Mission Training Centers	1	2017	4	2018
Develop metrics and tools to measure training proficiency gained during live, virtual, constructive events	3	2018	4	2022
Demonstrate persistent performance measurement and readiness assessment in 4th to 5th generation LVC events	2	2018	4	2019
Integrate 5th generation systems into distirbuted mission operations network	1	2017	3	2020

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655012 / *Full Combat Mission Training*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Conduct interoperability studies to evaluate the training value of fifth generation interoperable coalition training on the CAF DMO network	1	2017	3	2020
Develop joint and colation data standards and evaluate data management methods to support live, virtual, and constructive events	1	2019	2	2021
Evaluation of the integration of different data management and tracking methods to support large scale, secure and persistent Joint and Coalition LVC events.	2	2017	3	2019
Demonstrate persistent performance measurement and readiness assessment in fourth to fifth generation LVC events	4	2019	2	2023
Evaluate network architectures and typologies for distributed, secure, live, virtual, constructive events	1	2017	1	2019
Develop gateways and cross domain solutions to integrate high-fidelity trainers with Air Force, joint, and coalition networks	3	2019	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655354 / *F-16 Block 40/50 MTC*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
655354: *F-16 Block 40/50 MTC*	-	8.136	9.876	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

F-16 Block 40/50 Mission Training Center (MTC) supports the development, acquisition, fielding and integration of high fidelity, Distributed Mission Operations (DMO) capable flight simulators for F-16 Block 40 and 50 weapon systems. Each MTC includes multiple high fidelity Simulator Cockpits, Instructor Operator Stations, a Threat Server and Brief/Debrief and Mission Observation capability. Each is capable of linking to geographically distributed high-fidelity combat and combat support training devices including Command and Control (C2) and Intelligence, Surveillance, and Reconnaissance (ISR) systems. This capability allows the warfighters at home station to exercise and train at the operational and strategic levels of war as well as conduct networked unit-level training. Funds may be used to address emerging and short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issues. DMS efforts to include removal of end-of-life software/hardware within simulators systems and move to a modular, common open system architecture that is sustainable and cyber-resilient. Implement requirements and standards defined under the Simulator Common Architecture Requirements and Standards (SCARS) initiative.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Full Combat Mission Training capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

In FY 2019, PE 0207701F, Full Combat Mission Training, Project 655354, F-16 Blk 40/50 MTC efforts were transferred to PE 0207133F, F-16, Project 672671, F-16 Blk 40/50 MTC, in order to transfer programmatic responsibilities and funding to the F-16 weapon system team.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: F-16 MTC Modification Development	8.136	9.876	0.000	0.000	0.000
Description: Development and testing of modifications to the F-16 MTC to maintain concurrency with F-16 aircraft.					
FY 2018 Plans: -- Continue to Develop, test, and field F-16 MTC Operational Flight Plan (OFP) M7.2+ concurrency modifications. Ensures the MTC will achieve concurrency with the capabilities resident in the aircraft when the aircraft upgrades to OFP 7.2 3rd quarter of FY19.					
FY 2019 Base Plans:					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655354 / *F-16 Block 40/50 MTC*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding in FY 2019 and out was transferred from PE 0207701F to PE 0207133F					
Accomplishments/Planned Programs Subtotals	8.136	9.876	0.000	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• APAF 05 Line Item OTHACF: *Other Aircraft*	8.136	9.876	0.000	-	0.000	0.000	0.000	0.000	-	Continuing	Continuing
• APAF 06 Line item 000999: *Initial Spares/Repair Parts*	1.822	0.219	0.000	-	0.000	0.000	0.000	0.000	0.111	Continuing	Continuing

Remarks

In FY 2019, the APAF funds were transferred from Other Aircraft to PE 0207133F, f0160p, in order to transfer programmatic responsibilities and funding to the F-16 weapon system team.

D. Acquisition Strategy

F-16 Block 40/50 MTCs are being developed, fielded, and modified under a competitively awarded Federal Acquisition Regulation (FAR) Part 15 Supply contract with RDT&E and APAF funds. The MTCs are sustained by Contract Logistic Support (CLS) using Operations and Maintenance funds. Physical changes to the MTC cockpits required by any OFP update will be funded in the F-16 APAF Mod Line.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655354 / *F-16 Block 40/50 MTC*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
F-16 Blk 40/50 Mission Training Center (MTC)	C/Various	L3 Comm, Link Simulation & Training : Arlington, TX	-	7.954	Dec 2016	9.629	Dec 2017	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	7.954		9.629		0.000		-		0.000	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
F-16 Blk 40/50 Mission Training Center (MTC) Program Management Administration- Over Gov't Costs	C/FFP	AFLCMC/WNS AFMC : Dayton, OH	-	0.182	Dec 2016	0.247	Dec 2017	0.000		-		0.000	Continuing	Continuing	-
		Subtotal	-	0.182		0.247		0.000		-		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	8.136		9.876		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655354 / *F-16 Block 40/50 MTC*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
F-16 BLK 40/50																												
OFP M7.1+																												
OFP M7.2+																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0207701F / *Full Combat Mission Training*	**Project (Number/Name)** 655354 / *F-16 Block 40/50 MTC*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
F-16 BLK 40/50				
OFP M7.1+	1	2017	3	2018
OFP M7.2+	2	2018	4	2018

Note

These remarks do not appear in XML Preview exhibit.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0303267F / *Auctioned Spectrum Relocation Fund*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	54.499	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
658062: *Auctioned Spectrum Relocation Fund*	-	54.499	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding supports Spectrum relocation and sharing activities.

This program is in Budget Activity 5, System Development and Demonstration(SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	54.499	0.000	0.000	0.000	0.000
Total Adjustments	54.499	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	54.499	0.000	0.000	0.000	0.000

Change Summary Explanation

Receive funds during execution year through a transfer from OMB

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Auctioned Spectrum Relocation Fund	54.499	0.000	0.000	0.000	0.000
Description: Funding supports Spectrum relocation and sharing activities					

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0303267F / *Auctioned Spectrum Relocation Fund*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2018 Plans: N/A ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	54.499	0.000	0.000	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0303267F / *Auctioned Spectrum Relocation Fund*	**Project (Number/Name)** 658062 / *Auctioned Spectrum Relocation Fund*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Support spectrum relocation and sharing activities	TBD	Various : TBD	-	54.499		-		-		-		-	Continuing	Continuing	-
		Subtotal	-	54.499		-		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	54.499		0.000		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0303267F / *Auctioned Spectrum Relocation Fund*	**Project (Number/Name)** 658062 / *Auctioned Spectrum Relocation Fund*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Auctioned Spectrum Relocation Fund																												
Support spectrum relocation activities																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0303267F / *Auctioned Spectrum Relocation Fund*	**Project (Number/Name)** 658062 / *Auctioned Spectrum Relocation Fund*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Auctioned Spectrum Relocation Fund				
Support spectrum relocation activities	1	2017	4	2017

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0303367F / *Spectrum Access Research and Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	62.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
658063: *Spectrum Access R&D*	-	62.053	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Development of new methods for the sharing of spectrum or reducing DoD's overall footprint. Funding supports spectrum relocation and sharing activities.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	62.053	0.000	0.000	0.000	0.000
Total Adjustments	62.053	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	62.053	0.000	0.000	0.000	0.000

Change Summary Explanation

Receive funds during execution year through a transfer from OMB

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Spectrum Access R&D	62.053	0.000	-
Description: Development of new methods for the sharing of spectrum or reducing DoD's overall footprint.			
FY 2018 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0303367F / *Spectrum Access Research and Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Development of new methods for the sharing of spectrum or reducing DoD's overall footprint. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding supports spectrum relocation and sharing activities.			
Accomplishments/Planned Programs Subtotals	62.053	0.000	-

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Development of new methods for the sharing of spectrum or reducing DoD's overall footprint.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0303367F / *Spectrum Access Research and Development*	**Project (Number/Name)** 658063 / *Spectrum Access R&D*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Spectrum Access R&D	TBD	Not specified. : TBD	-	62.053		-		-		-		-	Continuing	Continuing	-
		Subtotal	-	62.053		-		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	62.053		0.000		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0303367F / *Spectrum Access Research and Development*	**Project (Number/Name)** 658063 / *Spectrum Access R&D*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Spectrum Access R&D																												
Funding support spectrum relocation and sharing activities																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0303367F / *Spectrum Access Research and Development*	**Project (Number/Name)** 658063 / *Spectrum Access R&D*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Spectrum Access R&D				
Funding support spectrum relocation and sharing activities	1	2017	4	2018

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0305176F / *Combat Survivor Evader Locator*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	30.282	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
654522: *CSAR EMD*	-	30.282	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0305176F, Combat Survivor Evader Locator efforts were transferred to PE 1203176F, Combat Survivor Evader Locator, due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1203176F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	29.253	0.000	0.000	0.000	0.000
Current President's Budget	30.282	0.000	0.000	0.000	0.000
Total Adjustments	1.029	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	1.029	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0307581F / *JSTARS Recap*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	170.185	113.334	417.201	0.000	0.000	0.000	0.000	0.000	0.000	0.000	480.300	1,181.020
650003: *JSTARS Recapitalization*	170.185	113.334	417.201	0.000	0.000	0.000	0.000	0.000	0.000	0.000	480.300	1,181.020
Quantity of RDT&E Articles	-	-	-	-	-	-	-	2	1	-		

Program MDAP/MAIS Code: 513

Note

FY17 funding reduced by reprogramming.

A. Mission Description and Budget Item Justification

The Joint Surveillance Target Attack Radar System Recapitalization (JSTARS Recap) weapon system will replace the currently fielded E-8C Joint STARS weapon system and will execute in both global and regional conflicts in support of operations ranging from peacetime engagements to conventional, high intensity, general warfare. JSTARS Recap will provide airborne, stand-off range, surveillance and target acquisition radar and Battle Management Command and Control (BMC2) capabilities. JSTARS Recap will provide theater, ground and air commanders with ground surveillance to support attack operations and targeting that contributes to the delay, disruption, and destruction of enemy forces.

FY18 to FY23 RDT&E BA required to execute the Engineering Manufacturing and Development (EMD) phase of this acquisition. The focus of EMD will be to procure three Commercial Derivative Aircraft (CDA) and integrate the various subsystems (i.e. BMC2, Communications, Radar and ground support systems) to verify that system performance meets required capabilities. The primary evaluation of the weapon system development will occur during the EMD phase. Additionally, there will be major Technical Reviews accomplished during this phase: Combined System Requirements Review/System Functional Review (SRFR); Preliminary Design Review (PDR); Critical Design Review (CDR); Test Readiness Reviews (TRR); Production Readiness Review (PRR), Functional Configuration Audit (FCA) and Physical Configuration Audit (PCA).

Funding may also support studies, analyses, and risk reduction activities addressing all subsystems to support both current program planning/execution and future Air Force program planning.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver JSTARS Recap weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it is projected to receive Milestone B approval and is conducting EMD tasks aimed at meeting validated requirements prior to Full Rate Production (FRP).

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0307581F / *JSTARS Recap*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	128.019	417.201	623.248	0.000	623.248
Current President's Budget	113.334	417.201	0.000	0.000	0.000
Total Adjustments	-14.685	0.000	-623.248	0.000	-623.248
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-9.999	0.000			
• SBIR/STTR Transfer	-4.686	0.000			
• Other Adjustments	0.000	0.000	-623.248	0.000	-623.248

Change Summary Explanation

FY17 funding reduced by reprogramming.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Technology Maturation and Risk Reduction (TMRR)	113.334	0.000	-

Description: JSTARS Recap TMRR Contract activities leveraged DoD prior investments and Industry's Independent Research and Development (IR&D) investments to conduct technical reviews and subsystem prototype demonstrations. TMRR activities assessed industry's system-level design readiness/maturity with respect to top integration risks and use of Open Systems Architecture (OSA) and Open Mission System (OMS) standards. The TMRR contract activities informed the Government about the integration complexity and associated lifecycle risks involved with different system-level design solutions, including radar risk reduction. Activities also include studies, analyses, and risk reduction addressing all subsystems to support current program planning/execution and future program planning. These activities informed the Engineering, Manufacturing and Development with Production Request for Proposal released 26 Dec 16.

FY 2018 Plans:
- Conduct Training Systems Requirements Analysis
- Execute EMD Source Selection
- Prepare for EMD Phase
- Enhance government's JSTARS Recap Systems Integration Lab for EMD readiness
- Prepare for Milestone B Defense Acquisition Board
- Prepare Statutory and Regulatory documentation in support of Milestone B
- Conduct and complete studies and analysis to reduce EMD risk

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0307581F / *JSTARS Recap*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Conduct and complete Radar Risk Reduction ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Program was cancelled.			
Title: Engineering Manufacturing Development (EMD) ***Description:*** The focus of EMD will be to procure three Commercial Derivative Aircraft (CDA) and integrate the various subsystems (i.e. BMC2, Communications, Radar and ground support systems) to verify that system performance meets required capabilities. Testing will occur throughout EMD using both contractor and Government provided data through various methods that include testing in System Integration Labs (SIL), ground testing, and flight testing. Major Technical Reviews will be accomplished during EMD: Combined System Requirements Review/System Functional Review (SRFR); Preliminary Design Review (PDR); Critical Design Review (CDR); Test Readiness Reviews; Production Readiness Review (PRR), Functional Configuration Audit (FCA) and Physical Configuration Audit (PCA). ***FY 2018 Plans:*** - Execute Milestone B Defense Acquisition Board - Award EMD Contract - Conduct Post Award Conference - Conduct Integrated Baseline Review (IBR) - Initiate long-lead Group A hardware procurement. - Establish (or upgrade?) government's JSTARS Recap Systems Integration Lab - Perform potential studies, analysis, and risk reduction activities addressing all subsystems to support current program planning/ execution and future program planning. ***FY 2019 Plans:*** - Conduct System Requirements Review / System Functional Review (SRR / SFR) - Conduct Preliminary and Critical Design Reviews - Procure BMC2 and Communications Mission Systems and associated Group A hardware after CDR - Begin DT&E ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Part of EMD ramp up, the contractor will have to increase manning to support accelerated CDR potentially within a year of contract award and multiple integration activities. Concurrently, the remaining hardware and software purchases for the BMC2 and Communications subsystem, as well as any remaining hardware and software purchases for the radar and CDA	-	417.201	0.000
Accomplishments/Planned Programs Subtotals	113.334	417.201	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0307581F / *JSTARS Recap*

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The JSTARS Recap program (hereinafter, the "Program") is a pre-Major Defense Acquisition Program (MDAP). The Program achieved Milestone (MS) A approval on 10 December 2015, received Request for Proposal (RFP) release decision review Acquisition Decision Memorandum (ADM) on 7 September 2016, and commenced source selection on 2 March 2017. The MS B decision review is currently scheduled for 2QFY18, with a contract award anticipated 3-4QFY18. JSTARS Recap is comprised of a business-class CDA with integrated BMC2, radar and communication subsystems, as well as ground support systems (trainers, simulators, mission planning, etc). The Program will leverage available systems and mature technologies using Open Systems Architecture (OSA) to minimize risks during the EMD phase while lowering life cycle costs. The Program developed a Government Reference Architecture (GRA) to define functional capabilities of the JSTARS Recap Weapon System (WS). The GRA enabled subsystem technical analysis and risk reduction to validate technical maturity. The GRA also supports the Program's strategy to OTB, aimed to reduce cost throughout the system's life cycle, foster competition during the Operations and Support (O&S) acquisition phase, and allow flexibility to readily incorporate new technologies and capabilities.

Prior to MS A, the Program executed three (3) contracts to conduct system-level System Requirements Reviews (SRR) (collectively, the "Pre-EMD Contracts"). The Pre-EMD Contracts focused on requirements analysis, assessing the WS design, design maturity, and risk reduction. Upon receiving MS A approval, the Program exercised the TMRR options for system-level design reviews and subsystems prototype demonstrations. In parallel with the Pre-EMD Contracts, the Program also executed contracts with the two (2) viable radar Original Equipment Manufacturers (OEMs) focused on advancing radar design, assessing manufacturing readiness, and mitigating both technical and schedule risk during the EMD Phase. The Program commenced source selection on 2 March 2017. This was separate, full and open competition for the EMD phase of the Program. Contract Award is expected between 2-4QFY18 and will include the EMD effort as well as options for Low-Rate Initial Production (LRIP) and FRP Lots #1-3.

The Program will develop a total of seventeen (17) JSTARS Recap WS. The first three (3) WS produced during EMD will be instrumented to support Developmental Test and Evaluation (DT&E). After DT&E, two (2) of these instrumented WS will be reconfigured to production representative WS in support of Initial Operational Capability (IOC); the one (1) remaining WS will maintain instrumentation for testing purposes. Two (2) LRIP WS will be developed to meet the four (4) WS required for IOC. FRP will consist of three (3) production lots to procure an additional twelve (12) WS to support Full Operational Capability (FOC) by 2QFY28.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0307581F / *JSTARS Recap*	**Project (Number/Name)** 650003 / *JSTARS Recapitalization*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
JSTARS Recap Pre-EMD Contract #1	C/FFP	Boeing Service Co. : Richardson, TX	37.380	-		-		-		-		-	0.000	37.380	27.380
JSTARS Recap Pre-EMD Contract #2	C/FFP	Northrop Grumman Systems Corp : Melbourne, FL	24.750	-		-		-		-		-	0.000	24.750	24.750
JSTARS Recap Pre-EMD Contract #3	C/FFP	Lockheed Martin Corp : King of Prussia, PA	24.723	-		-		-		-		-	0.000	24.723	24.723
JSTARS Recap Radar Risk Reduction Contract #1	C/CPFF	Raytheon : McKinney, TX	12.820	26.000	Oct 2016	-		-		-		-	0.000	38.820	60.465
JSTARS Recap Radar Risk Reduction Contract #2	C/CPFF	Northrop Grumman Systems Corp : Linthicum Heights, MD	12.569	42.000	Oct 2016	-		-		-		-	0.000	54.569	63.408
JSTARS Recap EMD	Various	TBD : TBD	-	-		373.600	May 2018	-		-		-	1,772.283	2,145.883	2,721.883
		Subtotal	112.242	68.000		373.600		-		-		-	1,772.283	2,326.125	N/A

Remarks

EMD contract award assumption is last half of FY18 (3QFY18 used for budgetary purposes). Pre-Engineering and Manufacturing Development (EMD) contracts were incrementally funded with the basic contract (Materiel Solution Analysis) awarded on 7 August 2015 and options for Technology Maturation and Risk Reduction (TMRR) activities exercised in FY16. Two Radar Risk Reduction contracts were awarded in FY16 with follow-on efforts in FY17.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Responsible Test Organization (RTO)	MIPR	Various : Various	1.467	2.070	Oct 2016	5.251	Oct 2017	-		-		-	21.716	30.504	37.020
		Subtotal	1.467	2.070		5.251		-		-		-	21.716	30.504	N/A

Remarks

Activities include, but not limited to, detailed test planning and provisioning to include the writing of a detailed test and safety plans, setting up the test execution data and documentation management infrastructure, developing data analysis tools, provisioning for test assets, instrumentation and ranges. Activities may be accomplished utilizing

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0307581F / *JSTARS Recap*	Project (Number/Name) 650003 / *JSTARS Recapitalization*

the DoD Major Ranges & Test Facilities which include, but not limited to, the AFTC (412TW and 96TH), Joint Interoperability Test Center (JITC), the 346th TS, Live Fire Test Organizations (AFLMC/EZJA and 96th TG Det 1), and Operational Test Agencies (AFOTEC).

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : Bedford, MA	10.500	11.080	Oct 2016	12.100	Oct 2017	-		-		-	83.800	117.480	130.000
PASS Support (A and AS)	Various	Various : Bedford, MA	2.400	2.608	Nov 2016	5.200	Nov 2017	-		-		-	6.600	16.808	26.654
ETASS Support (A and AS)	Various	Various : Bedford, MA	2.100	2.200	Nov 2016	6.200	Nov 2017	-		-		-	6.150	16.650	24.749
PMA and additional risk reduction activities	Various	Various : Bedford, MA	41.476	27.376	Dec 2016	14.850	Oct 2017	-		-		-	17.425	101.127	86.325
		Subtotal	56.476	43.264		38.350		-		-		-	113.975	252.065	N/A

Remarks

EMD contract award assumption is last half of FY18 (3QFY18 used for budgetary purposes). Management services are required to support an aggressive schedule leading to a Critical Design Review (CDR) within one year of contract award. This will require expertise and manpower to review CDRLs, software and documentation; analyze and model performance; and identify and mitigate risks.

Leading up to contract award, management services will support source selection and EMD preparation activities. These activities focus on ensuring operational effectiveness through Owning the Technical Baseline: modeling and simulation to understand design trade-space, establishment of a System Integration Lab (SIL) and tool development to assess Open Systems Architecture (OSA) and Open Mission Systems (OMS) compliance that ensures future affordability and agility.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	170.185	113.334		417.201		-		-		-	1,907.974	2,608.694	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0307581F / *JSTARS Recap*	**Project (Number/Name)** 650003 / *JSTARS Recapitalization*

JSTARs Recap	
Engineering and Manufacturing Development RFP Release (DEC 2016)	
Radar Risk Reduction Activities	
Milestone B	
Contract Award	
Engineering and Manufacturing Development	
CDA buys/deliveries	
Developmental Test and Evaluation	

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0307581F / *JSTARS Recap*	**Project (Number/Name)** 650003 / *JSTARS Recapitalization*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
JSTARs Recap				
Engineering and Manufacturing Development RFP Release (DEC 2016)	1	2017	1	2017
Radar Risk Reduction Activities	2	2017	1	2018
Milestone B	2	2018	2	2018
Contract Award	3	2018	4	2018
Engineering and Manufacturing Development	3	2018	4	2022
CDA buys/deliveries	3	2018	2	2022
Developmental Test and Evaluation	4	2019	4	2022

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0401310F / *C-32 Executive Transport Recapitalization*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	6.017	7.943	0.000	7.943	9.930	9.926	9.953	10.134	Continuing	Continuing
654019: *C-32 Executive Transport Recap*	-	0.000	6.017	7.943	0.000	7.943	9.930	9.926	9.953	10.134	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The C-32A Executive Transport Recapitalization program will replace the current C-32A aircraft fleet which reaches planned 25-year service life in 2023. Recapitalization efforts will align with the current Presidential Aircraft Recapitalization and the E-4B National Airborne Operations Center Recapitalization efforts to explore commonality and standardization of subsystems and airframes.

The C-32A mission is to provide Executive Airlift transportation for the President of the United States, First Lady, Vice President, Cabinet, Congress, and foreign Heads of State.

The C-32A recap will mitigate capability gaps when serving as the backup to the VC-25A and VC-25B Presidential Support Aircraft. The C-32A replacement aircraft will have increased range, passenger carrying capacity, enhanced senior leader communications systems, and a private work space.

This budget supports funding to complete an Analysis of Alternatives (AoA) in collaboration with the E-4B Recapitalization AoA to explore commonality and interoperability of mission equipment including the airframe. Funding also allows for establishing a program office, completing early acquisition activities, begin acquisition strategy development, and conducting market research. Funding also supports initial risk reduction activities and conduct cost/performance trade studies.

This program is in Budget Activity 5 (System Development and Demonstration), since it has passed Milestone B approval and is conducting Engineering and Manufacturing Development tasks aimed at meeting validated requirements prior to full rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0401310F / *C-32 Executive Transport Recapitalization*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	6.017	8.003	0.000	8.003
Current President's Budget	0.000	6.017	7.943	0.000	7.943
Total Adjustments	0.000	0.000	-0.060	0.000	-0.060
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.060	0.000	-0.060

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: C-32A Executive Transport Recapitalization Analysis of Alternatives ***Description:*** AoA activities to assesses potential materiel solutions to mitigate current capability gaps. ***FY 2018 Plans:*** Begin AoA activities to assesses potential materiel solutions to mitigate current capability gaps. ***FY 2019 Base Plans:*** Continue AoA activities to assesses potential materiel solutions to mitigate current capability gaps. ***FY 2019 OCO Plans:*** None ***FY 2018 to FY 2019 Increase/Decrease Statement:*** None	-	3.017	4.000	0.000	4.000
Title: C-32A Executive Transport Recapitalization Program Office Standup ***Description:*** Standup of Program Office to support AoA and early acquisition activities. ***FY 2018 Plans:*** Standup Program Office to support AoA and early acquisition activities. ***FY 2019 Base Plans:***	-	3.000	3.943	0.000	3.943

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0401310F / *C-32 Executive Transport Recapitalization*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue establishing Program Office to support AoA and early acquisition activities. ***FY 2019 OCO Plans:*** None ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increased staffing for statutory/regulatory documentation, final AOA outbrief, and program initiation.					
Accomplishments/Planned Programs Subtotals	-	6.017	7.943	0.000	7.943

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The C-32A Executive Transport Recapitalization effort acquisition strategy will be fully developed after completion of the Analysis of Alternatives. The program will integrate technologically mature subsystems into a commercial derivative aircraft.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0401310F / *C-32 Executive Transport Recapitalization*	**Project (Number/Name)** 654019 / *C-32 Executive Transport Recap*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C-32 Executive Transport Recapitalization Analysis of Alternatives	TBD	Not Specified : TBD	-	-		3.017	Mar 2018	4.000	Mar 2019	-		4.000	Continuing	Continuing	-
		Subtotal	-	-		3.017		4.000		-		4.000	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C-32 Executive Transport Recapitalization Other Government Costs	Various	AFLCMC/WL : Dayton, OH	-	-		3.000	Apr 2018	3.943	Jan 2019	-		3.943	Continuing	Continuing	-
		Subtotal	-	-		3.000		3.943		-		3.943	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		6.017		7.943		-		7.943	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0401310F / *C-32 Executive Transport Recapitalization*	**Project (Number/Name)** 654019 / *C-32 Executive Transport Recap*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
C-32 Recap																												
Program Office Standup																												
Analysis of Alternatives																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0401310F / *C-32 Executive Transport Recapitalization*	**Project (Number/Name)** 654019 / *C-32 Executive Transport Recap*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
C-32 Recap				
Program Office Standup	3	2018	4	2023
Analysis of Alternatives	3	2018	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0401319F / *Presidential Aircraft Recapitalization (PAR)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	288.426	311.252	434.069	673.032	0.000	673.032	739.123	638.824	536.773	332.422	Continuing	Continuing
655250: *Presidential Aircraft Recap (PAR)*	288.426	311.252	434.069	673.032	0.000	673.032	739.123	638.824	536.773	332.422	Continuing	Continuing
Quantity of RDT&E Articles	-	2	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 425

Note

FY10-14 Prior Years Funding $27.29M was executed in PE 0401314F, BPAC 675355.

A. Mission Description and Budget Item Justification

The Presidential Aircraft Recapitalization (PAR) Program, now officially designated as VC-25B, will replace the Presidential VC-25A fleet which faces capability gaps, rising maintenance costs, and parts obsolescence as it reaches the end of its planned 30-year life-cycle. The VC-25B Program Office will deliver a new fleet of aircraft to meet the requirements for the President to execute the duties of Head of State, Chief Executive, and Commander-in-Chief. The VC-25B Program will uniquely modify Boeing 747-8 commercial aircraft to provide the President, staff, and guests with safe and reliable air transportation with the equivalent level of communications capability and security available in the White House. The modifications to the 747-8 aircraft will include an electrical power upgrade with dual Auxiliary Power Units that are usable in flight, mission communication system, work and rest environment, executive interior, military avionics, self-defense system, autonomous enplaning and deplaning, and autonomous baggage loading. No significant changes to the existing VC-25A Concept of Operations or Concept of Employment are expected.

In August 2012, the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) approved the VC-25B Materiel Development Decision. The Capability Development Document (CDD) was validated by the Joint Requirements Oversight Council in November 2014. In January 2015, the Secretary of the Air Force's Determination and Findings designated the Boeing 747-8 aircraft as the VC-25B platform, and the USD (AT&L)'s Acquisition Decision Memorandum authorized Pre-Milestone B (Pre-MS B) contracts aimed at improving affordability and reducing program execution risk. In February 2015, the Assistant Secretary of the Air Force for Acquisition approved a Justification and Approval designating Boeing as the sole source for PAR Pre-MS B activities and Post-MS B design, integration, modification, and test activities. The acquisition strategy was approved by USD(AT&L) in September 2015. In March 2017, the White House reaffirmed the minimum set of requirements necessary to meet Presidential mission needs; these requirements are codified in the March 2017 CDD. MS B certification occurred in September 2016.

This budget supports Pre-MS B risk reduction activities and studies, Post-MS B design, integration, modification, and test of two aircraft to make them Presidential mission ready. In FY17, the program began Preliminary Design (PD) and awarded a contract modification to purchase two Boeing 747-8 commercial aircraft, taking acceptance of those aircraft in early FY18. In FY18 and FY19, the program will continue PD activities and begin Engineering and Manufacturing Development (EMD).

Funds may be used to address emerging and short-notice Diminishing Manufacturing and Material Shortage (DMSMS) issues.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0401319F / *Presidential Aircraft Recapitalization (PAR)*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver VC-25B system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

This program is in Budget Activity 5, System Development and Demonstration (SDD), because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	351.220	434.069	737.096	0.000	737.096
Current President's Budget	311.252	434.069	673.032	0.000	673.032
Total Adjustments	-39.968	0.000	-64.064	0.000	-64.064
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-29.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-10.968	0.000			
• Other Adjustments	0.000	0.000	-64.064	0.000	-64.064

Change Summary Explanation

The FY17 funding request was reduced by $39.968M due to a Congressional mark for early-to-need Preliminary Design and Small Business Innovative Research taxes. The FY19 funding request was reduced by $59M to account for the change in acquisition strategy for the purchase of the 747-8 aircraft.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: PAR Pre-MS B Risk Reduction, Commercial A/C, PD, EMD, & Program Management Administration (PMA)	310.729	433.219	669.537
Description: Pre-MS B activities to refine requirements and reduce risk; begin PD activities and utilize modeling and simulation, system integration labs, and mockups to assist in the design; execute EMD activities; and accomplish PMA to support the Program Office. In FY17, the Program Office purchased two commercial 747-8 aircraft which will enable PAR test activities. EMD activities include the management, detailed design, integration, modification, test/verification, certification, and pre-operational support to deliver two VC-25B Aircraft to be Presidential mission-ready.			
FY 2018 Plans: Funds in FY 2018 will continue PD activities, begin EMD, and support PMA.			
FY 2019 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0401319F / *Presidential Aircraft Recapitalization (PAR)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Funds in FY 2019 will continue PD and EMD activities, and support PMA. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The increase in funding is due to the ramp up of EMD design, integration, modification, and test activities.			
Title: VC-25B Government Test ***Description:*** Government test activities to prepare for, oversee, and conduct test events. ***FY 2018 Plans:*** Funds in FY 2018 will be used to prepare for and participate in test planning and events leading to PDR, update the Test & Evaluation Master Plan (TEMP), and support EMD contract modification award. ***FY 2019 Plans:*** Funds in FY 2019 will be used for Systems Integration Laboratory (SIL) development and design discussions for events leading to CDR; and participation in early test planning and reviews. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The increase in funding is due to increased test planning with SIL development efforts, and oversight with the start of SIL testing.	0.523	0.850	3.495
Accomplishments/Planned Programs Subtotals	311.252	434.069	673.032

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• MILCON PE 0401319F: *PAR Facilities*	22.220	271.500	191.000	-	191.000	-	-	-	-	Continuing	Continuing
• OPAF 04 Lineitem 843050: *PAR Mechanized Material Handling Equip*	-	-	41.110	-	41.110	-	-	-	-	Continuing	Continuing
• OPAF 03 Lineitem 8347240: *PAR CCTV/Audiovisual Equipment*	-	-	4.010	-	4.010	-	-	-	-	Continuing	Continuing
• OPAF 03 Lineitem 837300: *PAR Base Comm Infrastructure*	-	-	-	-	-	4.010	-	-	-	Continuing	Continuing
• O&M O&M: PE 0401319F: *PAR Furnishings and Equipment*	-	-	-	-	-	-	1.951	-	-	Continuing	Continuing

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0401319F / *Presidential Aircraft Recapitalization (PAR)*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost

Remarks

FY18 MILCON funding line pending Congressional marks for as much as $196M. The FY19 numbers account for those pending marks in order to maintain full funding.

E. Acquisition Strategy

The USD(AT&L) VC-25B Acquisition Strategy was approved in September 2015. The VC-25B Program will integrate technologically mature subsystems into commercial Boeing 747-8 aircraft. The VC-25B Program will design, integrate, modify, and test two aircraft to make them Presidential mission ready. Boeing will be the prime integrator for VC-25B development activities. However, the Air Force intends to incorporate competition for subsystems for the modified aircraft as much as practicable and will participate substantively in selected Boeing-led subsystem competitions. The VC-25B Program has a single contract with multiple planned major contract modifications which include 747-8 commercial aircraft, PD and EMD. The contract for risk reduction activities was awarded on 29 January 2016. The contract modification for two commercial aircraft was awarded 4 August 2017. The contract modification for PD was awarded 12 September 2017.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0401319F / *Presidential Aircraft Recapitalization (PAR)*	**Project (Number/Name)** 655250 / *Presidential Aircraft Recap (PAR)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
VC-25B Contract Activities	SS/ Various	The Boeing Company : Seattle, WA	280.129	304.873	Mar 2017	425.657	Dec 2017	662.050	Oct 2018	-		662.050	Continuing	Continuing	-
		Subtotal	280.129	304.873		425.657		662.050		-		662.050	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
VC-25B Developmental Test and Evaluation	MIPR	412 TW, JITC : Various, NV	0.231	0.523	Feb 2017	0.850	Oct 2017	3.495	Dec 2018	-		3.495	Continuing	Continuing	-
		Subtotal	0.231	0.523		0.850		3.495		-		3.495	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
VC-25B Other Government Costs	Various	AFLCMC/WV : WPAFB, OH	2.759	2.297	Nov 2016	3.230	Nov 2017	3.787	Nov 2018	-		3.787	Continuing	Continuing	-
VC-25B A&AS	C/T&M	AFLCMC/WL : WPAFB, OH	5.307	3.559	Dec 2016	4.332	Feb 2018	3.700	Feb 2019	-		3.700	Continuing	Continuing	-
		Subtotal	8.066	5.856		7.562		7.487		-		7.487	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	288.426	311.252		434.069		673.032		-		673.032	Continuing	Continuing	N/A

Remarks

FY 2010-2014 RDT&E Funding ($27.3M) was executed in PE 0401314F, Project 675355, BA07.

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0401319F / *Presidential Aircraft Recapitalization (PAR)*	**Project (Number/Name)** 655250 / *Presidential Aircraft Recap (PAR)*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0401319F / *Presidential Aircraft Recapitalization (PAR)*	**Project (Number/Name)** 655250 / *Presidential Aircraft Recap (PAR)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
VC-25B				
Pre-MS B Risk Reduction Activities	1	2017	2	2018
Commercial A/C Award	4	2017	4	2017
Preliminary Design Award & Activities	4	2017	1	2019
In-Progress Review, FY17	3	2017	3	2017
PDR	1	2019	1	2019
In-Progress Review, FY18	3	2018	3	2018
CDR	1	2020	1	2020
EMD Award & Activities	4	2018	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0701212F / *Automated Test Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	14.029	18.528	13.653	0.000	13.653	0.000	0.000	0.000	0.000	Continuing	Continuing
6506TE: *Test And Evaluation Support Budget Authority*	-	14.029	18.528	13.653	0.000	13.653	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 6506

Note

The Automatic Test System program office is responsible for developing, acquiring and sustain Automatic Test Systems for the United Stated Air Force (USAF).

The Bomber Armament Tester is replacing six legacy testers and combining their capabilities into one tester. The Bomber Armament Tester will support the B-2, B-1 and B-52 platforms.

The Common Aircraft Portable Reprogramming Equipment (CAPRE) is a secure common Memory Loader Verifier (MLV) that loads operational flight programs for 32 USAF weapons systems. Weapon Systems include but are not limited to A-10, B-1, B-52, C-5, C-17, C-130, CV-22, F-15, F-16, H-60 and KC-46.

A. Mission Description and Budget Item Justification

The Bomber Armament Tester will ensure that our USAF bomber fleet can conduct nuclear deterrence, global power projection and global strike operations to support the President of the United States and Combatant Commanders by providing a reliable, cyber secure, and sustainable tester. The tasks are to develop a common bomber armament tester and the Test Program Sets (Software, Hardware, and Documentation) to test the armament release equipment on the bombers.

RDT&E efforts support development, testing, and producibility of the Bomber Armament Tester and Test Program Sets. The program will utilize an incremental development approach with B-2 as Increment 1, B-1 as Increment 2, and B-52 as Increment 3. Increment 1 is funded and will consists of up to 5 test articles. Increment 2 and Increment 3 are currently unfunded in the FYDP.

The Common Aircraft Portable Reprogramming Equipment (CAPRE) Secure Memory Loader Verifier (SMLV) is a secure common memory loader verifier that loads operational flight programs to the weapon systems. . CAPRE leads the fleet on Cyber initiatives and is government owned and developed. CAPRE supports 32 USAF weapon systems including but not limited to A-10, B-1, B-52, C-5, C-17, C-130, CV-22, F-15, F-16, H-60 and KC-46.

RDT&E effort includes developing a Network Interface Module (NIM) that provides additional cyber hardening to the CAPRE system and redesigning the current CAPRE system to adapt to the NIM. RDT&E effort also includes software development for NIM interfaces and new weapons systems moving to the CAPRE system from other MLV systems. The goal is to provide one common cyber secure MLV for the Air Force that minimizes cyber vulnerabilities in weapon systems.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0701212F / *Automated Test Systems*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver X-XX weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F."

This program element also includes program administrative cost for the Automatic Test Systems program office and funds the cost of studies and research to support the Automatic Test Systems fleet.

FY 19 funding will be used to continue the development and testing of the Bomber Armament Tester (BAT) and FY 18 funds starts the development hardware and software for the Common Aircraft Portable Reprogrammable Equipment Secure Memory Loader Verifier (CAPRE SMLV)

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	19.062	18.528	13.756	0.000	13.756
Current President's Budget	14.029	18.528	13.653	0.000	13.653
Total Adjustments	-5.033	0.000	-0.103	0.000	-0.103
• Congressional General Reductions	-4.500	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.533	0.000			
• Other Adjustments	0.000	0.000	-0.103	0.000	-0.103

Change Summary Explanation

FY 2017 adjustments include -$4.500M congressional mark and -$0.533M for SBIR.

FY 2019 adjustments: -$0.103M: PB decrease

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Bomber Armament Tester	14.029	11.878	13.653	0.000	13.653
Description: New Common Bomber Armament Tester for B-1, B-2, and B-52.					
FY 2018 Plans: - Develop Bomber Armament Tester and Test Program Sets for use with B-2					

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0701212F / *Automated Test Systems*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
- Conduct initial test with B-2 - Requirements analysis for increments 1 and 2. This will include the most complex B-1 and B-52 test program set development. ***FY 2019 Base Plans:*** - Continue to develop Bomber Armament Tester and Test Program Sets for use with B-2 - Conduct additional test with B-2 - Requirements analysis for increments 1 and 2. This will include the most complex B-1 and B-52 test program set development. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Continued program progress					
Title: CAPRE ***Description:*** Development of a common cyber secure Memory Loader Verifier for the Air Force. ***FY 2018 Plans:*** Complete Network Interface Module (NIM) development and complete prototyping. Start development of Software for NIM and other weapons system transition. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Continue program progress.	-	6.650	-	-	-
Accomplishments/Planned Programs Subtotals	14.029	18.528	13.653	0.000	13.653

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• PAAF 07 00071: *Replacement Support Equipment*	20.000	7.782	12.000	-	12.000	-	-	-	-	0.000	39.782

Remarks

Other program funding includes procurement funds for Bomber Armament Tester Program and the Common Aircraft Portable Reprogrammable Equipment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 0701212F / *Automated Test Systems*	

E. Acquisition Strategy

Acquisition Strategy for the Bomber Armament Tester (BAT) was approved by AFPEO/ Agile Combat Support on 12 November 2015 . The BAT program will use an incremental approach based on customer needs to satisfy this requirement. Increment 1 includes the development of the core test set, the B-2A requirements and development of the most complex B-1B and B-52 test program sets. Increment 2 consist of the B-1B development and Increment 3 consists of the B-52H requirements. Currently increments 2 and 3 are unfunded through the FYDP. The BAT program will utilize full and open competition to award the contract. Contract awarded September 28, 2017.

The Acquisition strategy for Common Aircraft Portable Reprogrammable Equipment (CAPRE) Secure Memory Loader Verifier. (SMLV) is to use the original government manufacturer to develop the NIM , software and hardware development. Acquisition Strategy for CAPRE was approved by the Milestone Decision Authority in June 2017.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0701212F / *Automated Test Systems*	**Project (Number/Name)** 6506TE / *Test And Evaluation Support Budget Authority*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CAPRE/CAPRE SMLV Development	TBD	Not specified. : NV	-	-		6.300	Dec 2017	-		-		-	Continuing	Continuing	-
BAT Development	C/CPIF	Not specified. : NV	-	8.769	Sep 2017	7.444	Feb 2018	12.303	Sep 2019	-		12.303	Continuing	Continuing	-
		Subtotal	-	8.769		13.744		12.303		-		12.303	Continuing	Continuing	N/A

Remarks

Product Development Cost include the development of the Bomber Armament Test Sets (Units under test Software, hardware and Technical Data), Technical Data and maintenance of Government Furnished Equipment.

Development efforts include developing a Network Interface Module (NIM) that provides additional cyber hardening to the CAPRE system and redesigning the current CAPRE system to adapt to the NIM. Development effort also include software development for NIM interfaces and new weapons systems moving to the CAPRE system from other MLV systems. The goal is to provide one common cyber secure MLV for the Air Force.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Logistic Support	C/CPIF	Not specified. : NV	-	3.160	Sep 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	3.160		-		-		-		-	Continuing	Continuing	N/A

Remarks

Support Cost include Independent verification and validation support, Nuclear Certification Support and Cyber Security authority support.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development and Operation Testing support	C/CPIF	Not specified. : NV	-	-		2.834	Jan 2019	-		-		-	Continuing	Continuing	-
		Subtotal	-	-		2.834		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0701212F / *Automated Test Systems*	**Project (Number/Name)** 6506TE / *Test And Evaluation Support Budget Authority*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Environmental testing of the Bomber Armament Tester and operational testing of the test program sets for the B-2 and most complex B-1 and B-52

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
BAT Travel	Various	Not specified. : NV	-	0.100	Sep 2018	0.100	Sep 2018	0.100	Sep 2019	-		0.100	Continuing	Continuing	-
BAT Program Management Support	C/FFP	Not specified. : NV	-	2.000	Oct 2017	1.500	Mar 2018	1.000	Oct 2019	-		1.000	Continuing	Continuing	-
CAPRE/CAPRE SMLV Travel	Various	Not specified. : NV	-	-		0.050	Sep 2018	0.050	Sep 2019	-		0.050	Continuing	Continuing	-
CAPRE/ CAPRE SMLV Program Management Support	C/FFP	Not specified. : NV	-	-		0.300	Jun 2018	0.200	May 2019	-		0.200	Continuing	Continuing	-
		Subtotal	-	2.100		1.950		1.350		-		1.350	Continuing	Continuing	N/A

Remarks

PMA costs include travel to support the development of the Bomber Armament Tester. PMA cost also include an Information Assurance expert and Assistance and advisory service contractors to provide support to the program office during the development of the program.The program element may include necessary civilian pay expenses required to manage, execute and deliver Automatic Test System capability.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	14.029		18.528		13.653		-		13.653	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0701212F / *Automated Test Systems*	**Project (Number/Name)** 6506TE / *Test And Evaluation Support Budget Authority*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 0701212F / *Automated Test Systems*	**Project (Number/Name)** 6506TE / *Test And Evaluation Support Budget Authority*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Automatic Test Systems				
BAT Milestone B Decision	3	2017	3	2017
BAT Contract Award	4	2017	4	2017
BAT Milestone C Decision	4	2019	4	2019
CAPRE NIM Initial prototyping	3	2018	4	2018
CAPRE CDR	3	2018	3	2018
CAPRE NIM Baseline Design/Drawing and Software	3	2018	2	2019
CAPRE Software Development (Weapon Sytem Transition)	3	2018	4	2019
Cable Design	3	2018	4	2019

Note

Schedule reflects increment one EMD. Increments two and three are currently unfunded.

CAPRE is government designed and development. Plan is to have original government manufacturer to handle this development effort.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203176F / *Combat Survivor Evader Locator*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	30.282	24.967	0.939	0.000	0.939	0.000	0.000	0.000	0.000	Continuing	Continuing
654522: *CSAR EMD*	-	30.282	24.967	0.939	0.000	0.939	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Combat Survivor Evader Locator (CSEL) System provides aircrews with end-to-end global satellite secure emergency communication capability during combat and peace-time flying operations. CSEL provides a hand held radio as part of the mandatory aircrew survival gear. CSEL is the Joint Program of Record. CSEL supports four of five Personnel Mission Phases: Report, Locate, Support, and Recover.

A National Security Agency (NSA) Cryptographic Modernization mandate and the Ultra High Frequency Follow-On satellite constellation are at the end of life and are driving upgrades to 60,000+ hand held radios and base stations. This effort includes development to modernize the system to integrate common waveforms, integrate broadcast reception for non-CSEL devices, provide for cryptographic modernization, leverage software defined capabilities based on the FY16 cryptographic study, and to procure intellectual property. This funding will also be used to perform various studies and analysis in support of the CSEL Enterprise.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CSEL weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validate requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	29.253	24.967	0.946	0.000	0.946
Current President's Budget	30.282	24.967	0.939	0.000	0.939
Total Adjustments	1.029	0.000	-0.007	0.000	-0.007
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	2.100	0.000			
• SBIR/STTR Transfer	-1.071	0.000			
• Other Adjustments	0.000	0.000	-0.007	0.000	-0.007

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203176F / *Combat Survivor Evader Locator*

Change Summary Explanation

FY2017: $2.100M increase to fund cryptographic modernization.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: CSEL Next Generation Cryptographic Architecture (NGCA)	30.282	24.967	0.939
Description: A NSA cryptographic modernization mandate and the Ultra High Frequency Follow-On satellite constellation at end of life are both driving upgrades to 60,000 handheld CSEL rescue radios and base station. ***FY 2018 Plans:*** Continue cryptographic modernization development and begin formal testing. ***FY 2019 Plans:*** Complete formal testing and field the cryptographic modernization. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 decrease compared to FY2017 by $24.021M. Justification for this decrease is described in plans above.			
Accomplishments/Planned Programs Subtotals	30.282	24.967	0.939

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• OPAF 03 P-54: *OPAF: BA03: Line Item # 837170: Combat Survivor Evader Locator*	-	3.004	0.000	-	0.000	0.000	-	-	-	0.000	3.004

Remarks

Funding will be used to purchase hardware to upgrade the Ultra High Frequency (UHF) Base Stations.

E. Acquisition Strategy

This effort was awarded sole source to The Boeing Company due to the lack of technical data.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1203176F / *Combat Survivor Evader Locator*	Project (Number/Name) 654522 / *CSAR EMD*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Crypto Modernization - HW/SW Development	SS/CPIF	The Boeing Company : Huntington Beach, CA	-	29.303	Mar 2017	15.371	Mar 2018	-		-		-	Continuing	Continuing	-
		Subtotal	-	29.303		15.371		-		-		-	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AIRWorks Next Generation Cryptographic Architecture (NGCA) Support	MIPR	NAVAIR : Saint Inigoes, MD	-	0.600	Nov 2016	4.601	Mar 2018	-		-		-	Continuing	Continuing	-
Other Agency Support	MIPR	Various : TBD	-	-		2.600	Apr 2018	-		-		-	Continuing	Continuing	-
		Subtotal	-	0.600		7.201		-		-		-	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Crypto Modernization Developmental Testing	SS/CPIF	Then Boeing Company : Huntington Beach, CA	-	-		1.452	Mar 2018	-		-		-	Continuing	Continuing	-
		Subtotal	-	-		1.452		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1203176F / *Combat Survivor Evader Locator*	**Project (Number/Name)** 654522 / *CSAR EMD*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Advisory & Assistance Services	C/Various	Various : Hill AFB, UT	-	0.379	Jan 2017	0.400	Apr 2018	0.400	Jan 2019	-		0.400	Continuing	Continuing	-
Systems Engineering	C/Various	Various : Hill AFB, UT	-	-		0.543	Apr 2018	0.539	Mar 2019	-		0.539	Continuing	Continuing	-
		Subtotal	-	0.379		0.943		0.939		-		0.939	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	30.282		24.967		0.939		-		0.939	Continuing	Continuing	N/A

Remarks

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1203176F / *Combat Survivor Evader Locator*	**Project (Number/Name)** 654522 / *CSAR EMD*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
CSEL Crypto Modernization																												
Crypto Modernization Development																												
Crypto Modernization Test & Evaluation (T&E)																												
Crypto Modernization Fielding																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1203176F / *Combat Survivor Evader Locator*	**Project (Number/Name)** 654522 / *CSAR EMD*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CSEL Crypto Modernization				
Crypto Modernization Development	2	2017	4	2018
Crypto Modernization Test & Evaluation (T&E)	4	2018	3	2019
Crypto Modernization Fielding	4	2019	4	2020

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203269F / *GPS IIIC*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	451.889	0.000	451.889	474.235	435.063	371.441	306.158	Continuing	Continuing
653170: *GPS IIIC*	-	0.000	0.000	451.889	0.000	451.889	474.235	435.063	371.441	306.158	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 1203269F, project 653170, GPS III Follow-On Development, is a new start.

Program Element (PE) 1203269F GPS III Follow-On is a New Start comprised of some activities formerly documented in PE 1203265F GPS III Space Segment (BPAC 67A019 GPS III, SV11+ Production Readiness, Space Modernization Initiative (SMI) and BPAC 676007 SAR-GPS) from FY2019 forward and provides distinct and comprehensive documentation of the RDT&E activities supporting the GPS III Follow-On program.

In December 2017, Principal Deputy Office of the Assistant Secretary of the Air Force (Acquisition & Logistics) declared the GPS III Follow-On program a new start beginning in FY2019 and, consistent with the 2016 National Defense Authorization Act, the program is therefore categorized as an ACAT 1B Major Defense Acquisition Program (MDAP) with the Service Acquisition Executive (SAE) serving as the Milestone Decision Authority (MDA).

A. Mission Description and Budget Item Justification

GPS III Follow-On program will deliver GPS III satellites beyond the first ten Space Vehicles (SVs) being delivered by the GPS III program (funded in PE 1203265F GPS III Space Segment). The GPS III Follow-On satellites will maintain the same capabilities as the GPS III satellites, but will also deliver significant enhancements to include: backward compatibility, Unified S-Band (USB) interface compliance, integration of hosted payloads (redesigned Nuclear Detonation Detection System (NDS), Laser Retro-reflector Arrays (LRAs), Search and Rescue/GPS (SAR/GPS), Energetic Charged Particles (ECP) sensor), and Regional Military Protection (RMP) capabilities that provide the ability to deliver high-power regional M-Code signals in specific areas of intended effect. Implementation of RMP into the GPS Enterprise will require integration with the ground and user segments, executed by the Global Positioning System Next Generation Operational Control System (OCX) and Military GPS User Equipment (MGUE) programs, respectively.

This PE includes Space Modernization Initiative (SMI) funding. SMI focuses on space vehicle affordability, capability and addresses future requirements and resiliency needs. The Air Force is using its research laboratories to mature mission related capabilities, technologies (advanced clocks, amplifiers, crosslinks, etc.), and inform future PNT architectures.

This PE funds the research, development, test and evaluation of GPS III SV11-12 (to include non-recurring engineering support efforts). This activity includes risk-reducing simulators and systems engineering associated with delivering the new capabilities required of GPS III Follow-On.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise,

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203269F / *GPS IIIC*

to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This PE may include necessary civilian Pay expenses required to manage, execute, and deliver GPS III Space Segment weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in PEs 1206392F and 1206398F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	451.889	0.000	451.889
Total Adjustments	0.000	0.000	451.889	0.000	451.889
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	451.889	0.000	451.889

Change Summary Explanation

FY2019: +$451.889M transferred from PE 1203265F to new PE 1203269F GPS IIIC Follow-On to create GPS IIIC MDAP program transparency.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: GPS III Follow-On Development	-	-	451.889
Description: The program will utilize RDT&E funds to develop and deliver SV11-12, conduct the non-recurring engineering (NRE) of developing risk reducing simulators, support test equipment, and conducting the systems engineering associated with delivering the new capabilities required of GPS III Follow-On including backward compatibility, dual band TT&C, integration of Government Furnished Equipment (GFE) hosted payloads, and Regional Military Protection (RMP), which provides the ability to deliver high-power regional M-Code signals in specific areas of intended effect.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203269F / *GPS IIIC*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2019 Plans: Program office will award the Phase 2 contract in early FY 2019. Upon contract award, the program will initiate efforts to prepare for and conduct Critical Design Review (CDR), continue development of SV11-12, and prepare for Milestone C in early 2020. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** This program is an FY19 New Start. Related FY18 efforts are included in PE 1203265F.			
Accomplishments/Planned Programs Subtotals	-	-	451.889

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 07 1203265F: *GPS III Space Segment*	165.794	243.435	144.543	-	144.543	42.440	10.780	7.296	8.893	12.008	635.189
• SPAF 01 Line Item: GPS III: *GPS III Space Segment*	33.974	85.894	69.386	-	69.386	773.398	782.838	1,152.975	1,152.796	4,185.159	8,236.420

Remarks

E. Acquisition Strategy

In December 2017, Principal Deputy Office of the Assistant Secretary of the Air Force (Acquisition & Logistics) declared the GPS III Follow-On program a new start beginning in FY 2019 and, consistent with the 2016 National Defense Authorization Act, the program was categorized as an ACAT 1B Major Defense Acquisition Program (MDAP) with the Service Acquisition Executive (SAE) serving as the Milestone Decision Authority (MDA). During this time, the MDA approved the second phase of the two-phased GPS III Follow-On acquisition strategy. Executed using funds in PE 1203265F, GPS III Space Segment, the Phase 1 Production Readiness Feasibility Assessments conducted during FY2016-2017 provided data and insight into contractors' GPS satellite production designs with emphasis on a mature navigation payload and production-ready designs. Phase 1 results affirmed the viability of a competitive approach for Phase 2. The Phase 2 strategy directs the Air Force to conduct a full-and-open competition for GPS III Follow-On space vehicles and specifies the use of RDT&E funds to deliver SV11-12 and conduct associated non-recurring engineering (NRE). In addition to SV11-12, the RDT&E effort will be comprised of developing risk reducing simulators, support test equipment, and conducting the systems engineering associated with delivering the new capabilities required of GPS III Follow-On.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1203269F / *GPS IIIC*	**Project (Number/Name)** 653170 / *GPS IIIC*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS III-Follow-On Development (includes SMI)	C/Various	TBD : TBD	-	-		-		412.689	Nov 2018	-		412.689	Continuing	Continuing	-
GPS III Follow-On Technical Mission Analysis	MIPR	Various : Various	-	-		-		18.700	Oct 2018	-		18.700	Continuing	Continuing	-
GPS III Follow-On Enterprise SE&I	C/CPAF	Engility (TASC) : El Segundo, CA	-	-		-		3.200	Nov 2018	-		3.200	Continuing	Continuing	-
		Subtotal	-	-		-		434.589		-		434.589	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS III Follow-On FFRDC	MIPR	Aerospace Corp : El Segundo, CA	-	-		-		8.700	Dec 2018	-		8.700	Continuing	Continuing	-
GPS III Follow-On A&AS	Various	Various : El Segundo, CA	-	-		-		7.100	Nov 2018	-		7.100	Continuing	Continuing	-
GPS III Follow-On Other Support	Various	Various : El Segundo, CA	-	-		-		1.500	Oct 2018	-		1.500	Continuing	Continuing	-
		Subtotal	-	-		-		17.300		-		17.300	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		451.889		-		451.889	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1203269F / *GPS IIIC*	**Project (Number/Name)** 653170 / *GPS IIIC*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
GPS III Follow-On																												
GPS III Follow-On Acquisition Decision																												
GPS III Follow-On Request for Proposal (RFP) Release																												
GPS III Follow-On Contract Award																												
GPS III Follow-On CDR																												
GPS III Follow-On Milestone C																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1203269F / *GPS IIIC*	**Project (Number/Name)** 653170 / *GPS IIIC*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GPS III Follow-On				
GPS III Follow-On Acquisition Decision	1	2018	1	2018
GPS III Follow-On Request for Proposal (RFP) Release	2	2018	2	2018
GPS III Follow-On Contract Award	1	2019	1	2019
GPS III Follow-On CDR	4	2019	4	2019
GPS III Follow-On Milestone C	2	2020	2	2020

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203940F / *Space Situation Awareness Operations*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	10.029	46.668	0.000	46.668	161.829	39.704	4.977	5.067	Continuing	Continuing
65A037: *Ground Based Optical Sensor System (GBOSS)*	-	0.000	10.029	46.668	0.000	46.668	161.829	39.704	4.977	5.067	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Space Situational Awareness (SSA) is knowledge of all aspects of space related to operations. As the foundation for space control, SSA encompasses surveillance of all space objects and activities; detailed surveillance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering indications and warning on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities. This program element fields, upgrades, operationalizes, operates and maintains Air Force sensors and information integration capabilities within the SSA network while companion program element 1206425F, Space Situational Awareness Systems, develops new network sensors and improved information integration capabilities across the network. Funds also support efforts such as engineering studies and analysis, architectural engineering studies, trade studies, technology needs forecasting, modernization initiatives, systems engineering, system development, and test & evaluation, and may include prototyping and technology demonstration. Activities funded in this program element (1203940F) focus on surveillance of objects in earth orbit to aid tasks including satellite tracking; space object identification; tracking and cataloging; satellite attack warning; notification of satellite flyovers to U.S. forces; space treaty monitoring; and technical intelligence gathering.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Ground Based Optical Sensor System (GBOSS) capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203940F / *Space Situation Awareness Operations*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	10.029	50.020	0.000	50.020
Current President's Budget	0.000	10.029	46.668	0.000	46.668
Total Adjustments	0.000	0.000	-3.352	0.000	-3.352
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-3.352	0.000	-3.352

Change Summary Explanation

FY2019: $3.352M decrease due to schedule delay.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Ground Based Optical Sensor System (GBOSS)	-	10.029	46.668

Description: This capability provides global GBOSS performance for sensitivity, search rate, track of non-cooperative launches, precise tagging of clustered objects, and detection of closely spaced dim objects. This effort includes locating GBOSS capabilities in optimal global locations, upgrading existing Ground-based Electro-Optical Deep Space Surveillance (GEODSS) sensors to improve sensitivity and search rates, and may acquire new advanced technology sensor(s) to improve global electro-optical sensor resilience and persistence. The effort will coordinate with the Joint Space Operations Center (JSpOC) Mission System (JMS) program to ensure integration with enterprise data fusion and dissemination to support space battle management and command, control and communications (BMC3).

FY 2018 Plans:
Determine optical global GBOSS locations. Initiate Technology Maturation and Risk Reduction (TMRR) design activity. Continue program office support and other activities that may include, but are not limited to studies, technical analysis, etc.

FY 2019 Plans:
Complete GBOSS Technology Maturation and Risk Reduction (TMRR) activities and initiate Engineering Manufacturing Development (EMD). Rapidly respond to implement system resiliency and situational awareness necessary to operate in

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203940F / *Space Situation Awareness Operations*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $36.639M. Justification for this increase is described in plans above.			
Accomplishments/Planned Programs Subtotals	-	10.029	46.668

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

GBOSS acquisition strategy is being finalized.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1203940F / *Space Situation Awareness Operations*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor System (GBOSS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBOSS design, development and life extension	Various	Multiple : Colorado Springs, CO	-	-		5.501	Apr 2018	41.296	Nov 2018	-		41.296	Continuing	Continuing	-
GBOSS Technical Mission Analysis	SS/CPIF	NASA/JPL : Pasadena, CA	-	-		3.000	Jun 2018	2.000	Dec 2018	-		2.000	Continuing	Continuing	-
		Subtotal	-	-		8.501		43.296		-		43.296	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Multiple: TBD : TBD	-	-		1.177	May 2018	1.570	May 2019	-		1.570	Continuing	Continuing	-
FFRDC	Various	Multiple: TBD : TBD	-	-		0.351	May 2018	1.752	May 2019	-		1.752	Continuing	Continuing	-
Other Support	C/CPAF	Various: TBD : TBD	-	-		0.000		0.050	Oct 2018	-		0.050	Continuing	Continuing	-
		Subtotal	-	-		1.528		3.372		-		3.372	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		10.029		46.668		-		46.668	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1203940F / *Space Situation Awareness Operations*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor System (GBOSS)*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
GBOSS Phase I Development																												
GBOSS TMRR																												
GBOSS EMD																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1203940F / *Space Situation Awareness Operations*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor System (GBOSS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GBOSS Phase I Development				
GBOSS TMRR	3	2018	4	2019
GBOSS EMD	4	2019	4	2022

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	32.618	66.370	20.676	0.000	20.676	29.037	27.588	23.454	23.897	Continuing	Continuing
65A001: *Counter Satellite Communications System*	-	26.416	57.432	11.688	0.000	11.688	19.808	18.227	13.894	14.162	Continuing	Continuing
65A005: *Offensive Counterspace (OCS) C2*	-	3.832	7.052	7.081	0.000	7.081	7.282	7.376	7.529	7.667	Continuing	Continuing
65A013: *BOUNTY HUNTER*	-	2.370	1.886	1.907	0.000	1.907	1.947	1.985	2.031	2.068	Continuing	Continuing

A. Mission Description and Budget Item Justification

Acquisition Decision Memorandum (24 April 2009) directed all capabilities identified in the 4 October 2006 CCS Block 20, Joint Requirements Oversight Council (JROC) approved Capability Development Document (CDD) shall be accomplished as a Pre-planned Product Improvement Program (P3I) upgrades to the Counter Communications System (CCS) Block 10. On 11 April 2016, AFSPC A5/A8/A9 signed and updated ADM adding additional responsibility for CCS B10.3.

CCS provides expeditionary, deployable, reversible offensive space control (OCS) effects applicable across the full spectrum of conflict. It prevents adversary Satellite Communications (SATCOM) in Area of Responsibility (AOR) including Command & Control (C2), Early Warning and Propaganda, and hosts Rapid Reaction Capabilities in response to Urgent Needs. This program effort includes architecture engineering and studies, system hardware design and development, software design and integration, and testing and demonstration of capabilities to provide disruption of satellite communications signals.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Counterspace weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

The FY 2019 funding requested was reduced by $9.271 million to account for the availability of prior year execution balances.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	34.819	66.370	24.946	0.000	24.946
Current President's Budget	32.618	66.370	20.676	0.000	20.676
Total Adjustments	-2.201	0.000	-4.270	0.000	-4.270
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-2.201	0.000	-4.270	0.000	-4.270

Change Summary Explanation

FY 2017: $2.201 decrease for higher Air Force priorities.
FY 2019: $4.27M decrease for higher Air Force priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
65A001: *Counter Satellite Communications System*	-	26.416	57.432	11.688	0.000	11.688	19.808	18.227	13.894	14.162	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Acquisition Decision Memorandum (24 April 2009) directed all capabilities identified in the 4 October 2006 CCS Block 20, Joint Requirements Oversight Council (JROC) approved Capability Development Document (CDD) shall be accomplished as a Pre-planned Product Improvement Program (P3I) upgrades to the Counter Communications System (CCS) Block 10. On 11 April 2016, AFSPC A5/A8/A9 signed and updated ADM adding additional responsibility for CCS B10.3.

CCS provides expeditionary, deployable, reversible offensive space control (OCS) effects applicable across the full spectrum of conflict. It prevents adversary Satellite Communications (SATCOM) in Area of Responsibility (AOR) including Command & Control (C2), Early Warning and Propaganda, and hosts Rapid Reaction Capabilities in response to Urgent Needs. This program effort includes architecture engineering and studies, system hardware design and development, software design and integration, and testing and demonstration of capabilities to provide disruption of satellite communications signals.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Counter Communications System (CCS) Pre-planned Product Improvement (P3I) Program	26.416	57.432	11.688	0.000	11.688
Description: Develop, integrate, test and field the CCS P3I program. This is an incremental approach to deliver Block 20 CCS capabilities. ***FY 2018 Plans:*** Continue development, integration and testing of Increment 2 of Block 10 P3I program (CCS B10.2). Include additional CCS B20 CDD capabilities in CCS B 10.2, design mission techniques, and mission specific emulators. Continue program office support and other related support activities that may include, but not limited to studies, technical analysis, etc. ***FY 2019 Base Plans:*** Begin development, integration and testing of increment 3 of Block 10 P3I program (CCS B10.3). Include additional CCS B20 CDD capabilities in CCS B10.3, design Forward Garrison systems, mission techniques, mission specific emulators, and multi-range integration. Begin development planning and risk reduction activities for next generation Electronic Warfare capabilities. Rapidly respond to implement system resiliency and					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2019 OCO Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $45.744M. Justification for this decrease is described in plans above.					
Accomplishments/Planned Programs Subtotals	26.416	57.432	11.688	0.000	11.688

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line Item CTRSPC: *Counterspace Systems*	46.884	22.737	0.000	-	0.000	0.000	0.000	0.000	-	0.000	69.621

Remarks

D. Acquisition Strategy

All contracts in this program element will be awarded using competitive procedures to the maximum extent possible, to upgrade existing capabilities as well as to acquire next generation capabilities through incremental acquisitions.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Block 10 P3I Development	Various	Various : El Segundo, CA	-	19.198	Feb 2017	48.643	Feb 2018	5.500	Nov 2018	-		5.500	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA	-	0.694	Oct 2016	0.706	Oct 2017	0.723	Oct 2018	-		0.723	Continuing	Continuing	11.144
Enterprise Systems Engineering and Integration	C/FFP	AT&T : El Segundo, CA	-	0.356	May 2017	0.356	May 2018	0.199	May 2019	-		0.199	Continuing	Continuing	-
		Subtotal	-	20.248		49.705		6.422		-		6.422	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Security	C/CPAF	Mantech : El Segundo, CA	-	2.101	Nov 2016	2.138	Nov 2017	2.177	Nov 2018	-		2.177	Continuing	Continuing	-
Miscellaneous Support Services	Various	Various : TBD	-	0.006	Nov 2016	0.007	Nov 2017	0.007	Nov 2018	-		0.007	Continuing	Continuing	-
		Subtotal	-	2.107		2.145		2.184		-		2.184	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp : El Segundo, CA	-	0.719	Oct 2016	0.732	Oct 2017	1.067	Oct 2018	-		1.067	Continuing	Continuing	-
A&AS	Various	Various : El Segundo, CA	-	3.229	May 2017	4.748	May 2018	1.928	May 2019	-		1.928	Continuing	Continuing	-
Other Support	Various	Various : El Segundo, CA	-	0.113	Oct 2016	0.102	Oct 2017	0.087	Oct 2018	-		0.087	Continuing	Continuing	-
		Subtotal	-	4.061		5.582		3.082		-		3.082	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206421F / *Counterspace Systems*	Project (Number/Name) 65A001 / *Counter Satellite Communications System*	

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	26.416		57.432		11.688		-		11.688	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
No project title.				
10.2 System Verification Review (SVR)	1	2017	1	2017
10.2 Development Test/Operational Test (DT/OT)	2	2017	2	2017
10.2 System Delivery: #1-2	2	2017	2	2017
10.2 System Deliveries : #3-16	3	2018	4	2020
10.3 Authority To Proceed (ATP)	1	2020	1	2020
10.3 System Deliveries # 1-4	4	2021	4	2021

Note

For CCS B10.2, 14 systems delivered plus 2 trainers.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A005 / *Offensive Counterspace (OCS) C2*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
65A005: *Offensive Counterspace (OCS) C2*	-	3.832	7.052	7.081	0.000	7.081	7.282	7.376	7.529	7.667	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This effort supports the evolution of command and control (C2) and mission planning capabilities in support of the fielding and employment of Counterspace Systems. It provides for the integration and upgrade of collaborative tools to link deployable counterspace systems with Joint Warfighting C2 systems and to enable integrated planning and execution of the counterspace mission. Upgraded capabilities will be integrated into current and future command and control systems. This program will leverage the Joint Execution and Tasking System for Space (JETSS) effort in C2 for future space control and counterspace mission capabilities. Requirements for this program are derived from AFSPC prioritized AF IMT 1067 IAW AFSPCI 63-104.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Joint Execution and Tasking System for Space (JETSS) ***Description:*** Evolve with upgrades the counterspace mission planning and C2 capability to support counterspace systems space control warfighter activities. ***FY 2018 Plans:*** Continue Spiral 5 development. Begin upgrades to the JETSS Graphic User Interface (GUI), develop a more robust security architecture to support multiple security classification levels. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Base Plans:*** Continue Spiral 5 development of security architecture and higher protection level to support multiple classification levels and risk reduction efforts to support C2 initiatives for various programs. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 increased compared to FY2018 by $0.029M. Justification for this increase is described in plans above.	3.832	7.052	7.081	-	7.081
Accomplishments/Planned Programs Subtotals	3.832	7.052	7.081	-	7.081

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A005 / *Offensive Counterspace (OCS) C2*

C. Other Program Funding Summary ($ in Millions)

Remarks

-

D. Acquisition Strategy

All contracts will be awarded using competitive procedures to the maximum extent possible to acquire next generation capabilities through incremental acquisitions.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A005 / *Offensive Counterspace (OCS) C2*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Develop Counterspace Planning and C2 System (JETSS)	C/CPAF	General Dynamics : Santa Clara, CA	-	2.443	Dec 2016	5.479	Dec 2017	4.925	Jan 2019	-		4.925	Continuing	Continuing	-
Counterspace Architecture Development	C/CPFF	NGMS : Redondo Beach, CA	-	0.054	Jun 2017	0.953	Jun 2018	0.790	Jun 2019	-		0.790	Continuing	Continuing	-
		Subtotal	-	2.497		6.432		5.715		-		5.715	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	C/CPAF	Various : NV	-	1.212	Oct 2016	0.570	Oct 2017	1.214	Oct 2018	-		1.214	Continuing	Continuing	-
Other Support	C/Various	Various : NV	-	0.123	Oct 2016	0.050	Oct 2017	0.152	Oct 2018	-		0.152	Continuing	Continuing	-
		Subtotal	-	1.335		0.620		1.366		-		1.366	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	3.832		7.052		7.081		-		7.081	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A005 / *Offensive Counterspace (OCS) C2*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A005 / *Offensive Counterspace (OCS) C2*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
JETSS				
C2 Spiral #5 Development	1	2017	1	2018
C2 Spiral #5 Test	1	2018	1	2018
C2 Spiral #5 Delivery	2	2018	2	2018
C2 Spiral #6 Developement	2	2018	3	2021
JMS SOA Integration Study	4	2018	1	2019
JMS Integration	1	2020	4	2021
C2 Spiral #6 Test	4	2020	3	2021
C2 Spiral #6 Delivery	3	2021	4	2021

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A013 / *BOUNTY HUNTER*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
65A013: *BOUNTY HUNTER*	-	2.370	1.886	1.907	0.000	1.907	1.947	1.985	2.031	2.068	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Bounty Hunter (BH) supports the Defensive Space Control of US systems in a specific AOR and provides the capacity to prevent effective adversary use of Command, Control, Communications, Computers, and Intelligence (C4I). Continuing yearly spiral development is needed to meet new user needs in an ever changing threat environment.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Bounty Hunter ***Description:*** Develop new capabilities for the Bounty Hunter program to maintain operational capability. Specific accomplishments are classified. ***FY 2018 Plans:*** Developed and integrate EMI upgrade based on verified warfighter need (which is classified). ***FY 2019 Base Plans:*** Complete development/integration of EMI upgrade and deliver to warfighter. Continue development of BH upgrades in response to verified warfighter need (classified) to maintain operational capability and combat evolving threats. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 increased compared to FY2018 by $0.035M. Justification for this increase is described in plans above.	2.370	1.886	1.907	-	1.907
Accomplishments/Planned Programs Subtotals	2.370	1.886	1.907	-	1.907

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 CTRSPC / Counterspace Sy...: *Bounty Hunter Investment*	0.000	6.061	1.130	-	1.130	-	-	-	-	0.000	7.191

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A013 / *BOUNTY HUNTER*

D. Acquisition Strategy

Contracts funded for this program shall be awarded to the MITRE Federally Funded Research and Development Center (FFRDC).

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A013 / *BOUNTY HUNTER*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Bounty Hunter Spiral Development	MIPR	MITRE : Colorado Springs, CO	-	2.241	Feb 2017	1.886	Oct 2017	1.907	Oct 2017	-		1.907	Continuing	Continuing	-
		Subtotal	-	2.241		1.886		1.907		-		1.907	Continuing	Continuing	N/A

Remarks

Bounty Hunter program was a new start in FY 2016.

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
BOUNTY HUNTER SPIRAL DEVELOPMENT	MIPR	Not specified. : NV	-	0.129	Feb 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	0.129		-		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	2.370		1.886		1.907		-		1.907	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A013 / *BOUNTY HUNTER*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206421F / *Counterspace Systems*	**Project (Number/Name)** 65A013 / *BOUNTY HUNTER*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
BOUNTY HUNTER				
Bounty Hunter Development Spiral 1	4	2017	4	2017
Spiral #1 Delivery	4	2017	4	2017
Bounty Hunter Development Spiral 2	1	2017	3	2017
Spiral #2 Delivery	4	2017	4	2017
Bounty Hunter Development Spiral 3	1	2018	3	2018
Spiral # 3 Delivery	4	2018	4	2018
Bounty Hunter Development Spiral 4	1	2019	3	2019
Spiral #4 Delivery	4	2019	4	2019
Bounty Hunter Development Spiral 5	1	2020	3	2020
Spiral #5 Delivery	4	2020	4	2020
Bounty Hunter Development Spiral 6	1	2021	3	2021
Spiral #6 Delivery	4	2021	4	2021
Bounty Hunter Development Spiral 7	1	2022	3	2022
Spiral #7 Delivery	4	2022	4	2022

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	0.000	25.540	48.448	134.463	0.000	134.463	122.698	78.476	51.407	30.912	0.000	491.944
65A006: *Space Based Space Surveillance*	0.000	25.540	48.448	134.463	0.000	134.463	122.698	78.476	51.407	30.912	0.000	491.944

Program MDAP/MAIS Code: 328

A. Mission Description and Budget Item Justification

Space Situational Awareness (SSA) is knowledge of all aspects of space related to operations as described in the approved SSA Initial Capabilities Document (ICD). As the foundation for space control, SSA encompasses intelligence on adversary space operations; surveillance of all space objects and activities; detailed reconnaissance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; and conducting integrated command, control, communications, processing, analysis, disseminations, and archiving activities. This program develops new Air Force sensors and improved information capabilities for integration across the SSA network. It also includes developmental planning and technology forecasting for future blocks and emerging needs.

The Space-Based Space Surveillance (SBSS) Block 10 satellite was launched September 2010 with a design life through 2018 and an extended operational capability through 2020. The SBSS Follow-On (SBSS FO) program will develop and deliver a system to continue providing space object surveillance from space post SBSS Block 10 End-of-Life. AFSPC and NRO have signed a Memorandum of Agreement (MOA) partnering SBSS FO with an NRO program based on overlapping requirements. The new partner program is called SILENTBARKER. SILENTBARKER requirements will be based on a Statement of Capabilities (SOC) and upon the current SSA ICD architectural requirements focused on protecting High Value Assets (HVAs). SILENTBARKER will provide the capability to search, detect, and track objects from a space-based sensor for timely custody and event detection. Surveillance from space augments and overcomes existing ground sensor limitations with timely 24-hour above the weather collection of satellite metric data only possible with a space-based sensor and then communicates its findings to the Joint Space Operations Center (JSpOC), National Space Defense Center (NSDC), and other classified users.

The Space Situational Awareness Environmental Monitoring (SSAEM) program is a subset of COSMIC-2 that provides three sensors for each of the six spacecraft of the COSMIC-2 constellation. These sensors measure ionospheric density and irregularities to mitigate adverse space weather impacts on communication, navigation, surveillance, and other radio frequency systems used by the warfighter.
Development activities enable deployment of new advanced sensors capable of searching for and identifying threats, tracking the expanding number of debris objects on orbit, as well as the increasing number of satellites launched by other nations, many of which are smaller and more capable than previous spacecraft. These activities are also required to better integrate the disparate elements of SSA in order to enable rapid and responsive space operations.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*

decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space Situational Awareness weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because the initial contract has been awarded conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production. Milestone B approval and requirements validation are imminent.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	23.945	48.448	83.075	0.000	83.075
Current President's Budget	25.540	48.448	134.463	0.000	134.463
Total Adjustments	1.595	0.000	51.388	0.000	51.388
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	1.595	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	51.388	0.000	51.388

Change Summary Explanation

FY 2017: $1.595M increase for SSAEM

FY 2019: $52.400M increase for SBSS Follow-On to fund partnership with NRO to Office of Director of National Intelligence (ODNI) Independent Cost Estimate (ICE) levels.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 65A006 / *Space Based Space Surveillance*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
65A006: *Space Based Space Surveillance*	0.000	25.540	48.448	134.463	0.000	134.463	122.698	78.476	51.407	30.912	0.000	491.944
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space-Based Space Surveillance (SBSS) Block 10 satellite was launched September 2010 with a design life through 2018 and an extended operational capability through 2020. The SBSS Follow-On (SBSS FO) program will develop and deliver a system to continue providing space object surveillance from space post SBSS Block 10 End-of-Life. AFSPC and NRO have signed a Memorandum of Agreement (MOA) partnering SBSS FO with an NRO program based on overlapping requirements. The new partner program is called SILENTBARKER. SILENTBARKER requirements will be based on a Statement of Capabilities (SOC) and upon the current Space Situational Awareness (SSA) Initial Capabilities Document (ICD) architectural requirements focused on protecting High Value Assets (HVAs). SILENTBARKER will provide the capability to search, detect, and track objects from a space-based sensor for timely custody and event detection. Surveillance from space augments and overcomes existing ground sensor limitations with timely 24-hour above the weather collection of satellite metric data only possible with a space-based sensor and then communicates its findings to the Joint Space Operations Center (JSpOC), National Space Defense Center (NSDC), and other classified users.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: SBSS Follow-On (SBSS FO) Design & Development ***Description:*** Performs space based SSA analysis, research, and development for the SBSS FO system (SILENTBARKER). ***FY 2018 Plans:*** Award contract and hold NRO Acquisition Board to declare Milestone B. Begin development of SBSS FO (SILENTBARKER) with entry into Engineering and Manufacturing Development (EMD) phase. Perform risk reduction activities and analyses based on threat paradigm analyzed/out-briefed by the Space Security and Defense Programs (SSDP). ***FY 2019 Plans:*** Continue SBSS FO (SILENTBARKER) development in EMD phase. Prepare for and conduct Preliminary Design Review (PDR). Continue development in EMD phase in preparation for Critical Design Review in FY 2020. Continue analyses of associated ground mission data processing and scheduling in order to draft an acquisition approach for ground architecture and mission data processing. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $86.015M. Justification for this increase is described in plans above.	25.540	48.448	134.463
Accomplishments/Planned Programs Subtotals	25.540	48.448	134.463

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 65A006 / *Space Based Space Surveillance*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Acquisition Strategy was approved to minimize the space-based SSA gap post-SBSS Block 10. The SBSS FO anticipates Initial Launch Capability (ILC) in FY 2022 with Full Operational Capability (FOC) by FY 2022. The SBSS FO Material Development Decision was approved by the Milestone Decision Authority on 5 April 2016. The Acquisition Strategy Panel (ASP) was completed with the MDA on 29 August 2016. To satisfy the SSA architecture needs, the SBSS FO program requirements combined with an NRO program and were updated in the December 2017 SILENTBARKER Statement of Capabilities. The SBSS FO program remains an Air Force program, but will leverage NRO processes to fulfill SBSS FO space segment and telemetry, tracking, and commanding (TT&C) program segments in order to further National Security Space objectives. Mutual investment for the non-recurring engineering (NRE) cost enables the potential for a larger initial constellation buy and lower unit costs. The Air Force and NRO will determine the approach to meet mission processing requirements and will develop the ground architecture.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 65A006 / *Space Based Space Surveillance*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SBSS Follow On Prime Development	TBD	TBD : TBD	-	15.689	Sep 2017	36.824	Dec 2017	119.962	Dec 2018	-		119.962	236.476	408.951	-
SBSS Follow On Technical Mission Analysis	Various	Various : Various, CA	-	3.309	Oct 2016	3.385	Dec 2017	0.824	Dec 2018	-		0.824	3.465	10.983	-
		Subtotal	-	18.998		40.209		120.786		-		120.786	239.941	419.934	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	C/FFP	Aerospace Corp. : Los Angeles, CA	-	0.784	Oct 2016	0.808	Oct 2017	0.824	Oct 2018	-		0.824	3.465	5.881	-
A&AS	Various	Various : CA	-	5.703	Oct 2016	7.376	Oct 2017	12.753		-		12.753	39.687	65.519	-
Other Support	Various	Various : TBD	-	0.055	Oct 2016	0.055	Oct 2017	0.100	Oct 2018	-		0.100	0.400	0.610	-
		Subtotal	-	6.542		8.239		13.677		-		13.677	43.552	72.010	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	25.540		48.448		134.463		-		134.463	283.493	491.944	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 65A006 / *Space Based Space Surveillance*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206425F / *Space Situation Awareness Systems*	**Project (Number/Name)** 65A006 / *Space Based Space Surveillance*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SBSS Follow On				
Acq Strategy, RFP Dev and Source Selection	1	2017	2	2018
Contract Award	1	2018	1	2018
Tech Dev / Engineering and Manufacturing Development / Production	2	2018	3	2022
Preliminary Design Review (PDR)	4	2019	4	2019
Milestone B	2	2018	2	2018
Critical Design Review (CDR)	4	2020	4	2020
Available for Launch	4	2022	4	2022

Note

Event dates are aligned with SILENTBARKER program threshold schedule

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206426F / *Space Fence*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	420.888	162.510	35.937	20.215	0.000	20.215	0.000	0.000	0.000	0.000	0.000	639.550
65A009: *Space Fence*	420.888	162.510	35.937	20.215	0.000	20.215	0.000	0.000	0.000	0.000	0.000	639.550
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 438

Note

FY2015 through FY2017 budgeted in PE 0604426F.

A. Mission Description and Budget Item Justification

The Space Fence effort will develop a system of ground-based sensors to improve upon the former Air Force Space Surveillance System (AFSSS), a Very High Frequency (VHF) radar operational from 1961 to 2013. The Space Fence will provide a more accurate and timely detection capability of smaller orbiting objects, primarily in low-earth orbit (LEO). The system will use higher frequency S-band radars at globally dispersed sites. As a result, it will greatly expand the uncued detection and tracking capacity of the Space Surveillance Network, from around 20,000 to 100,000+ objects, while working in concert with other network sensors. Requirements are identified in the June 2012 approved Space Fence Capabilities Development Document (CDD).

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space Fence weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, and 0605898F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206426F / *Space Fence*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	168.364	35.937	5.267	0.000	5.267
Current President's Budget	162.510	35.937	20.215	0.000	20.215
Total Adjustments	-5.854	0.000	14.948	0.000	14.948
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-5.854	0.000			
• Other Adjustments	0.000	0.000	14.948	0.000	14.948

Change Summary Explanation

FY2019: $14.948M increase due to requirements for Risk Management Framework (RMF) and Coherent Integration.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Space Fence	162.510	35.937	20.215

Description: Develops S-band SSA radar system to provide detection and tracking capability of objects in Low Earth Orbit.

FY 2018 Plans:

Complete commissioning of facility infrastructure and validation of facility requirements. Complete contractor installation, checkout and formal on-site contractor test of the system at the Kwajalein Atoll, Marshall Islands and the Space Fence Operations Center (SOC) at the Reagan Test Site Operations Center-Huntsville (ROC-H). Obtain Interim Authority to Test (IATT) and Authorization to Connect (ATC) from the Army for the Space Fence System. Obtain ATC from A6 for Integrated Test Bed (ITB) connection to SOC. Conduct 60 day Cyber Security Control Assessment. Conduct Developmental Test Readiness Review (DTRR) to confirm and certify readiness to enter Developmental Test and Evaluation (DT&E). Conduct government DT&E. Secure test assets and test support for government testing. Continue verification of technical data and parameters in an operational environment. Conduct Cyber Risk Assessment of the Sensor Site 1 (SS1) and SOC. Perform Cyber Penetration Testing at SS1. Conduct a formal Adversarial Cybersecurity DT&E Assessment at SS1 and SOC followed by a formal Cooperative Vulnerability Penetration Assessment (CVPA). Continue Functional Configuration Audit (FCA) and Physical Configuration Audit (PCA) progress. Continue organic depot maintenance activation planning. Initiate preparations for the second radar site, including studies, investigations, and site surveys in support of Full Operational Capability (FOC). Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc.

FY 2019 Plans:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206426F / *Space Fence*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Conduct weapon system enhancement development. Complete government DT&E. Obtain Authority to Operate (ATO). Enter into and complete dedicated Initial Operational Test and Evaluation (IOT&E). Conduct Trial Period. Receive certified/verified technical orders and manuals from Original Equipment Manufacturer (OEM). Continue organic depot maintenance activation planning to execute turnover of hardware and software depot maintenance support in mid FY 2021. Complete FCA and PCA. Complete government material inspection and receipt of SS1 and SOC. Continue preparations for the second radar site, including studies, investigations, and site surveys in support of FOC. Continue program office support and other activities that may include, but are not limited to studies, technical analysis, etc. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $15.722M. Justification for this decrease is described in plans above.			
Accomplishments/Planned Programs Subtotals	162.510	35.937	20.215

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line Item SPCFNC: *Space Fence*	-	-	51.361	-	51.361	55.760	-	-	-	0.000	107.121

Remarks

E. Acquisition Strategy

A single Engineering Manufacturing and Development (EMD) Production and Deployment contract was awarded on 2 June 2014 to Lockheed Martin Mission Systems and Training. The contract will take the contractor through Critical Design Review (CDR), fabrication, integration, test, production and deployment, with up to two years of Interim Contractor Support (ICS). The program will utilize a two increment approach. Increment 1/Initial Operational Capability (IOC) will consist of successful operations at the first radar site located on the Kwajalein Atoll and the SOC at ROC-H. Increment 2 (contract option)/FOC will include completion of the second radar at a location which is to be determined pending a separate Memorandum of Agreement (MOA) decision approval and negotiations with the proposed host nation.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206426F / *Space Fence*	**Project (Number/Name)** 65A009 / *Space Fence*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Fence Development	C/FPIF	Lockheed Martin : Moorestown, NJ	387.916	134.781	Nov 2016	23.064	Aug 2018	16.960	Feb 2019	-		16.960	0.000	562.721	911.115
Various (Independent Program Assessment, site survey, software, Site Activation Task Force (SATAF), Space Fence Operations Center (SOC)	Various	Various : Various	6.844	10.579	Jan 2017	1.501	Nov 2017	0.094	Nov 2018	-		0.094	0.000	19.018	-
Space Fence Design Oversight and Management	SS/FP	MIT Lincoln Laboratory : Lexington, MA	2.300	0.488	Jan 2017	0.640	Dec 2017	0.000		-		0.000	0.000	3.428	-
		Subtotal	397.060	145.848		25.205		17.054		-		17.054	0.000	585.167	N/A

Remarks

Prior to FY15 all funds were executed and reported in PE 0604425F (Space Situational Awareness Systems)
Product Development: $774.994M

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test - 96th Cyberspace Test Group (CTG)	PO	96th CTG : Eglin AFB, FL	2.644	1.880	Dec 2016	2.365	Dec 2017	0.000		-		0.000	0.000	6.889	-
Test - Joint Interoperability Test Command	MIPR	Joint Interoperability Test Command : Fort Huachuca, AZ	0.049	0.064	Feb 2017	0.185	Jan 2018	0.000		-		0.000	0.000	0.298	-
		Subtotal	2.693	1.944		2.550		0.000		-		0.000	0.000	7.187	N/A

Remarks

Prior to FY15 all funds were executed and reported in PE 0604425F (Space Situational Awareness Systems)
Test and Evaluation: $1.366M

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206426F / *Space Fence*	**Project (Number/Name)** 65A009 / *Space Fence*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	8.637	9.404	Oct 2016	3.883	Oct 2017	1.887	Oct 2018	-		1.887	0.000	23.811	-
FFRDC	SS/FP	Various : Various	12.498	5.314	Nov 2016	4.299	Nov 2017	1.274	Oct 2018	-		1.274	0.000	23.385	-
		Subtotal	21.135	14.718		8.182		3.161		-		3.161	0.000	47.196	N/A

Remarks

Prior to FY15 all funds were executed and reported in PE 0604425F (Space Situational Awareness Systems)
Management Services: $68.683M

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	420.888	162.510		35.937		20.215		-		20.215	0.000	639.550	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206426F / *Space Fence*	**Project (Number/Name)** 65A009 / *Space Fence*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206426F / *Space Fence*	**Project (Number/Name)** 65A009 / *Space Fence*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Fence				
Increment 1 EMD	1	2017	3	2019
Development Test and Evaluation	4	2018	1	2019
Initial Operational Test and Evaluation	2	2019	3	2019
Initial Operational Capability (IOC) Increment 1	3	2019	3	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	427.288	221.584	145.610	151.506	0.000	151.506	106.378	55.157	14.745	15.015	Continuing	Continuing
657103: *Advanced MILSATCOM*	427.288	30.241	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	457.529
657104: *MILSATCOM Space Modernization Initiative (SMI)*	0.000	191.343	145.610	151.506	0.000	151.506	106.378	55.157	14.745	15.015	Continuing	Continuing

Program MDAP/MAIS Code: 261

A. Mission Description and Budget Item Justification

The Space Modernization Initiative (SMI) strategy is to evolve current and future Protected MILSATCOM systems, sustain the existing AEHF system capability and develop a more affordable and resilient MILSATCOM enterprise capable of meeting near term and emerging MILSATCOM requirements. A significant thrust for this initiative is to demonstrate technologies and Concepts of Operations (CONOPS) that lead to a future Protected Anti-Jam Tactical SATCOM (PATS) capability that provides tactical-level MILSATCOM users protected, anti-jam satellite communications while operating in a contested environment. PATS will provide tactical users significantly higher data rates than AEHF and a security architecture that enables forward deployed users to have protected satellite communications in scenarios where AEHF terminals cannot be deployed. Under this construct the SMI will: 1) Reduce parts/obsolescence risk to AEHF space vehicles, 2) Continue the AEHF Capabilities Insertion Program (CIP) to enhance the current AEHF constellation performance, and improve system operational resiliency, and 3) Invest in technologies and demonstrations (e.g. Protected Tactical Service Field Demonstration) that enable the future Protected Tactical Enterprise Service and SATCOM programs by continued development of the Protected Tactical Waveform (PTW) technologies, maturing the Protected Tactical Testbed, and demonstrating resilient and affordable wideband protected technologies and CONOPS.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Advanced EHF MILSATCOM weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	259.131	145.610	129.946	0.000	129.946
Current President's Budget	221.584	145.610	151.506	0.000	151.506
Total Adjustments	-37.547	0.000	21.560	0.000	21.560
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-30.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-7.547	0.000			
• Other Adjustments	0.000	0.000	21.560	0.000	21.560

Change Summary Explanation

FY2017: -$30.000M Congressional Directed Reduction for unjustified growth

FY2019: +$21.560M: +$12.400M for AEHF crypto and survivability improvements (Mission Control Segment Increment 8.4); +$5.300M to fund AEHF Operational Resiliency Phase 2 to expand resiliency capability from AEHF SV 5-6 to AEHF SV-4; and +$5.000M for Protected Tactical Service Field Demonstration (PTSFD); -$1.140M inflation adjustment

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657103: *Advanced MILSATCOM*	427.288	30.241	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	457.529
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

As of the December 2016 Selected Acquisition Report, Prior Years dollars total $7,354.7M and include $270.5M of International Partners funding.

A. Mission Description and Budget Item Justification

Develop and acquire Advanced Extremely High Frequency (AEHF) Military Satellite Communications (MILSATCOM) satellites, mission control segment and cryptography for survivable, anti-jam, worldwide, secure communications for the strategic and tactical warfighters. AEHF satellites will replenish the existing EHF system (Milstar) providing much higher capacity and data rate (5x increase over Milstar II) capabilities.

AEHF is a cooperative program that includes International Partners (Canada, the United Kingdom, and the Kingdom of the Netherlands).

AEHF Initial Operational Capability (IOC) was declared on 28 July 2015.

Advanced EHF and Enhanced Polar System (EPS) Key Management Architectures (KMA) are not compatible with the National Security Agency's new enterprise system, Key Management Infrastructure (KMI). Per the Acquisition Decision Memorandum signed by (USD)AT&L on June 2013, the Air Force shall transition the AEHF and EPS KMA from the Electronic Key Management System (EKMS) to the KMI by March 2018. This funding supports development, acquisition, integration and testing of a Protected SATCOM Key Management Architecture (PKMA) that will replace the legacy EKMS to be compatible with the KMI by March 2018.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: AEHF Key Management Infrastructure (KMI) transition	30.241	0.000	0.000
Description: Develop and conduct systems engineering, integration and test of the Protected SATCOM Key Management Architecture (PKMA). National Security Agency (NSA) will lead the development of the PKMA centralized elements. Enable testing and integration of AEHF Local Key Management functionality within the KMI client with the AEHF system. Initiate PKMA integration activities with the AEHF prime contractor and the Enhanced Polar System (EPS) Control and Planning Segment (CAPS) contractor.			
FY 2018 Plans: N/A			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	30.241	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line Item ADV555: *Advanced EHF*	645.569	56.974	29.829	-	29.829	31.894	17.240	-	-	0.000	781.506
• RDTE 05 PE 0605433F: *Wideband Global SATCOM (Space)*	11.800	-	0.000	-	0.000	0.000	0.000	-	-	0.000	11.800
• RDTE 05 PE 1206433F: *Wideband Global SATCOM (Space)*	0.000	4.263	3.970	-	3.970	1.920	0.000	0.000	-	0.000	10.153

Remarks

Wideband Global SATCOM (Space) funding is within the Command and Control System - Consolidated (CCS-C) project.

D. Acquisition Strategy

The Advanced MILSATCOM, also known as Advanced EHF (AEHF), program is a sole source acquisition to a contractor team comprised of Lockheed Martin (prime/ integrator) and Northrop Grumman (provider of the satellite payload). This team performed the Advanced Component Development and Prototypes (ACD&P) and Systems Development and Demonstration (SDD) of two RDT&E-funded satellites and associated mission command and control ground capabilities under Cost Plus Award Fee line items on the contract. AEHF incorporated lessons learned and improvements from Milstar and commercial SATCOM practices into the next generation EHF secure, anti-jam military communications satellite system.

The Protected SATCOM Key Management Architecture (PKMA) acquisition is a software development effort to update DoD secure satellite communication encryption systems and become compatible with the National Security Agency's enterprise Key Management Infrastructure (KMI). The Acquisition Decision Memorandum was signed by USD(AT&L) on 17 June 2013. The prime contractor for the PKMA development under the NSA is Leidos with subcontracts to L3 Communications and General Dynamics. The acquisition strategy is managed by NSA.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Crypto Interim Contractor Support	MIPR	Cryptologic Sys Group : San Antonio, TX	10.100	-		-		-		-		-	0.000	10.100	-
AEHF SVs 1-2 and MCS Interim Contractor Support	SS/CPIF	Lockheed Martin : Sunnyvale, CA	214.139	-		-		-		-		-	0.000	214.139	-
GFP - AEHF Calibration Facility (ACF)	Various	Lincoln Labs : Lexington, MA	3.286	-		-		-		-		-	0.000	3.286	-
PKMA MIT/LL Test Support	Various	Lincoln Labs : Lexington, MA	0.696	0.509	Apr 2017	-		-		-		-	0.000	1.205	-
New KMI Component Development	MIPR	NSA : Ft Meade, MD	145.684	-		-		-		-		-	0.000	145.684	-
Enterprise SE&I	C/CPIF	Linquest Corp : Los Angeles, CA	2.803	0.925	Jun 2017	-		-		-		-	0.000	3.728	-
NSA Interim Contractor Support/KMI Component Development	MIPR	NSA : Ft Meade, MD	-	18.708	Jan 2017	-		-		-		-	0.000	18.708	10.000
Install/Integrate/Test New AEHF KMI Components	SS/CPIF	Lockheed Martin : Sunnyvale, CA	12.463	2.200	Aug 2017	-		-		-		-	0.000	14.663	12.464
Install/Integrate/Test New EPS KMI Componenets	SS/CPIF	Northrop Grumman Info Sys : Redondo Beach, CA	8.830	-		-		-		-		-	0.000	8.830	-
Test New KMI Hardware/ Software	MIPR	AFLCMC : San Antonio, TX	12.410	5.869	Apr 2017	-		-		-		-	0.000	18.279	21.893
Operational Test Support	Various	17th Test Sqd : Peterson, CO	0.373	0.521	Sep 2017	-		-		-		-	0.000	0.894	-
		Subtotal	410.784	28.732		-		-		-		-	0.000	439.516	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test and Evaluation Support	Various	Various : Various	0.250	-		-		-		-		-	0.000	0.250	-
		Subtotal	0.250	-		-		-		-		-	0.000	0.250	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	The Aerospace Corporation : El Segundo, CA	3.146	-		-		-		-		-	0.000	3.146	-
A&AS	Various	Various : Various	11.549	1.417	Dec 2016	-		-		-		-	0.000	12.966	-
Other Support	Various	Various : Various	1.559	0.092	Oct 2016	-		-		-		-	0.000	1.651	-
		Subtotal	16.254	1.509		-		-		-		-	0.000	17.763	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	427.288	30.241		0.000		-		-		-	0.000	457.529	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
PKMA																												
PKMA Development Complete																												
Operations Transition/Acceptance of PKMA																												

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
PKMA				
PKMA Development Complete	1	2017	1	2017
Operations Transition/Acceptance of PKMA	2	2018	1	2019

Note

PKMA operations transition is funded with RDT&E

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657104: *MILSATCOM Space Modernization Initiative (SMI)*	0.000	191.343	145.610	151.506	0.000	151.506	106.378	55.157	14.745	15.015	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Modernization Initiative (SMI) strategy is to evolve current and future Protected MILSATCOM systems, sustain the existing AEHF system capability and develop a more affordable and resilient MILSATCOM enterprise capable of meeting near term and emerging MILSATCOM requirements. A significant thrust for this initiative is to demonstrate technologies and Concepts of Operations (CONOPS) that lead to a future Protected Anti-Jam Tactical SATCOM (PATS) capability that provides tactical-level MILSATCOM users protected, anti-jam satellite communications while operating in a contested environment. PATS will provide tactical users significantly higher data rates than AEHF and a security architecture that enables forward deployed users to have protected satellite communications in scenarios where AEHF terminals cannot be deployed. Under this construct the SMI will: 1) Reduce parts/obsolescence risk to AEHF space vehicles, 2) Continue the AEHF Capabilities Insertion Program (CIP) to enhance the constellation performance and improve mission operational resiliency and 3) Invest in technologies and demonstrations (e.g. Protected Tactical Service Field Demonstration or PTSFD) that enable the future Protected Tactical Enterprise Service (PTES) and SATCOM programs by continued development of the Protected Tactical Waveform (PTW) technologies, maturing the Protected Tactical Testbed, and demonstrating resilient and affordable wideband protected technologies and CONOPS.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Capabilities Insertion Program (CIP)	29.900	57.194	82.972
Description: Develop software that will increase the current AEHF constellation capacity by 10%, broaden overall user base, and accommodate a larger user population through improved resource utilization efficiencies. Develop modifications that will improve the mission operational resiliency. Develop software to increase current AEHF terminal data rates with adaptive coding algorithms. These efforts are included in PNO 261.			
FY 2018 Plans: Complete Phase III INC (8.1) development and verifications. Continue Phase IV INC (8.2) development. Award and begin Phase V INC (8.3) development to enable endurance mission replan and other improvements. Develop modifications to increase the systems operational resiliency. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc.			
FY 2019 Plans: Complete Phase IV (Inc 8.2) Terminal Integration development and verifications. Continue Phase V (Inc 8.3) XDR Transition development. Begin Phase VI (Inc 8.4) Endurance Mission Replan to provide crypto and survivability improvements, maintain user communication when fixed site support is unavailable, adds capability for planning downlink resources and other			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
improvements. Complete Operational Resiliency (OR) 2 & OR2B - Phase 1 (i.e., Engineering analysis of SV 5/6, Command and Control System-Consolidated (CCS-C) maintain vehicle configuration). Initiate OR2 & OR2B - Phase 2 (i.e., Engineering analysis of SV-4 and Flight software). Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 increased compared to FY2018 by $26.402M. Justification for this increase is described in plans above.			
Title: Evolved AEHF ***Description:*** The Evolved AEHF (E-AEHF) provides nuclear survivable, protected MILSATCOM to eXtended Data Rate (XDR) users only. E-AEHF supports strategic mission requirements such as Presidential and National Voice Conferencing (PNVC), Nuclear Command and Control (NC2) strategic networks, terminal report back, and Emergency Action Message (EAM) dissemination. ***FY 2018 Plans:*** Effort has transitioned to PE 1206855F. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	2.796	0.000	0.000
Title: Protected Tactical Testbed ***Description:*** Protected Tactical Testbed provides a government gold standard of reference for risk reduction and experimentation on critical technology elements for the space payload, terminals and networking segments of the PATS system. Supports the hardware development of the hub component for the PTES ground system and any necessary test capabilities to support either the over-the-air (OTA) or laboratory demonstrations for the PTSFD. It enables system integration capabilities with industry and FFRDC partners for interoperability testing and conducting experiments to mature the PATS operations, with a focus on the PTW. ***FY 2018 Plans:*** Conduct Protected Tactical Testbed test readiness-review in preparation for PTSFD contractor compatibility testing. Support three PTSFD contractor modem-to-testbed PTW compatibility technology demonstrations. Finalize Protected Testbed baseline configuration to support OTA technology demonstrations over Wideband Global SATCOM (WGS) and commercial satellites for	37.224	13.000	11.910

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
PTSFD. Prepare Protected Testbed for OTA WGS certification testing. Enhance Protected Testbed capabilities to support PTES and Protected Tactical SATCOM (PTS) risk-reduction efforts. ***FY 2019 Plans:*** Conduct compatibility testing between the ground testbed and the Terminal Modem (TM) Line Replaceable Unit (LRU). This is a precursor activity to the compatibility testing with representative WGS payload hardware. Begin OTA testing. Expand Hub capability for PTES and PTS risk reduction event. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 decreased compared to FY2018 by $1.000M. Justification for this decrease is described in plans above.			
Title: Protected Tactical Service Field Demonstration (PTSFD)	94.552	75.416	56.624
Description: PTSFD is a technology demonstration that will develop and demonstrate prototype Terminal Modem (TM) Line Replaceable Units (LRUs) utilizing PTW over wideband space/ground systems with an option to demonstrate over a commercial SATCOM system and design and build the Mission Management System (MMS) simulator. Develop PTW components, protected tactical terminal modems that will be capable of being fully integrated into existing wideband terminals, and a new End Cryptographic Unit (ECU) that will support the PTW. The ECUs will be integrated with the PTW modem and certified by NSA. The PTSFD will demonstrate an Anti-Jam (AJ) and Low Probability of Intercept (LPI)/Low Probability of Detection (LPD) communications capability that can be provided to tactical users in all Services through fielded terminals, existing wideband MILSATCOM assets, and potential COMSATCOM assets. Conduct trade space and requirements definition to support future PTW-related capabilities. Identify potential assets such as ground hubs and information assurance components that can be further developed by future PTW-related programs for wideband users and explore releasability of PTW-related technologies to International Partners. ***FY 2018 Plans:*** Conduct Protected Testbed test readiness-review in preparation for PTSFD contractor compatibility testing. Support three PTSFD contractor modem-to-testbed PTW compatibility technology demonstrations. Finalize Protected Testbed baseline configuration to support over-the-air technology demonstrations over WGS and commercial satellites for PTSFD. Prepare Protected Testbed for over-the-air WGS certification testing. Enhance Protected Testbed capabilities to support PTES and PTS risk-reduction efforts. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Complete Terminal to TM LRU Integration and Test (I&T) for each vendor and each identified service terminal. Complete Compatibility Test involving the first System Integration Lab (SIL) test using the Protected Tactical Testbed. Conduct Modem Certification Test with ARSTRAT. Conduct first Physical Hardware Equipment Chain (PHEC) test to verify compatibility using			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
a WGS emulator on the ground prior to the WGS demo. Conduct over-the-air technology demonstrations over WGS and commercial satellites for PTSFD and conduct the second SIL test. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 decreased compared to FY2018 by $18.366M. Justification for this decrease is described in plans above.			
Title: Protected Tactical Enterprise Service (PTES) ***Description:*** The PTES will utilize the PTW to provide a protected anti-jam communications capability over the WGS system. The PTES system will consist of three segments: a Mission Management System (MMS), a Key Management System (KMS), and Joint Hubs integrated into existing SATCOM gateways. PTES will enable, along with the TM LRU's developed during the PTSFD, an anti-jam communications capability over WGS for tactical users in all Services and International Partners. ***FY 2018 Plans:*** Effort has transitioned to PE 1206760F. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	19.800	0.000	0.000
Title: Enterprise Ground Services (EGS) ***Description:*** EGS is envisioned to provide a robust enterprise ground architecture for Air Force space systems, which leverages mission commonality and automation to reduce sustainment costs and re-focus manpower on warfighting capabilities. In addition, EGS will enable a near-real-time common operating picture of enterprise-wide tactical health, status, indications, and warnings for Air Force satellites. The end-state will be a modern technical infrastructure which is cyber-secure and resilient against the Advanced Persistent Threat and employs streamlined architecting, acquisition, and operational processes. Through early architecture studies and prototyping, the government will establish clear ownership of the technical baseline to meet Better Buying Power principles as the EGS effort evolves through development. This effort provides focus and expertise for the development, test, certification and enforcement of standards and interfaces for all AFSPC satellite ground systems to enable transition planning for legacy ground systems, new capability demonstrations, and systems acquisition leading to an enterprise ground architecture for Air Force space systems. ***FY 2018 Plans:*** In FY18, Enterprise Ground Services has been consolidated under Space and Missile Test and Evaluation Center; PE 1203173F. ***FY 2019 Plans:***	7.071	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	191.343	145.610	151.506

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line Item ADV555: *Advanced EHF*	645.569	56.974	29.829	-	29.829	31.894	17.240	-	-	0.000	781.506

Remarks

AEHF CIP: OR2 (software) & OR2B (hardware/software): Provides automated space resiliency planning elements into AEHF mission control and provides system level capability to execute both OR2 and OR2B resiliency CONOPS in phases

D. Acquisition Strategy

MILSATCOM SMI includes parts obsolescence redesign and incremental capability upgrades contracted with current Prime contractor team. Enterprise studies, system design for affordability, protected tactical awards and risk reduction efforts for next generation capabilities.

The PTSFD is a technology maturation and risk reduction effort that will demonstrate the ability to provide wideband anti-jam communications to tactical users using the WGS constellation and Commercial SATCOM by developing production-representative Terminal Modem Line Replaceable Units (TM LRUs) that implement the government-developed PTW, and integrating and demonstrating them with existing WGS-certified terminals. The effort includes the design, development, factory testing and fabrication of PTW-enabled TM LRU prototypes for integration, compatibility testing and Type-1 cryptographic certification evaluation by the NSA to support potential future acquisitions by the service Terminal Program Offices (TPOs). The acquisition strategy includes the award of up to three TM LRU contracts; each a four-year, Cost-Plus Incentive Fee, Cost-Plus Fixed Fee with a Firm Fixed Price option contract, awarded through a full and open competitive, best-value source selection process. The PTSFD will use a Government-built ground test bed to facilitate the demonstrations and to allow for compatibility and integration testing for the TM LRU.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AEHF Capabilities Insertion Program (CIP)	SS/CPIF	Lockheed Martin : Sunnyvale, CA	-	29.900	Jun 2017	52.618	Jun 2018	76.908	Jun 2019	-		76.908	Continuing	Continuing	56.151
Protected Tactical Service Field Demonstration (PTSFD) (Modem)	Various	Various : various	-	11.683	Jan 2017	6.415	Jan 2018	21.764	Jan 2019	-		21.764	Continuing	Continuing	-
PTSFD (Modem) Contractor 1	C/CPIF	L3 : Camden, NJ	0.000	15.544	Jan 2017	14.869	Jan 2018	5.945	Jan 2019	-		5.945	Continuing	Continuing	35.700
PTSFD (Modem) Contractor 2	C/CPIF	VIASAT : Carlsbad, CA	0.000	17.044	Jan 2017	14.868	Jan 2018	5.575	Jan 2019	-		5.575	Continuing	Continuing	31.400
PTSFD (Modem) Contractor 3	C/CPIF	Raytheon : Marlborough, MA	-	15.044	Jan 2017	14.868	Jan 2018	5.156	Jan 2019	-		5.156	Continuing	Continuing	37.500
PTSFD (Mission Management System simulator)	Various	Aerospace : El Segundo, CA	-	0.323	Jan 2017	1.254	Jan 2018	1.557	Nov 2018	-		1.557	Continuing	Continuing	-
Technical Mission Analysis	MIPR	Aerospace : El Segundo, CA	0.000	14.899	Oct 2016	3.175	Oct 2017	4.756	Nov 2018	-		4.756	Continuing	Continuing	-
Evolved AEHF (E-AEHF)	Various	Various : Various	0.000	2.796	Jan 2017	-		-		-		-	0.000	2.796	-
Protected Tactical Testbed	Various	MIT/LL : Various	0.000	37.224	Jan 2017	10.929	Jan 2018	10.532	Jan 2019	-		10.532	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	Linquest : Los Angeles, CA	0.000	24.149	Jan 2017	14.205	Jan 2018	6.269	Jan 2019	-		6.269	Continuing	Continuing	-
Enterprise Ground Services (EGS)	Various	Various : Various	-	7.071	Jan 2017	-		-		-		-	0.000	7.071	-
		Subtotal	0.000	175.677		133.201		138.462		-		138.462	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : Various	0.000	5.567	Jan 2017	0.167	Jan 2018	0.173	Nov 2018	-		0.173	Continuing	Continuing	-
Other Support	Various	Various : Various	0.000	0.325	Dec 2016	0.050	Dec 2017	0.100	Nov 2018	-		0.100	Continuing	Continuing	-
A&AS	Various	Various : Various	-	9.774	Jan 2017	12.192	Jan 2018	12.771	Jan 2019	-		12.771	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	0.000	15.666		12.409		13.044		-		13.044	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	191.343		145.610		151.506		-		151.506	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

MILSATCOM Space Modernization Initiative	
AEHF CIP: Phase IV Inc 8.2 VPS Terminal Integration	
AEHF CIP: Phase V Inc 8.3 XDR Transition	
AEHF CIP: Phase VI Inc 8.4 Endurance Mission Replan (EMR)	
AEHF CIP: Operational Resiliency - Phase 1	
AEHF CIP: Operational Resiliency - Phase 2	
Protected Tactical Service Field Demo (PTSFD) PTW Demo : Factory Tests (TM LRU, MMS, KMS)	
Protected Tactical Service Field Demo (PTSFD) PTW Demo : Development Tests (TM LRU, MMS, PHEC)	
Protected Tactical Service Field Demo (PTSFD) PTW Demo : Conduct End to End OTA Demonstration	
Protected Tactical Testbed: Factory Tests (TM LRU, MMS, KMS)	
Protected Tactical Testbed: Support Development Tests (TM LRU, MMS, PHEC)	
Protected Tactical Testbed: Support End to End OTA Demonstration (TM LRU, MMS, PHEC)	

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MILSATCOM Space Modernization Initiative				
AEHF CIP: Phase IV Inc 8.2 VPS Terminal Integration	4	2017	1	2020
AEHF CIP: Phase V Inc 8.3 XDR Transition	4	2018	1	2021
AEHF CIP: Phase VI Inc 8.4 Endurance Mission Replan (EMR)	4	2019	1	2022
AEHF CIP: Operational Resiliency - Phase 1	4	2018	4	2020
AEHF CIP: Operational Resiliency - Phase 2	3	2019	3	2021
Protected Tactical Service Field Demo (PTSFD) PTW Demo : Factory Tests (TM LRU, MMS, KMS)	2	2018	4	2018
Protected Tactical Service Field Demo (PTSFD) PTW Demo : Development Tests (TM LRU, MMS, PHEC)	4	2018	3	2020
Protected Tactical Service Field Demo (PTSFD) PTW Demo : Conduct End to End OTA Demonstration	2	2019	3	2020
Protected Tactical Testbed: Factory Tests (TM LRU, MMS, KMS)	1	2018	4	2018
Protected Tactical Testbed: Support Development Tests (TM LRU, MMS, PHEC)	4	2018	3	2020
Protected Tactical Testbed: Support End to End OTA Demonstration (TM LRU, MMS, PHEC)	2	2019	3	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206432F / *Polar MILSATCOM (SPACE)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	273.056	44.306	33.644	27.337	0.000	27.337	0.000	0.000	0.000	0.000	0.000	378.343
657105: *Polar Satellite Communications*	273.056	44.306	33.644	27.337	0.000	27.337	0.000	0.000	0.000	0.000	0.000	378.343
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 121

Note

As of the December 2016 Selected Acquisition Report, Prior Years dollars total $1,251.8M.

A. Mission Description and Budget Item Justification

This program element acquires the Polar MILSATCOM system that provides protected communications (anti-jam and low probability of intercept and detection) for users in the north polar region.

Through FY 2005, Polar Satellite Communications funded three low data rate Milstar packages on three classified host satellites as an expedited, interim solution for protected connectivity requirements in the north polar region (i.e., Interim Polar System (IPS)). Two satellites with hosted packages are required to provide the necessary 24-hour coverage. The third package went into operations in November 2008 to sustain the 24-hour coverage.

In FY 2006, the DoD began funding the next generation Polar Satellite Communications capability with two more polar packages via the same host vehicle type (i.e., Enhanced Polar System (EPS)). The host spacecraft and the polar communications packages required design modifications that replaced obsolete components and took advantage of the more capable Advanced Extremely High Frequency (AEHF) technology including the eXtended Data Rate (XDR) waveform. The EPS Capability Development Document (CDD), approved by the Joint Requirements Oversight Council in September 2006, is based on a two-package, hosted XDR program with operational availability in CY 2015 and CY 2017. EPS is comprised of four segments: Payload, Ground Control, Gateway, and Terminal (acquired by each Service's Terminal Program Office). Milestone B review was completed 2 April 2014.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206432F / *Polar MILSATCOM (SPACE)*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Polar MILSATCOM weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

The Polar MILSATCOM program is in Budget Activity 5, SDD because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	50.815	33.644	0.000	0.000	0.000
Current President's Budget	44.306	33.644	27.337	0.000	27.337
Total Adjustments	-6.509	0.000	27.337	0.000	27.337
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-5.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.509	0.000			
• Other Adjustments	0.000	0.000	27.337	0.000	27.337

Change Summary Explanation

FY 2017: -$5.000M Congressional Directed Reduction due to unjustified request.
FY 2019: +$27.337M: +$27.542M for software sustainment builds and cyber security updates to Gateway Segment and Control and Planning Segment (CAPS), and Preoperational Support (PS)/Interim Contractor Support (ICS); -$0.205M inflation adjustment.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: EPS	44.306	33.644	27.337
Description: Develop and acquire EPS MILSATCOM which consists of: 1) two Extremely High Frequency payloads, using AEHF's XDR waveform, on hosted spacecraft; 2) a standalone Control and Planning Segment (CAPS) to provide command and control and XDR mission planning capability; and 3) one gateway to provide connectivity between polar and mid-latitude users through the Global Information Grid.			
FY 2018 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206432F / *Polar MILSATCOM (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Complete test activities for Lead Development Test Organization. Execute MOT&E. Complete PEO certification. Execute Payload #2 on-orbit testing. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Complete software sustainment builds, cyber security updates, and Operational Test and Evaluation (OT&E) report. Funds Preoperational Support (PS)/Interim Contractor Support (ICS) in order to support final O&M contract award. Continue to appropriately staff contractor-operated protected communications satellite system for operational trial period and troubleshoot system anomalies during PS/ICS period. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $6.307M. Justification for this decrease is described in plans above.			
Accomplishments/Planned Programs Subtotals	44.306	33.644	27.337

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The EPS is the follow-on to the currently operational IPS and is a component of the Extremely High Frequency SATCOM architecture providing secure, protected communications to worldwide users. The EPS acquisition consists of four segments (Payload, Ground Control, Gateway, and Terminal) acquired by separate procurement actions. Each EPS payload and its integration onto classified host satellites is funded by the EPS program while the development and integration is performed by the host organization. The MILSATCOM Systems Directorate will procure the Ground Control and Planning Segment. The Ground Gateway segment, funded by the EPS program, will be organically developed by the Navy's Space and Naval Warfare Systems Center Pacific, San Diego, CA. The MILSATCOM Systems Directorate is the prime systems integrator for the EPS payload, ground control, and gateway segments. The Terminals that will use EPS will be acquired by each Service's Terminal Program Office.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206432F / *Polar MILSATCOM (SPACE)*	**Project (Number/Name)** 657105 / *Polar Satellite Communications*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Control and Planning Segment	C/CPIF	NGMS : Redondo Beach, CA	139.914	15.078	Nov 2016	12.720	Nov 2017	14.530	Nov 2018	-		14.530	0.000	182.242	148.600
Gateway architecture development	MIPR	Space and Naval Warfare Systems Command (SPAWAR) Systems Center - Pacific : San Diego, CA	39.212	7.728	Nov 2016	3.496	Nov 2017	3.604	Nov 2018	-		3.604	0.000	54.040	75.454
EPS Design/Development Contract	SS/CPAF	NGAS : Redondo Beach, CA	6.949	2.065	Nov 2016	2.911	Nov 2017	0.850	Nov 2018	-		0.850	0.000	12.775	606.693
T&C-T Development	MIPR	Lincoln Labs : Boston, MA	6.377	2.980	Nov 2016	3.060	Nov 2017	1.595	Nov 2018	-		1.595	0.000	14.012	-
Technical Mission Analysis	Various	Various : Various	8.435	4.650	Nov 2016	3.886	Nov 2017	2.026	Nov 2018	-		2.026	0.000	18.997	-
Enterprise SE&I	Various	Various : Various	28.247	7.443	Nov 2016	3.976	Nov 2017	2.074	Nov 2018	-		2.074	0.000	41.740	-
		Subtotal	229.134	39.944		30.049		24.679		-		24.679	0.000	323.806	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Planning/Management Support for T&E	MIPR	Various : Various	1.279	-		-		-		-		-	0.000	1.279	-
		Subtotal	1.279	-		-		-		-		-	0.000	1.279	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : Various	18.248	0.400	Nov 2016	0.633	Nov 2017	0.330	Nov 2018	-		0.330	0.000	19.611	-
A&AS	Various	Various : Various	23.935	3.662	Nov 2016	2.692	Nov 2017	2.187	Nov 2018	-		2.187	0.000	32.476	-
Other Support	Various	Various : Various	0.460	0.300	Oct 2016	0.270	Nov 2017	0.141	Oct 2018	-		0.141	0.000	1.171	-
		Subtotal	42.643	4.362		3.595		2.658		-		2.658	0.000	53.258	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206432F / *Polar MILSATCOM (SPACE)*	**Project (Number/Name)** 657105 / *Polar Satellite Communications*

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	273.056	44.306		33.644		27.337		-		27.337	0.000	378.343	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206432F / *Polar MILSATCOM (SPACE)*	**Project (Number/Name)** 657105 / *Polar Satellite Communications*

Enhanced Polar System	
Field Control and Planning Segment (CAPS)	
Availability of Payload #2	
Conduct Multiservice Operational Test and Evaluation (MOT&E)	
IOC/FOC declaration	
Preoperational Support/Interim Contractor Support	

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206432F / *Polar MILSATCOM (SPACE)*	**Project (Number/Name)** 657105 / *Polar Satellite Communications*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Enhanced Polar System				
Field Control and Planning Segment (CAPS)	1	2017	4	2017
Availability of Payload #2	2	2017	1	2018
Conduct Multiservice Operational Test and Evaluation (MOT&E)	3	2018	4	2018
IOC/FOC declaration	1	2019	1	2019
Preoperational Support/Interim Contractor Support	1	2019	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	73.901	14.263	3.970	0.000	3.970	1.920	0.000	0.000	0.000	Continuing	Continuing
657102: *Command & Control Sys-Consolidated (CCS-C)*	-	11.800	4.263	3.970	0.000	3.970	1.920	0.000	0.000	0.000	Continuing	Continuing
657107: *WGS Space Systems Resiliency Upgrade*	-	62.101	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Military Satellite Communications (MILSATCOM) Command and Control System-Consolidated (CCS-C) system provides integrated launch and on-orbit command and control (C2) functionality at Schriever AFB and Vandenberg AFB for MILSATCOM satellites. Schriever AFB is used for primary operations and Vandenberg AFB is used for backup operations. CCS-C uses modified commercial off the shelf hardware/software to control emerging and legacy MILSATCOM systems including Milstar, Defense Satellite Communications System (DSCS), Wideband Global SATCOM (WGS) and Advanced Extremely High Frequency (AEHF) satellites.

The CCS-C project 657102 funds system architecture evolution to provide increased performance for additional satellites and to comply with DoD, Air Force, and AFSPC-directed standards for Information Assurance, Satellite Control Standardization, and Net-Readiness. This continuing effort was previously funded in the FY14PB and prior as an Acquisition Category II (ACAT II) program. With the 10 October 2013 Final Operational Capability (FOC) declaration, the program has transitioned to an ACAT III program, the Command and Control System-Consolidated Assurance and Capability Enhancement (CACE), beginning FY2014. The WGS and AEHF procurement program elements fund the mission unique software and databases for the WGS Block II Follow-On satellites and the AEHF 4-6 satellites, respectively.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Wideband Global SATCOM (Space) weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	41.632	14.263	4.000	0.000	4.000
Current President's Budget	73.901	14.263	3.970	0.000	3.970
Total Adjustments	32.269	0.000	-0.030	0.000	-0.030
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-5.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	40.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-2.731	0.000			
• Other Adjustments	0.000	0.000	-0.030	0.000	-0.030

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2017	FY 2018
Project: 657107: *WGS Space Systems Resiliency Upgrade*		
Congressional Add: *COMSATCOM Pilot Program, Phase 2*	10.000	0.000
Congressional Add: *COMSATCOM Pathfinder #3*	28.977	0.000
Congressional Add Subtotals for Project: 657107	38.977	0.000
Congressional Add Totals for all Projects	38.977	0.000

Change Summary Explanation

FY2017:
-$5.0M Congressional directed reduction for prior year carryover
+$40.0M Congressional adds: $10.0M for COMSATCOM Pilot Program, +$30.0M transferred from SPAF, GAP000/Wideband Gapfiller Satellite (SPACE) PE 1203600F to RDT&E, PE 1206433F for COMSATCOM Pathfinder #3
FY2019: -$0.030M Inflation adjustment

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657102 / *Command & Control Sys-Consolidated (CCS-C)*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657102: *Command & Control Sys-Consolidated (CCS-C)*	-	11.800	4.263	3.970	0.000	3.970	1.920	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Military Satellite Communications (MILSATCOM) Command and Control System-Consolidated (CCS-C) system provides integrated launch and on-orbit command and control (C2) functionality at Schriever AFB and Vandenberg AFB for MILSATCOM satellites. Schriever AFB is used for primary operations and Vandenberg AFB is used for backup operations. CCS-C uses modified commercial off the shelf hardware/software to control emerging and legacy MILSATCOM systems including Milstar, Defense Satellite Communications System (DSCS), Wideband Global SATCOM (WGS) and Advanced Extremely High Frequency (AEHF) satellites.

The CCS-C project 657102 funds system architecture evolution to provide increased performance for additional satellites and to comply with DoD, Air Force, and AFSPC-directed standards for Information Assurance, Satellite Control Standardization, and Net-Readiness. This continuing effort was previously funded in the FY14PB and prior as an Acquisition Category II (ACAT II) program. With the 10 October 2013 Final Operational Capability (FOC) declaration, the program has transitioned to an ACAT III program, the Command and Control System-Consolidated Assurance and Capability Enhancement (CACE), beginning FY2014. The WGS and AEHF procurement program elements fund the mission unique software and databases for the WGS Block II Follow-On satellites and the AEHF 4-6 satellites, respectively.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more effective. This agility must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: CCS-C development	11.800	4.263	3.970
Description: Develop system architecture to provide enhanced C2 of MILSATCOM satellites.			
FY 2018 Plans: Continue to execute implementation, integration, and conduct test verification activities for all CCS-C modifications. Continue to manage the operational CCS-C & CACE baseline throughout testing activities. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, and contract actions.			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657102 / *Command & Control Sys-Consolidated (CCS-C)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Continue to execute implementation, integration, and conduct test verification activities for all CCS-C modifications. Continue to execute Development Test and initiate Operational Test at Schriever AFB. Continue to manage the operational CCS-C & CACE baseline throughout testing activities. Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 decreased compared to FY2018 by $0.293M. Justification for this decrease is described in plans above.			
Accomplishments/Planned Programs Subtotals	11.800	4.263	3.970

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line Item MILSAT: *Milsatcom Space*	0.272	0.277	0.000	-	0.000	0.000	0.000	0.000	-	0.000	0.549
• SPAF 01 Line Item GAP000: *Wideband Global System Procurement*	0.000	0.208	0.000	-	0.000	0.000	0.000	0.000	-	0.000	0.208

Remarks

D. Acquisition Strategy

Competitive contract was awarded in November 2012 and began performance in January 2013. The CCS-C Production and Sustainment Contract (CPASC) includes effort to increase the capability of the CCS-C system to provide ongoing C2, launch readiness support, and anomaly resolution for MILSATCOM satellite families. The CCS-C project 657102 funds system architecture evolution to provide increased performance for additional satellites and to comply with DoD, Air Force, and AFSPC-directed standards for Information Assurance, Satellite Control Standardization, and Net-Readiness.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657102 / *Command & Control Sys-Consolidated (CCS-C)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Production and Sustainment Contract	C/FPIF	Kratos : San Diego, CA	-	10.154	Oct 2016	2.619	Oct 2017	2.423		-		2.423	Continuing	Continuing	-
Technical Mission Analysis	C/Various	Aerospace : El Segundo, CA	-	0.000	Oct 2016	0.192	Oct 2017	0.195		-		0.195	Continuing	Continuing	-
Enterprise SE&I	C/CPIF	LinQuest : Los Angeles, CA	-	0.457	Oct 2016	0.236	Oct 2017	0.240		-		0.240	Continuing	Continuing	-
		Subtotal	-	10.611		3.047		2.858		-		2.858	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Aerospace : El Segundo, CA	-	0.000	Oct 2016	0.398	Oct 2017	0.382		-		0.382	Continuing	Continuing	-
A&AS	Various	Various : Various	-	1.183	Oct 2016	0.768	Oct 2017	0.680		-		0.680	Continuing	Continuing	-
Other Support	Various	Various : Various	-	0.006	Oct 2016	0.050	Oct 2017	0.050		-		0.050	Continuing	Continuing	-
		Subtotal	-	1.189		1.216		1.112		-		1.112	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	11.800		4.263		3.970		-		3.970	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657102 / *Command & Control Sys-Consolidated (CCS-C)*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Command and Control System Consolidated (CCS-C)																												
Capacity Upgrade: "Wideband Capacity Capability Improvement."																												
Resource Pooling:--"Processing Architecture Capability Improvement for Better Resource Management"--"Automated Data Synchronization for Increased Efficiency."																												
Cryptography Upgrade: "Replace CCS-C KI-17 with KS-252"																												
Secure FTP: "Cross-Domain Capability Improvement for secure data transfer"																												
IA Controls: "8500 Compliance Capability Improvement for security."																												
Interoperability: "Interoperability Capability Improvement to Migrate to USB standard"																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657102 / *Command & Control Sys-Consolidated (CCS-C)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Command and Control System Consolidated (CCS-C)				
Capacity Upgrade: "Wideband Capacity Capability Improvement."	1	2017	4	2020
Resource Pooling:--"Processing Architecture Capability Improvement for Better Resource Management"--"Automated Data Synchronization for Increased Efficiency."	1	2017	4	2020
Cryptography Upgrade: "Replace CCS-C KI-17 with KS-252"	1	2017	4	2020
Secure FTP: "Cross-Domain Capability Improvement for secure data transfer"	1	2017	4	2020
IA Controls: "8500 Compliance Capability Improvement for security."	1	2017	4	2020
Interoperability: "Interoperability Capability Improvement to Migrate to USB standard"	1	2017	4	2020

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206433F / *Wideband Global SATCOM (SPACE)*	Project (Number/Name) 657107 / *WGS Space Systems Resiliency Upgrade*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657107: *WGS Space Systems Resiliency Upgrade*	-	62.101	10.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Wideband Global SATCOM (WGS) System provides the DoD with high data rate military satellite communications (MILSATCOM) services in accordance with the Joint Space Management Board-approved MILSATCOM architecture (August 1996), the Joint Requirements Oversight Council (JROC)-approved MILSATCOM Capstone Requirements Document (October 1997), and JROC-approved WGS Operational Requirements Document (May 2000). This program was originally conceived to augment the near-term "bandwidth gap" in warfighter communications needs. Dual-frequency WGS satellites augment, then replace the DoD's Defense Satellite Communications System X-band service and augment one-way Global Broadcast Service Ka-band capabilities. In addition, WGS provides a high capacity two-way Ka-band service.

All WGS Block I (Satellites 1-3), Block II (Satellites 4-6), and the first Block II Follow-on (Satellite 7) have been launched and are operational. Satellites 8-9 successfully launched on 7 December 2016 and 18 March 2017, respectively. With the operation of WGS-5, the constellation has global coverage and Full Operational Capability (FOC) was declared on 12 May 2014. Project 657107, WGS Space Systems Resiliency Upgrade, is an Acquisition Category III (ACAT III) effort. The WGS resiliency upgrade will enable the WGS system to both locate and neutralize ground-based jamming threats to the X-band.

The Commercial SATCOM (COMSATCOM) Pilot Program consists of three phases. Pilot Phase I was awarded in April 2017, Pilot Phase II is expected to be awarded 2Qtr FY18 and Pilot Phase III 4Qtr FY18. These efforts will demonstrate the feasibility and utility of the DoD using order-of-magnitude SATCOM capability improvements advertised by commercial companies.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: WGS Upgrade	21.624	0.000	0.000
Description: Upgrade WGS system to both locate and neutralize ground-based jamming threats.			
FY 2018 Plans: N/A			
FY 2019 Plans: N/A			
FY 2018 to FY 2019 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
N/A			
Title: Wideband AoA ***Description:*** Analysis of alternatives for a follow-on wideband communications system to the WGS system. ***FY 2018 Plans:*** N/A ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	1.500	0.000	0.000
Title: COMSATCOM Pilot Program ***Description:*** The COMSATCOM Pilot Program will be conducted in 3 Phases. Pilot Phase 1 will study future wideband SATCOM architecture. Pilot Phase 2 will develop and demonstrate a Flexible Modem Interface (FMI). Pilot Phase 3 will conduct end-to-end demonstrations of order-of-magnitude improvements in SATCOM capability, affordability, and resiliency. ***FY 2018 Plans:*** Implement flexible modem/terminal interface and centralized management process enabling demonstration of order of magnitude improvements in commercial satellite communications. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decrease compared to FY 2018 by $10.0M. Justification for this decrease is described in plans above.	0.000	10.000	0.000
Accomplishments/Planned Programs Subtotals	23.124	10.000	0.000

	FY 2017	FY 2018
Congressional Add: COMSATCOM Pilot Program, Phase 2 ***FY 2017 Accomplishments:*** N/A ***FY 2018 Plans:*** N/A	10.000	0.000
Congressional Add: COMSATCOM Pathfinder #3	28.977	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*

	FY 2017	FY 2018
FY 2017 Accomplishments: N/A ***FY 2018 Plans:*** N/A		
Congressional Adds Subtotals	38.977	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line Item GAP000: *Wideband Global System Procurement*	48.772	80.849	61.606	-	61.606	0.000	0.000	0.000	-	0.000	191.227

Remarks

D. Acquisition Strategy

The Wideband Global SATCOM (WGS) Space Systems Resiliency Upgrade will be accomplished by modifying the WGS Block II Follow-On (B2FO) Firm Fixed Price (FFP) contract definitized in August 2010. The B2FO contract currently provides development, production, and deployment of WGS satellites 7-10. The COMSATCOM Pilot Program Phase II will be awarded under Other Transaction Authority (OTA) to multiple vendors.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
WGS Upgrade: X-band Anti-jam enhancement	SS/FFP	The Boeing Company : El Segundo, CA	-	20.260	Jan 2017	-		-		-		-	Continuing	Continuing	55.560
Technical Mission Analysis	Various	Aerospace : El Segundo, CA	-	0.707	Feb 2017	2.000	Nov 2017	-		-		-	Continuing	Continuing	-
Lincoln Labs (COMSATCOM Pilot Program)	Various	Lincoln Labs : Lexington, MA	-	0.000		7.800	Apr 2018	-		-		-	Continuing	Continuing	-
Wideband Analysis of Alternatives (AoA)	Various	Multiple : Multiple	-	1.500	Jun 2017	-		-		-		-	Continuing	Continuing	-
Congressional Add: COMSATCOM Pilot Program, Phase 2	TBD	TBD : TBD	-	10.000	Jan 2018	-		-		-		-	Continuing	Continuing	-
Congressional Add: COMSATCOM Pathfinder #3	SS/FFP	ARDEC : Washington, DC	-	28.977	Dec 2017	-		-		-		-	Continuing	Continuing	-
		Subtotal	-	61.444		9.800		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Aerospace : El Segundo, CA	-	0.069	May 2017	-		-		-		-	Continuing	Continuing	6.180
Other Support	Various	Various : Various	-	0.588	Dec 2016	0.200	Oct 2017	-		-		-	Continuing	Continuing	1.200
		Subtotal	-	0.657		0.200		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	62.101		10.000		-		-		-	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*	

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

FY16 Lincoln Labs (COMSATCOM Pilot Program) Subcontractors: Boeing, Northrop Grumman, Space Systems-Loral, Hughes, KRATOS, and ViaSat

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206433F / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
No project title.				
X band: Ground Based Receiver Equipment Development	1	2017	2	2018
X-band: GSCCE Software Development (GBAN)	1	2017	2	2019
X-band: In Service Calibration / Geolocation / Beam SW	1	2017	2	2019
X-band: Rack Integration & Test	1	2017	2	2019
X-band: System Integration & Test and IA Certification	3	2017	2	2019
X-band: Fielding and Activation	3	2019	4	2019
Wideband Communications Services AoA Materiel Development Decision	1	2017	1	2017
COMSATCOM Pilot Program Analysis Phase 1	1	2017	2	2018
COMSATCOM Pilot Program Phase 2 Award	2	2018	1	2019
COMSATCOM Pilot Program Order of Magnitude Demos Phase 3	4	2018	4	2019

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	10,031.708	161.966	311.844	60.565	0.000	60.565	0.001	0.000	0.000	0.001	Continuing	Continuing
653616: *SBIRS High Element Emd*	10,031.708	108.890	121.760	50.436	0.000	50.436	0.000	0.000	0.000	0.001	0.000	10,312.795
657009: *Space Mod Initiative*	0.000	53.076	173.537	10.129	0.000	10.129	0.001	0.000	0.000	0.000	Continuing	Continuing
657106: *Evolved SBIRS*	0.000	0.000	16.547	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Program MDAP/MAIS Code: 210

Note

Starting in FY 2019, PE 1206441F,Space Based Infrared System (SBIRS) High EMD, Project 657009, Space Mod Initiative efforts were transferred to PE 1206442F, Evolved SBIRS, Project 657009, SMI, in order to realign the Evolved SBIRS.

Starting in FY 2019, PE 1206441F,Space Based Infrared System (SBIRS) High EMD, Project 657106, Evolved SBIRS efforts were transferred to PE 1206442F, Evolved SBIRS, Project 657106, Evolved SBIRS Ground, in order to realign the Evolved SBIRS. The realignment will provide better insight into space and ground elements of the future SBIRS system.

A. Mission Description and Budget Item Justification

The SBIRS RDT&E FY 2019 budget justification exhibits describe three elements of the SBIRS program: 1) the SBIRS Engineering and Manufacturing Development (EMD) program of record PNO 210 MDAP, 2) the Space Modernization Initiative (SMI) (non-MDAP) and the 3) Evolved SBIRS follow-on (pre-MDAP PNO 499).

1. SBIRS EMD: The Space-Based Infrared System (SBIRS) primary mission is to provide initial warning of a ballistic missile attack on the US, its deployed forces, and its allies. SBIRS enhances detection and improves reporting of intercontinental ballistic missile launches, submarine launched ballistic missile launches, and tactical ballistic missile launches. SBIRS supports Missile Defense, Battlespace Awareness, and Technical Intelligence missions by providing reliable, accurate, and timely data to Unified Combatant Commanders, Joint Task Force (JTF) Commanders, the intelligence community, and other users. SBIRS provides increased detection and tracking performance over legacy systems in order to meet requirements in Air Force Space Command's (AFSPC) Operational Requirements Document (ORD). The SBIRS system includes both space and ground elements. The space segment consists of Geosynchronous Earth Orbit (GEO) satellites, payloads hosted on satellites in Highly Elliptical Orbit (HEO), and Defense Support Program (DSP) satellites. The ground segment consists of both fixed and mobile data processing elements, communications infrastructure, and relay ground stations serving all SBIRS space elements. Four HEO payloads and four GEO satellites are on-orbit. Two of the four GEO and two of the four HEO satellites have completed AFSPC and USSTRATCOM operational acceptance and are certified for Integrated Tactical Warning/ Attack Assessment (ITW/AA) missile warning operations and technical intelligence operations. HEO-3 and HEO-4 are in a storage/residual operational mode. GEO-4 (Flight 3) and GEO-3 (Flight 4) are proceeding through on-orbit checkout and infrared sensor tuning following their respective launches in Jan 2017 and Jan 2018. The program of record (PoR)ground segment development exploits both the new scanner and starer sensor data through software processing and builds user messages for missile warning and missile defense. Also, data exploitation efforts enable access to raw and processed data to expand capabilities for battlespace awareness and other applications. The baseline

requirement document is the 1996 SBIRS ORD. Enterprise Systems Engineering and Integration (SE&I) provides intra- and inter-program requirements development, enterprise master planning, validation and verification, specialty engineering, and architecture development.

2. SMI: The primary objective of SMI is to enable and inform future decisions to maintain and evolve a capable, resilient, and affordable OPIR architecture by maturing technologies and mitigating risk areas to facilitate OPIR modernization within the Department's constrained resources. SMI supports the PoR by assessing future parts and material obsolescence and designing future space and ground modifications focused on affordability and capability while simultaneously maximizing the effectiveness of existing system data products. SMI funds engineering activities to reduce both production and future system costs through manufacturing and producibility enhancements and through technology insertion. SMI will also mature potential technology upgrades at the component and system level for future space and ground architecture affordability and capability enhancements. The SBIRS OPIR SMI plan includes studies and risk reduction activities to evolve the current PoR SBIRS constellation, reduce production timelines, and reduce recurring production costs. Based on the outcome of these studies and technology development, the Sensor Ground Demonstration will develop capability for current, next generation sensors, processors, and algorithms. SMI funded data exploitation efforts include OPIR mission data processing (MDP), data fusion, data dissemination, algorithm development, network connectivity, efficient interfaces and sensor performance assessments to enable greater exploitation of SBIRS PoR and other data sources. SMI exploitation efforts build upon PoR capabilities and inform the PoR decision process. The data exploitation efforts identify affordable, responsive and resilient measures to improve technical intelligence and battlespace awareness processing and data dissemination tools to enhance OPIR support to the warfighters and other data users. The SMI Hosted Payloads and Wide Field of View (WFOV) Testbed activities explore technology maturation, qualification of new components, and subsystem/component prototyping to evolve the OPIR architecture. Hosted Payloads and WFOV Testbeds support maturation of MDP algorithms for tactical and strategic applications which are critical demonstration efforts to enhance PoR capabilities and to reduce program risks for future OPIR systems, whether new systems or evolutions of the PoR. Collection of on-orbit WFOV data is critical to develop algorithms to process large data sets generated by emerging large format focal planes and to reduce risk for possible SBIRS follow-on architectures. SBIRS Enterprise Ground Services (EGS) infrastructure modernization efforts under SMI will introduce Telemetry, Tracking and Command systems (TT&C) and Ground Control automation, Future Operationally Resilient Ground Evolution (FORGE) MDP as well as competition into SBIRS Ground with an emphasis to on-ramp to EGS as soon as practical. SMI activities are balanced and phased to enable an expanded tradespace and improve the competitive environment.

3. Evolved SBIRS: The Future Operationally Resilient Ground Evolution (FORGE) will consist of Command and Control (C2) migration to Enterprise Ground Services (EGS), modernization of Mission Data Processing (MDP), and required development/upgrades to Remote Ground Stations (RGS). The FORGE effort will implement an open framework for mission data processing and migration of C2 of satellite operations to integrate with EGS. FORGE and EGS efforts will provide the flexibility to integrate new MDP capabilities and more efficiently allow the system to meet evolving warfighter needs.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SBIRS High EMD, SMI, and OPIR Enterprise weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements to full-rate production.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	218.766	311.844	345.460	0.000	345.460
Current President's Budget	161.966	311.844	60.565	0.000	60.565
Total Adjustments	-56.800	0.000	-284.895	0.000	-284.895
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-20.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-36.800	0.000	-284.895	0.000	-284.895

Change Summary Explanation

FY 2017: Congressional Mark (-$20.000M) unjustified request from Tech Maturation and (-$36.800M) RAA Backout.
FY 2019, PE 1206441F,Space Based Infrared System (SBIRS) High EMD, Project 657009, Space Mod Initiative efforts were transferred to PE 1206442F, Evolved SBIRS, Project 657009, SMI, in order to realign the Evolved SBIRS. FY 2018 and prior remain in PE 1206441F.
FY 2019, PE 1206441F,Space Based Infrared System (SBIRS) High EMD, Project 657106, Evolved SBIRS efforts were transferred to PE 1206442F, Evolved SBIRS, Project 657106, Evolved SBIRS Ground, in order to realign the Evolved SBIRS.
FY 2019: +$12.8M for SBIRS Standard Space Trainer (SST), -$65M SMI ISR Reduction, -$136.201M Realign SMI to Next Gen PE, -$96.039M Realign all of FY 2019 Evolved SBIRS to PE 1206442F

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 653616 / *SBIRS High Element Emd*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
653616: *SBIRS High Element Emd*	10,031.708	108.890	121.760	50.436	0.000	50.436	0.000	0.000	0.000	0.001	0.000	10,312.795
Quantity of RDT&E Articles	4	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Note: The quantity of RDT&E articles above reflects delivery of GEO-1 in FY 2011, GEO-2 in FY 2012, HEO-1 in FY 2004, and HEO-2 in FY 2005.

The SBIRS primary mission is to provide initial warning of a ballistic missile attack on the US, its deployed forces, and its allies. SBIRS enhances detection and improves reporting of intercontinental ballistic missile launches, submarine launched ballistic missile launches, and tactical ballistic missile launches. SBIRS supports Missile Defense, Battlespace Awareness, and Technical Intelligence missions by providing reliable, accurate, and timely data to Unified Combatant Commanders, Joint Task Force (JTF) Commanders, the intelligence community, and other users. SBIRS provides increased detection and tracking performance over legacy systems in order to meet requirements in Air Force Space Command's (AFSPC) Operational Requirements Document (ORD). The SBIRS system includes both space and ground elements. The space segment consists of GEO satellites, payloads hosted on satellites in HEO, and Defense Support Program (DSP) satellites. The ground segment consists of both fixed and mobile data processing elements, communications infrastructure, and relay ground stations serving all SBIRS space elements. The three HEO payloads and two GEO satellites are on-orbit. Both GEO and two of the four HEO satellites have completed AFSPC and USSTRATCOM operational acceptance and are certified for Integrated Tactical Warning/Attack Assessment (ITW/AA) missile warning operations and technical intelligence operations. HEO-3 is in a storage/ residual operational mode. The PoR ground segment development exploits both the new scanner and starer sensor data through software processing and builds user messages for missile warning and missile defense. Also, data exploitation efforts enable access to raw and processed data to expand capabilities for battlespace awareness and other applications. SBIRS ground system cyber defense increases resiliency by resolving legacy DSP network architecture issues and establishes an active cyber defense capability. The baseline requirement document is the 1996 SBIRS ORD. Enterprise SE&I provides intra- and inter-program requirements development, enterprise master planning, validation and verification, specialty engineering, and architecture development.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: SBIRS EMD	108.890	121.760	50.436
Description: Continued EMD contracts for Space and Ground segment development, concept studies/activities for obsolescence issues.			
FY 2018 Plans: Continue Block 20 Ground System Development, System Engineering and Program Management, HEO host program office support, Technical Intelligence activities, Data Processing/ Exploitation/ground integration activities, systems integration and test studies. Continue developing and fielding Command & Control, Technical Intelligence, and Battlespace Awareness operations to leverage residual capability for HEO 1/2 post-transition. Decommissioning of Increment 1 facilities replaced by Block 10 will occur			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 653616 / *SBIRS High Element Emd*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
in a time phased manner through O&M efforts. Continue enterprise SE&I. Continue cyber defense improvements to SBIRS ground system architecture in Block 20 to address identified deficiencies during operational testing. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Complete Block 20 Ground System Development, System Engineering and Program Management, HEO host program office support, Technical Intelligence activities, Data Processing/ Exploitation/ground integration activities, systems integration and test studies. Execute Block 20 fielding and OA time phased with operational priorities to enable effective fielding of capabilities while minimizing concurrency risks to current ITW/AA operations. Decommissioning of Increment 1 facilities replaced by Block 10 will occur in a time phased manner through O&M efforts. Complete developing and fielding Command & Control, Technical Intelligence, and Battlespace Awareness operations to leverage residual capability for HEO 1/2 post-transition. Continue enterprise SE&I. Complete cyber defense improvements to SBIRS ground system architecture in Block 20 to address identified deficiencies during operational testing. Complete Standard Space Trainer (SST) Phase 3. Phase 3 incorporates the next generation of upgrades to the SBIRS SST to address current system deficiencies. Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $71.945M. Justification for this decrease is described in plans above			
Accomplishments/Planned Programs Subtotals	108.890	121.760	50.436

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line 13, MSSBIR: *SBIR High (Space)*	355.114	1,113.429	138.397	-	138.397	136.552	113.065	8.188	8.340	Continuing	Continuing

Remarks

D. Acquisition Strategy

The pre-SDD SBIRS contracts were competed in full and open competition. Two contracts were awarded to Lockheed/Loral/Aerojet and Hughes/TRW in 1995 for the pre-SDD phase. A single contract was awarded to Lockheed Martin in 1996 for the SDD phase. This contract is still ongoing and will incrementally deliver the ground segment. Production contracts are discussed in the procurement budget exhibits.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 653616 / *SBIRS High Element Emd*

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 653616 / *SBIRS High Element Emd*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Pre-EMD (LMMS & Hughes)	C/CPFF	Hughes Aircraft Company : El Segundo, CA	159.600	0.000		-		-		-		-	0.000	159.600	159.600
SBIRS EMD	Various	Prime: Lockheed MartinSub:Northrop Grumman : Sunnyvale; Azusa, CA	8,940.461	86.629	Oct 2016	104.333	Oct 2017	27.488	Oct 2018	-		27.488	0.000	9,158.911	9,158.709
Enterprise SE&I	C/CPAF	The Analytical Sciences Corporation : El Segundo, CA	56.009	4.979	Dec 2016	2.971	Dec 2017	-		-		-	0.000	63.959	64.541
SST Phase 3	C/CPAF	Not specified. : TBD	0.000	-		-		12.800	Oct 2018	-		12.800	0.000	12.800	-
SBIRS Pre-SDD Contract Adjustment	Various	Various : Various	4.780	0.000		-		-		-		-	0.000	4.780	4.780
Technology	Various	Various : Various	11.600	0.000		-		-		-		-	0.000	11.600	11.600
Phenomenology	Various	Various : Various	17.350	0.000		-		-		-		-	0.000	17.350	17.350
Sensor Technology	Various	Sandia National Lab : Albuquerque, NM	10.000	0.000		-		-		-		-	0.000	10.000	10.000
Technical Mission Analysis	RO	Aerospace Corp. : El Segundo, CA	8.869	5.050	Oct 2016	5.089	Oct 2017	5.241	Oct 2018	-		5.241	0.000	24.249	22.794
HEO Command & Control (C2) Ground Expansion	Various	Lockheed Martin : Sunnyvale, CA	36.259	0.000		-		-		-		-	0.000	36.259	36.259
HEO 1/2 Residual Capability	Various	Various : Various	14.600	0.000		-		-		-		-	0.000	14.600	14.600
		Subtotal	9,259.528	96.658		112.393		45.529		-		45.529	0.000	9,514.108	N/A

Remarks

Award dates represent date of first award of the funds for that fiscal year.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 653616 / *SBIRS High Element Emd*

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
WFOV Testbed Concept Study	MIPR	Millennium Space Systems : El Segundo, CA	8.000	0.000		-		-		-		-	0.000	8.000	8.000
Program Support	Various	Various : Various	11.942	0.000		-		-		-		-	0.000	11.942	11.942
		Subtotal	19.942	0.000		-		-		-		-	0.000	19.942	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp. : El Segundo, CA	459.775	5.450	Oct 2016	3.761	Oct 2017	3.874	Oct 2018	-		3.874	0.000	472.860	471.006
A&AS	Various	Various : Various	166.560	1.933	Dec 2016	2.559	Dec 2017	-		-		-	0.000	171.052	174.682
Other Support	Various	Various : Various	125.903	4.849	Oct 2016	3.047	Oct 2017	1.033	Oct 2018	-		1.033	0.000	134.832	134.510
		Subtotal	752.238	12.232		9.367		4.907		-		4.907	0.000	778.744	N/A

Remarks

Award dates represent date of first award of the fiscal year.

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	10,031.708	108.890		121.760		50.436		-		50.436	0.000	10,312.794	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 653616 / *SBIRS High Element Emd*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
SBIRS High Element EMD																												
B10.3 Completed and ITW/AA Certified																												
Block 20 Integration & Test at MCSB																												
Block 20 Operational Utility Evaluation and Initial Operational Test & Evaluation with AFOTEC																												
B20 Completed and ITW/AA Certified																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 653616 / *SBIRS High Element Emd*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SBIRS High Element EMD				
B10.3 Completed and ITW/AA Certified	1	2017	1	2017
Block 20 Integration & Test at MCSB	3	2017	2	2019
Block 20 Operational Utility Evaluation and Initial Operational Test & Evaluation with AFOTEC	2	2019	3	2019
B20 Completed and ITW/AA Certified	4	2019	4	2019

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657009: *Space Mod Initiative*	0.000	53.076	173.537	10.129	0.000	10.129	0.001	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Starting in FY2019, PE 1206441F, Space Based Infrared System (SBIRS), Project 657009, Space Mod Initiative efforts were transferred to PE 1206442F, Evolved SBIRS, Project 657009, SMI based on Air Force panel direction. FY18 and prior remain in PE 1206441F.

A. Mission Description and Budget Item Justification

The primary objective of SMI is to enable and inform future decisions to maintain and evolve a capable, resilient, and affordable OPIR architecture by maturing technologies and mitigating risk areas to facilitate OPIR modernization within the Department's constrained resources. SMI supports the PoR by assessing future parts and material obsolescence and designing future space and ground modifications focused on affordability and capability while simultaneously maximizing the effectiveness of existing system data products. SMI funds engineering activities to reduce both production and future system costs through manufacturing and producibility enhancements and through technology insertion. SMI will also mature potential technology upgrades at the component and system level for future space and ground architecture affordability and capability enhancements. The SBIRS OPIR SMI plan includes studies and risk reduction activities to evolve the current PoR SBIRS constellation, reduce production timelines, and reduce recurring production costs. Based on the outcome of these studies and technology development, the Sensor Ground Demonstration will develop capability for current, next generation sensors, processors, and algorithms. SMI funded data exploitation efforts include OPIR mission data processing, data fusion, data dissemination, algorithm development, network connectivity, efficient interfaces and sensor performance assessments to enable greater exploitation of SBIRS PoR and other data sources. SMI exploitation efforts build upon PoR capabilities and inform the PoR decision process. The data exploitation efforts identify affordable, responsive and resilient measures to improve technical intelligence and battlespace awareness processing and data dissemination tools to enhance OPIR support to the warfighters and other data users. The SMI Hosted Payloads and Wide Field of View (WFOV) Testbed activities explore technology maturation, qualification of new components, and subsystem/component prototyping to evolve the OPIR architecture. Hosted Payloads and WFOV Testbeds support maturation of MDP algorithms for tactical and strategic applications which are critical demonstration efforts to enhance PoR capabilities and to reduce program risks for future OPIR systems. Collection of on-orbit WFOV data is critical to develop algorithms to process large data sets generated by emerging large format focal planes and to reduce risk for possible SBIRS follow-on architectures. SBIRS EGS infrastructure modernization efforts under SMI will introduce Telemetry, Tracking and Command systems (TT&C) and Ground Control automation, FORGE MDP as well as competition into SBIRS Ground with an emphasis to on-ramp to EGS as soon as practical. SMI activities are balanced and phased to enable an expanded tradespace and improve the competitive environment.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Technology Maturation	1.284	61.475	10.129
Description: Assess technology needs to support resiliency of PoR assets as well as future architectures, responsive to the evolving threat environment. Perform trade and design studies to assess obsolescence, affordability, capability design modifications, and CONOPS for the OPIR mission. Based on study outcomes, mature technologies and manufacturability to			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
reduce cost, schedule, and technical risk for new component and subsystem designs which may be used in the next production block. Develop modeling and simulation capabilities, and engineering model prototypes for hardware/software integration and testing to reduce risk and mature technologies applicable to PoR and future architectures. ***FY 2018 Plans:*** Continue prototyping resiliency hardware and maturing technologies critical to current and future PoRs which include large format Focal Plane Arrays (FPAs), intrinsically-hardened FPAs, resilient processing algorithms, pointing mirrors, threat warning sensors, and next generation space processors. Continue to develop technology options to address emerging threats and stressing targets to current and future OPIR systems. Continue to develop and space qualify ground and on-orbit prototypes to reduce risk for SBIRS and other OPIR programs. Continue to demonstrate system resiliency and advanced technology concepts via ground and on-orbit demonstrations in order to validate performance and prove enhanced system capabilities. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Continue prototyping resiliency hardware and maturing critical technologies which include large format Focal Plane Arrays (FPA), resilient FPAs and processing algorithms, pointing mirrors, threat warning sensors, and processors. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 decreased compared to FY2018 by $51.346M. Justification for this decrease is described in plans above.			
Title: Data Exploitation ***Description:*** Exploit existing OPIR data sources (DSP, SBIRS HEO, SBIRS GEO Scanner, SBIRS GEO Starer, Commercially Hosted Infrared Payload (CHIRP), and other classified sources) through data collection, processing, fusion, data dissemination, algorithm development and testing, network connectivity, and sensor performance assessments. SBIRS and other sensors provide a rich data set for exploitation. SMI data exploitation enables access to raw and processed data for data analysts and application developers to expand capabilities for battlespace awareness and other applications. SMI data exploitation efforts are complementary to, and enhance, the exploitation capabilities delivered by the PoR and inform future PoR exploitation efforts. SMI will develop tools and algorithms to enable users to apply OPIR data to support their mission needs. Data exploitation efforts are also evaluating tools for command and control, mission management, and MDP for risk reduction to support evolution of the SBIRS PoR ground system to an open architecture that could support PoR and other future satellites and payload alternatives. SMI ground system development activities seek to demonstrate the performance of an evolved ground system architecture capable of supporting multi-satellite, multi-payload, multi-mission management and data processing for any IR payload to achieve lower operating costs with enhanced net-centric and service oriented features along with a flexible expansion capability that was not designed into the current PoR ground system.	29.095	58.514	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2018 Plans: Continue to provide enhanced ground segment capability and tools for command and control, data collection, mission processing, and data dissemination to enhance mission resiliency and data exploitation of SBIRS and other OPIR data. Continue to collaborate with Intelligence Community and Missile Defense Agency to enhance Joint OPIR Ground initiatives. Continue WFOV MDP software development. Continue WFOV C2 ground station and software development. Continue planning for the WFOV payload calibration and test campaign. Complete building and expanding data exploitation laboratory capability into its final location to support experimentation, technology maturity and evolution of exploitation algorithms. Continue development and expansion of a Battlespace Awareness real-time capability and facility that will integrate applications and services matured in the data exploitation government lab. Develop and demonstrate the performance of an evolved ground system architecture to support multi-satellite, multi-payload, multi-mission management and data processing for any IR payload with enhanced net-centric and service oriented features along with a flexible expansion capability. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 funds transferred to PE 1206442F.			
Title: Hosted Payloads ***Description:*** Hosted Payloads mature WFOV technology and demonstrate multi-mission capabilities including the potential for a single sensor to simultaneously perform both the strategic and tactical missions. On-orbit data is required in order to develop and validate WFOV algorithms and on-board MDP throughput requirements for the Strategic Missile Warning Mission. These payload risk-mitigation efforts support the potential to field future Strategic Missile Warning and/or multi-mission systems and potentially increase capability of the PoR starer. WFOV payloads are a part of all evolved and new architecture alternatives. ***FY 2018 Plans:*** Complete final payload integration and checkout. Deliver payload to the calibration and test facility. Conduct the payload calibration and test campaign. Deliver payload to bus contractor to begin space vehicle integration. Initiate post-calibration ground analysis. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:***	14.100	10.915	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY2019 funds transferred to PE 1206442F.			
Title: WFOV Testbeds ***Description:*** WFOV Testbeds are satellite platforms offering opportunities to demonstrate mission capabilities on-orbit and mitigate development risks for employing WFOV sensors. WFOV Testbeds include contractual options to integrate, test, and launch prototype, developmental WFOV payloads with a Government-owned free-flyer spacecraft or on a host government or commercially owned satellite. The WFOV Testbed will host the WFOV payload to demonstrate on-orbit mission performance. On-orbit data from the WFOV payload hosted on the WFOV Testbed is essential to develop and validate WFOV algorithms and on-board MDP throughput requirements for the Strategic Missile Warning mission. These two critical risk mitigation efforts support the potential to field future Strategic Missile Warning and/or multi-mission WFOV systems. ***FY 2018 Plans:*** Begin payload-to-bus integration. Continue SEIT activities, including inter-segment testing and IA accreditation approval. Begin launch integration and analysis. Procure launch parts and materials. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 funds transferred to PE 1206442F.	1.972	18.025	0.000
Title: Sensor Ground Demonstration ***Description:*** Based on Technology Maturation study outcomes, design and build test capability for next generation sensors, processors, and algorithms. Develop M&S software, breadboards/brassboards, test equipment, and data reduction software. Perform ground demonstration of candidate FPAs, optical filters, on-board processors, and other payload components for future Missile Warning satellites to validate requirements and ensure demonstrated technical maturity for the next-generation payload technologies and threat mitigation strategies. Activities for the Sensor Ground Demonstrator (SGD) were started in FY17 in Technology Maturation. ***FY 2018 Plans:*** Initiate the fabrication of the SGD test bed. Integrate M&S scenes to the demo test bed to begin scene projection on demo sensors. A test will be designed and conducted to expose a test sensor to a directed energy source. The test results will feed into an iterative process with the M&S scenes to refine and mature the design. The demo test bed will be used to validate resiliency	0.000	9.020	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
options identified by resiliency studies to inform the SBIRS Next-Gen OPIR program. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 funds transferred to PE 1206442F.			
Title: Management Services ***Description:*** Provide program office and other related support activities that may include, but not limited to Federally Funded Research and Development Center (FFRDC), System Engineering Technical Assistance (SETA), studies, technical analysis, etc. ***FY 2018 Plans:*** Provide program office and other related support activities that may include, but not limited to FFRDC, SETA, studies, technical analysis, etc. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	3.525	15.588	0.000
Title: Enterprise Ground Services (EGS) ***Description:*** EGS is envisioned to provide a robust enterprise ground architecture for Air Force space systems, which leverages mission commonality and automation to reduce sustainment costs and re-focus manpower on war fighting capabilities. In addition, EGS will enable a near-real-time common operating picture of enterprise-wide tactical health, status, indications, and warnings for Air Force satellites. The end-state will be a modern technical infrastructure which is cyber-secure and resilient against the Advanced Persistent Threat and employs streamlined architecting, acquisition, and operational processes. Through early architecture studies and prototyping, the government will establish clear ownership of the technical baseline to meet Better Buying Power principles as the EGS effort evolves through development. This effort provides focus and expertise for the development, test, certification and enforcement of standards and interfaces for all AFSPC satellite ground systems to enable transition planning for legacy ground systems, new capability demonstrations, and systems acquisition leading to an enterprise ground architecture for Air Force space systems.	3.100	-	-
Accomplishments/Planned Programs Subtotals	53.076	173.537	10.129

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line 13: *MSSBIR: SBIR High (Space)*	355.114	1,113.429	138.397	-	138.397	136.552	113.065	8.180	8.340	Continuing	Continuing

Remarks

D. Acquisition Strategy

The program office will use a variety of acquisition approaches to execute various concept studies, technology maturation efforts, testbed/prototype demonstrations, and data exploitation initiatives and projects. The program office will collaborate with appropriate contracting agencies to support each individual effort. Data exploitation efforts in the laboratory and the Battlespace Awareness center will leverage existing external contracts, as well as new internal competitive contracts. Activities, such as SBIRS obsolescence and affordability enhancements to the existing satellite design, will leverage existing PoR contracts. Technology maturation and component prototyping and/or qualification could leverage existing contracts; in fact many are planned in collaboration with AFRL and other government agencies. Where practical, other efforts could be competed. FFRDC and SETA contractors will also be used to conduct and support studies. New technology, replacement components, and system designs will be acquired with government data rights to the maximum extent to allow their incorporation into any future OPIR satellite production or system development. Contracting partnerships with other agencies will also be used to study, develop, demonstrate and prove emerging capabilities.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Technology Maturation	Various	Various : Various	-	1.284	Aug 2017	61.475	Dec 2017	10.129	Dec 2018	-		10.129	0.000	72.888	-
Data Exploitation	Various	Various : Various	-	29.095	Dec 2016	58.514	Nov 2017	-		-		-	0.000	87.609	-
Hosted Payloads	C/CPFF	L3 Communications : Wilmington, MA	-	14.100	Dec 2016	10.915	Dec 2017	-		-		-	0.000	25.015	-
WFOV Testbeds	C/CPFF	Millenium Space Systems : El Segundo, CA	-	1.972	Dec 2016	18.025	Dec 2017	-		-		-	0.000	19.997	-
Sensor Ground Demonstration	TBD	TBD : TBD	-	0.000		9.020	Feb 2018	-		-		-	0.000	9.020	-
Enterprise SE&I	TBD	TBD : TBD	-	0.000		0.000		-		-		-	0.000	0.000	-
Enterprise Ground Services (EGS)	Various	MITRE Corp, NRL : Various	-	3.100	Dec 2016	-		-		-		-	0.000	3.100	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	0.000		0.000		-		-		-	0.000	0.000	-
		Subtotal	-	49.551		157.949		10.129		-		10.129	0.000	217.629	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : Various	-	2.390	Nov 2016	9.616	Oct 2017	-		-		-	0.000	12.006	-
A & AS	Various	Various : Various	-	1.017	Sep 2017	1.035	Sep 2018	-		-		-	0.000	2.052	-
Other Support	Various	Various : Various	-	0.118	Oct 2016	4.937	Oct 2017	-		-		-	0.000	5.055	-
		Subtotal	-	3.525		15.588		-		-		-	0.000	19.113	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	53.076		173.537		10.129		-		10.129	0.000	236.742	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Modernization Initiative				
Technology Maturation	1	2017	2	2019
Data Exploitation	1	2017	4	2018
Wide Field of View (WFOV) Starer Payload	1	2017	2	2018
(WFOV) Payload delivery to Calibration	3	2018	3	2018
(WFOV) Payload delivery to Millennium Space System (MSS)	4	2018	4	2018
Wide Field of View Testbed	1	2017	4	2018
Sensor Ground Demonstration	1	2017	4	2018
Enterprise Ground Services	1	2017	4	2017

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657106 / *Evolved SBIRS*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657106: *Evolved SBIRS*	0.000	0.000	16.547	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Starting in FY2019, PE 1206441F, Space Based Infrared System (SBIRS) High EMD, Project 657106, Evolved SBIRS transferred to PE 1206442F Evolved SBIRS, Project 657106, Evolved SBIRS Ground in order to align the Evolved SBIRS effort.

A. Mission Description and Budget Item Justification

FORGE will consist of C2 migration to EGS, modernization of MDP, and required development/upgrades to Remote Ground Stations (RGS). The FORGE effort will implement an open framework for MDP and migration of C2 of satellite operations to integrate with EGS. FORGE and EGS efforts will provide the flexibility to integrate new MDP capabilities and more efficiently allow the system to meet evolving warfighter needs.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more effective. This agility must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to speed decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SBIRS HIGH EMD, SMI, and OPIR Enterprise weapon system capabilities. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Future Operational Resilient Ground Evolution (FORGE)	0.000	16.547	0.000
Description: Formally titled Evolved SBIRS. FORGE will consist of C2 migration to EGS, modernization of MDP, and required development/upgrades to RGS. The FORGE effort will implement an open framework for MDP and migration of C2 of satellite operations to integrate with EGS. FORGE and EGS efforts will provide the flexibility to integrate new MDP capabilities and more efficiently enable the system to meet evolving warfighter needs.			
FY 2018 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657106 / *Evolved SBIRS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Begin development of the EGS prototype which will perform C2 for two SBIRS HEO payloads with a capability deployment in FY19. Begin FORGE MDP risk reduction with prototype development of an OPIR enterprise framework. The framework must be capable of hosting applications that will meet mission area requirements. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funds transferred to PE 1206442F.			
Accomplishments/Planned Programs Subtotals	0.000	16.547	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 05 PE 1206442F: *Evolved SBIRS*	-	71.018	643.126	-	643.126	936.450	1,503.891	2,257.813	2,014.802	Continuing	Continuing

Remarks

D. Acquisition Strategy

Utilize existing SMC contracts to transition SBIRS C2 satellite operations to EGS. Compete a MDP framework provider and MDP applications. OPIR Enterprise system acquisition will satisfy global strategic Missile Warning coverage for both the GEO and Polar orbits.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657106 / *Evolved SBIRS*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FORGE	TBD	TBD : TBD	-	-		16.547		-		-		-	Continuing	Continuing	-
		Subtotal	-	-		16.547		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		16.547		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, **RDT&E Schedule Profile:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657106 / *Evolved SBIRS*

	FY 2017				FY 2018				FY 2019				FY 2020				FY 2021				FY 2022				FY 2023			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Evolved SBIRS																												
FORGE																												

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206441F / *Space Based Infrared System (SBIRS) High EMD*	**Project (Number/Name)** 657106 / *Evolved SBIRS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Evolved SBIRS				
FORGE	2	2018	4	2023

Note

FORGE continuing past 2023.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	71.018	643.126	0.000	643.126	936.450	1,503.891	2,257.813	2,014.802	Continuing	Continuing
657009: *Space Mod Initiative*	-	0.000	0.000	186.556	0.000	186.556	230.723	220.516	200.731	221.409	Continuing	Continuing
657106: *EVOLVED SBIRS*	-	0.000	71.018	257.865	0.000	257.865	181.468	145.843	270.514	300.058	Continuing	Continuing
657120: *Evolved SBIRS Space*	-	0.000	0.000	198.705	0.000	198.705	524.259	1,137.532	1,786.568	1,493.335	Continuing	Continuing

Program MDAP/MAIS Code:
Project MDAP/MAIS Code(s): N42

Note

Evolved SBIRS Ground and Space Modernization Initiative funds for FY 2019-2023 transferred from PE 1206441F to PE 1206442F. New Project 657120 Evolved SBIRS Space created within PE 1206442F for transparency between space and ground efforts.

A. Mission Description and Budget Item Justification

The Evolved Space Based Infrared System (SBIRS) RDT&E FY2019 budget justification exhibits describe the Next Generation Overhead Persistent Infrared (Next-Gen OPIR) Space, Ground, and Space Modernization Initiative (SMI) programs.

1. SMI (Project 657009: Space Mod Initiative): The primary objective is to enable and inform future decisions, and maintain and evolve a capable, resilient, and affordable OPIR architecture. This will be accomplished using maturing technologies and mitigating risk areas to modernize OPIR systems within the Department's constrained resources. SMI supports the SBIRS Program of Record (PoR) by assessing future parts and material obsolescence, designing future space and ground modifications focused on affordability and capability, and maximizing the effectiveness of existing system data products. SMI funds engineering activities to reduce both production and future system costs through manufacturing and producibility enhancements, and technology insertion. SMI will also mature potential technology upgrades at the component and system level for future space and ground architecture enhancements. SMI includes studies and risk reduction activities to evolve the current PoR constellation, reduce production timelines, and reduce recurring production costs. SMI activities are balanced and phased to enable an expanded trade space and improve the competitive environment. The three major thrust areas under SMI are Demonstrations, Technical Maturation and Data Exploitation.
The Demonstrations mature and demonstrate technologies in ground and on-orbit prototypes, advance system performance and algorithms for tactical and strategic applications to enhance PoR capabilities and reduce program risks for future OPIR systems, whether new systems or evolutions of the current PoR. Technology Maturation assesses needs to support resiliency of PoR assets and future architectures to be responsive to the evolving threat environment. Data Exploitation enables access to OPIR data sources to expand technical intelligence and battlespace awareness processing and data dissemination tools to support warfighters and other data users.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*

2. Next-Gen OPIR-Ground (Project 657106: Evolved SBIRS): The Future Operational Resilient Ground Evolution (FORGE) will consist of Command and Control (C2) migration to Enterprise Ground Services (EGS), modernization of Mission Data Processing (MDP), and required development/upgrades to Remote Ground Stations (RGS) to meet the current and future space domain demands. The FORGE effort will implement an open framework for MDP and migration of C2 satellite operations to integrate with EGS. FORGE and EGS efforts will provide the flexibility to integrate new MDP capabilities and more efficiently allow the system to meet evolving warfighter needs. The Next-Gen OPIR-Ground includes risk reduction efforts and cyber enhancements for the PoR and Next-Gen OPIR-Ground.

3. Next-Gen OPIR-Space (Project 657120: Evolved SBIRS Space): The primary mission is to provide initial missile warning of a ballistic missile attack on the US, its deployed forces and its allies. Next-Gen OPIR-Space enhances detection and improves reporting of intercontinental ballistic missile launches, submarine launched ballistic missile launches, and tactical ballistic missile launches. Development consists of the Next-Gen OPIR Polar and Geostationary Earth Orbit (GEO) satellites with new payloads in a highly resilient bus, providing real-time persistent global infrared coverage to meet the validated requirements based on Air Force Space Command (AFSPC) guidance on current and future space domain demands.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SMI and Next-Gen OPIR Ground and Space weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	71.018	5.766	0.000	5.766
Current President's Budget	0.000	71.018	643.126	0.000	643.126
Total Adjustments	0.000	0.000	637.360	0.000	637.360
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	637.360	0.000	637.360

Change Summary Explanation

In FY2019 - FY2023 Evolved SBIRS Ground (Project 657106) and Space Modernization Initiative (Project 657009) funds transferred from PE 1206441F to PE 1206442F in order to isolate the SBIRS PoR development through completion, align SMI with future efforts, and merge Next-Gen OPIR Space and Ground funds in the same PE. A new Project 657120 (Evolved SBIRS Space) was created within PE 1206442F for transparency between Space and Ground efforts.

FY2019:
SMI: +$136.201M transferred from PE 1206441F, +$52.000M added for Demonstrations, and -$1.645M for inflation adjustment;
Next-Gen OPIR-Space: +$67.192M transferred from PE 1206441F, +$131.513M added for development;
Next-Gen OPIR-Ground: +$28.847M transferred from PE 1206441F, +$158.000M added for risk reduction activities and implementation of cyber modernization

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657009 / *Space Mod Initiative*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657009: *Space Mod Initiative*	-	0.000	0.000	186.556	0.000	186.556	230.723	220.516	200.731	221.409	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The primary objective of SMI is to enable and inform future decisions, and maintain and evolve a capable, resilient, and affordable OPIR architecture. This will be accomplished using maturing technologies and mitigating risk areas to modernize OPIR systems within the Department's constrained resources. SMI supports the SBIRS Program of Record (PoR) by assessing future parts and material obsolescence, designing future space and ground modifications focused on affordability and capability, and maximizing the effectiveness of existing system data products. SMI funds engineering activities to reduce both production and future system costs through manufacturing and producibility enhancements, and technology insertion. SMI will also mature potential technology upgrades at the component and system level for future space and ground architecture enhancements. SMI includes studies and risk reduction activities to evolve the current PoR constellation, reduce production timelines, and reduce recurring production costs. SMI activities are balanced and phased to enable an expanded trade space and improve the competitive environment. The three major thrust areas under SMI are Demonstrations, Technical Maturation and Data Exploitation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Demonstrations	-	-	69.082
Description: The Demonstrations mature and demonstrate OPIR technologies in ground and on-orbit prototypes, advance system performance, algorithms, and resiliency for future OPIR systems. The demonstrations explore technology maturation, qualification of new components, and subsystem/component prototyping to evolve the OPIR architecture. The demonstrations support maturation of MDP algorithms for tactical and strategic applications which are critical efforts to enhance PoR capabilities and to reduce program risks for future OPIR systems, whether new systems or evolutions of the PoR. The Wide Field Of View (WFOV) demonstration matures WFOV technology and validates multi-mission capabilities including the potential for a single sensor to simultaneously perform strategic and tactical missions. Collection of on-orbit WFOV data is critical to develop algorithms to process large data sets generated by emerging large format focal planes and to reduce risk for possible future architectures. The WFOV payload and bus are separate development efforts. The WFOV testbed program provides a bus capable of demonstrating on-orbit mission performance and mitigating the development risks for employing WFOV sensors. The testbed program includes contractual options to integrate, test, and launch prototype, developmental WFOV payloads with a government-owned free-flyer spacecraft or on a host government or commercially owned satellite. The WFOV Testbed will host the WFOV payload. As an integrated Space Vehicle, the WFOV system will prove on-orbit mission performance of WFOV sensors. The WFOV payload will provide the critical on-orbit data required to develop and validate WFOV algorithms, as well as on-board MDP throughput requirements for strategic missile warning.			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
The technology demonstration space vehicles under development are responsive to emerging stressing targets to the current missile warning architecture, as well as the rapidly evolving threats to the enterprise to inform the future OPIR architecture to include SBIRS, the Missile Defense Agency (MDA), and other mission partners. The assets will be Class-C missions with a 3-5 year designed mission life and an initial launch capability beginning in 2024. The technology demonstrations will incorporate resiliency components and features while advancing the state of the art performance technology. The demonstrations will focus on the rapid acquisition, technology insertion, and launch of advanced missile warning technologies and system resiliency components. These assets will incorporate threat mitigation technologies and other resiliency features with the goal of demonstrating these technologies in ground and on-orbit. These demonstrations will facilitate tech insertion, validate technical performance, inform future OPIR requirements, and reduce technical risk to the enterprise. ***FY 2019 Plans:*** Complete support of WFOV Space Vehicle integration and test. Begin integrated WFOV Space Vehicle end-to-end test and maintenance. Continue Systems Engineering, Integration and Test (SEIT) activities, including inter-segment testing and Information Assurance accreditation approval. Begin launch service integration. Continue concept refinement of technology demonstration space vehicles, and hold design reviews. Select up to two contractors to develop a system level Critical Design Review (CDR) design, mature ground integration plan, begin development of engineering model for a resiliency ground demonstration in sensor test bed, and begin procuring long lead items. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 funds transferred from PE 1206441F.			
Title: Technology Maturation ***Description:*** Assess technology needs to support resiliency of PoR assets and future architectures, that are responsive to the evolving threat environment. Perform trade and design studies to assess obsolescence, affordability, capability design modifications, and Concept of Operations (CONOPS) for the OPIR mission. Based on study outcomes, mature technologies and manufacturability to reduce cost, schedule, and technical risk for new component and subsystem designs that may be used in the future systems to include processors, algorithms, Focal Plane Arrays (FPA), optical filters, on-board processors, and other payload components for future missile warning satellites. Develop modeling and simulation (M&S) capabilities, and engineering model prototypes for hardware/software integration and testing to reduce risk and mature technologies applicable to future systems and architectures. Develop sensor ground test bed incorporating M&S software, breadboards/brassboards, test equipment, and data reduction software to provide an evaluation capability for prototype systems and hardware. The test bed will	-	-	57.631

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
validate requirements and ensure technical maturity for next-gen payload technologies as well as threat mitigation components and techniques. ***FY 2019 Plans:*** Continue prototyping resilient hardware and maturing critical technologies that include large format FPAs, resilient FPAs, resilient processing algorithms, pointing mirrors, threat warning sensors, and processors. Continue to develop technology options to address emerging threats and stressing targets to current and future OPIR systems. Continue to develop and space qualify emerging technologies to reduce risk for SBIRS and future OPIR programs. Continue to develop system resiliency and advanced technology concepts via ground and on-orbit demos in order to validate requirements, demonstrate performance, develop CONOPS, and prove enhanced system capabilities. Continue the integration of sensor test bed components and begin resiliency tests in sensor ground test bed. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 funds transferred from PE 1206441F.			
Title: Data Exploitation ***Description:*** Exploit existing OPIR data sources (Defense Support Program (DSP), SBIRS Highly Elliptical Orbit (HEO), SBIRS GEO Scanner, SBIRS GEO Starer, Commercially Hosted Infrared Payload (CHIRP), and other classified sources) through data collection, processing, fusion, data dissemination, algorithm development and testing, network connectivity, and sensor performance assessments. SBIRS and other sensors provide a rich data set for exploitation. SMI data exploitation enables access to raw and processed data for data analysts and application developers to expand capabilities for battlespace awareness and other applications. SMI data exploitation efforts are complementary to, and enhance, the exploitation capabilities delivered by the PoR and inform future PoR exploitation efforts. SMI will develop tools and algorithms to enable users to apply OPIR data to support their mission needs. Data exploitation efforts also evaluate tools for C2, mission management, and MDP for risk reduction to evolve the PoR ground system to an open architecture that could support PoR and other future satellites and payload alternatives. SMI ground system development activities seek to demonstrate the performance of an evolved ground system architecture capable of supporting multi-satellite, multi-payload, multi-mission management and data processing for any infrared payload to achieve lower operating costs with enhanced net-centric and service oriented features along with a flexible expansion capability that was not designed into the current PoR ground system. ***FY 2019 Plans:*** Continue to provide enhanced ground segment capability and tools for C2, data collection, mission processing, and data dissemination to enhance mission resiliency and data exploitation of SBIRS and other OPIR data. Continue to collaborate with Intelligence Community (IC) and MDA to enhance Joint OPIR Ground (JOG) study initiatives. Complete building and expansion of data exploitation lab capability into its final location and support experimentation, technology maturity and evolution of exploitation algorithms. Continue development and expansion of a Battlespace Awareness real-time capability and center that will integrate	-	-	59.843

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
applications and services matured in the data exploitation government lab. Develop and demonstrate the performance of an evolved ground system architecture to support multi-satellite, multi-payload, multi-mission management and data processing for any infrared payload with enhanced net-centric and service oriented features along with a flexible expansion capability. Incorporate results from WFOV payload calibration into WFOV MDP software. Develop and test WFOV calibration algorithm. Begin preparation for WFOV on-orbit calibration support. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 funds transferred from PE 1206441F.			
Accomplishments/Planned Programs Subtotals	-	-	186.556

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line 13: *MSSBIR: SBIR High (Space)*	355.114	1,113.429	138.397	-	138.397	136.552	113.065	8.188	8.340	Continuing	Continuing

Remarks

D. Acquisition Strategy

The program office will use a variety of acquisition approaches to execute various concept studies, technology maturation efforts, testbed/prototype demonstrations,and data exploitation initiatives and projects. The program office will collaborate with appropriate contracting agencies to support each individual effort. Data exploitation efforts in the laboratory and the Battlespace Awareness center will leverage existing external contracts, as well as new internal competitive contracts. Activities, such as SBIRS obsolescence and affordability enhancements to the existing satellite design, will leverage existing Program of Record contracts. Technology maturation and component prototyping and/or qualification could leverage existing contracts; in fact many are planned in collaboration with Air Force Research Lab (AFRL) and other government agencies. Where practical, other efforts could be competed. Federally Funded Research and Development Center (FFRDC) and Systems Engineering and Technical Assistance (SETA) contractors will also be used to conduct and support studies. New technology, replacement components, and system designs will be acquired with government data rights to the maximum extent to allow their incorporation into any future OPIR satellite production or system development. Contracting partnerships with other agencies will also be used to study, develop, demonstrate and prove emerging capabilities.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstrations	Various	Various : Various	-	-		-		53.915	Dec 2018	-		53.915	Continuing	Continuing	-
Technology Maturation	Various	Various : Various	-	-		-		57.631	Dec 2018	-		57.631	Continuing	Continuing	-
Data Exploitation	Various	Various : Various	-	-		-		59.843	Nov 2017	-		59.843	Continuing	Continuing	-
Enterprise SE&I	Various	Various : Various	-	-		-		-		-		-	Continuing	Continuing	-
Enterprise Ground Services (EGS)	Various	MITRE Corp, NRL : Various	-	-		-		-		-		-	Continuing	Continuing	-
Technical Mission Analysis & Enterprise SE&I	RO	Aerospace : El Segundo, CA	-	-		-		4.126	Dec 2018	-		4.126	Continuing	Continuing	-
		Subtotal	-	-		-		175.515		-		175.515	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : Various	-	-		-		4.853	Oct 2018	-		4.853	Continuing	Continuing	4.583
A & AS	Various	Various : Various	-	-		-		1.757	Sep 2019	-		1.757	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		-		4.431	Oct 2018	-		4.431	Continuing	Continuing	-
		Subtotal	-	-		-		11.041		-		11.041	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		186.556		-		186.556	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
WFOV Demonstration				
Payload Calibration	1	2019	1	2019
Space Vehicle Integration and Test	1	2019	3	2019
Launch	3	2020	3	2020
On-orbit calibration	3	2020	4	2020
WFOV On-Orbit Demo	4	2020	4	2021
Technology Demonstration Space Vehicles				
Payload Development	1	2019	1	2021
Payload Build	2	2021	3	2023
Bus Design	2	2020	1	2021
Bus Build	2	2021	4	2023
Integration and Test	3	2023	4	2023
Technology Maturation				
Technology Maturation	1	2019	4	2023
Data Exploitation				
Data Exploitation	1	2019	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657106 / *EVOLVED SBIRS*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657106: *EVOLVED SBIRS*	-	0.000	71.018	257.865	0.000	257.865	181.468	145.843	270.514	300.058	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: N42

A. Mission Description and Budget Item Justification

Next-Gen OPIR-Ground (Project 657106): The Future Operational Resilient Ground Evolution (FORGE) will consist of Command and Control (C2) migration to EGS, modernization of Mission Data Processing MDP, and required development/upgrades to Remote Ground Stations (RGS) to meet AFSPC guidance on the current and future space domain demands. The FORGE effort will implement an open framework for MDP and migration of C2 satellite operations to integrate with EGS. FORGE and EGS efforts will provide the flexibility to integrate new MDP capabilities and more efficiently allow the system to meet evolving warfighter needs. The Next-Gen OPIR ground includes risk reduction efforts to enable cyber enhancements for the PoR and Next-Gen OPIR ground systems. EGS infrastructure modernization efforts will introduce Telemetry, Tracking and Command (TT&C) systems and ground control automation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Next-Gen OPIR - Ground	0.000	71.018	257.865

Description: Infrastructure modernization and implementation of a Government owned open framework for MDP and migration for C2 of satellite operations onto common platform.

FY 2018 Plans:
Begin infrastructure modernization of FORGE and EGS. The FORGE effort will implement a Government owned open framework for MDP and migrate C2 of satellite operations onto a common platform, EGS. FORGE and EGS platforms provide enhanced flexibility and scalability which will allow for more efficient integration of new mission data processing and C2 capabilities, standardized C2 interfaces across multiple space missions, a resilient cyber defense, and a system that is prepared to meet evolving user and warfighter needs. Begin risk reduction phase and engage industry in maturing payload design that meet new missile warning requirements balancing affordability, capability, and resiliency requirements. The risk reduction phase is intended to develop a Preliminary Design Review (PDR) level design, plan for integration onto EGS, perform ground-based demonstrations, and will reduce risk for optical resilience hardware, intrinsically-hardened FPAs, multispectral and resilient processing algorithms, affordable pointing mirrors and space processors. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited studies, program office support, studies, technical analysis, prototyping, etc.

FY 2019 Plans:
Complete development of C2 capabilities and transition two SBIRS HEO payloads to EGS. Continue risk reduction phase of FORGE MDP with framework prototype and begin MDP application provider prototype. Initial demonstration of the framework prototype with subset of mission applications. These efforts provide initial open architecture capabilities, standardized interfaces

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657106 / *EVOLVED SBIRS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
across multiple space missions, a resilient cyber defense, and a system that is prepared to meet evolving user and warfighter needs. MDP which began in FY 2018 will ramp up starting in FY2019. Begin risk reduction efforts to modify current ground to enable Next-Gen OPIR system, accelerate FORGE activities, and implement cyber modernization for enterprise ground. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $186.847M. Justification for this increase is described in plans above.			
Accomplishments/Planned Programs Subtotals	0.000	71.018	257.865

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 05 PE 1206441F: *Space Based Infrared System (SBIRS) High EMD*	-	16.547	-	-	-	-	-	-	-	0.000	16.547

Remarks

D. Acquisition Strategy

Utilize existing Space and Missile Systems Center (SMC) contracts to transition SBIRS C2 satellite operations to EGS. Compete a MDP framework provider and MDP applications. EGS infrastructure modernization and FORGE MDP will introduce competition into OPIR ground systems with an emphasis to on-ramp to EGS as soon as practical.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657106 / *EVOLVED SBIRS*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next-Gen OPIR-Ground	TBD	TBD : TBD	-	-		57.959	Mar 2018	232.290		-		232.290	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	Analytical Sciences Corp. : Andover, MA	-	-		2.137	Dec 2017	8.346	Dec 2018	-		8.346	Continuing	Continuing	-
Technical Mission Analysis	Various	Aerospace Corporation : El Segundo, CA	-	-		4.369	Oct 2017	2.428	Oct 2018	-		2.428	Continuing	Continuing	-
		Subtotal	-	-		64.465		243.064		-		243.064	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Aerospace Corporation : El Segundo, CA	-	-		2.573	Oct 2017	1.430	Oct 2018	-		1.430	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		2.168	Dec 2017	7.976	Dec 2018	-		7.976	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		1.812	Oct 2017	5.395	Oct 2018	-		5.395	Continuing	Continuing	-
		Subtotal	-	-		6.553		14.801		-		14.801	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		71.018		257.865		-		257.865	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657106 / *EVOLVED SBIRS*

Exhibit R-4A, **RDT&E Schedule Details:** PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657106 / *EVOLVED SBIRS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
FORGE - EGS				
SBIRS HEO 1 & 2 Development	1	2017	1	2019
SBIRS HEO 3 & 4 Development	1	2021	4	2023
SBIRS GEO 1 - 4 Development	2	2019	4	2023
SBIRS GEO 5 & 6 Development	4	2019	4	2022
Next-Gen OPIR GEO C2 Launch Readiness	2	2020	4	2023
FORGE - MDP				
Infrastructure Development	3	2018	2	2021
MDP Development	4	2019	2	2021
SBIRS GEO 1 transition to MDP	1	2021	4	2022
SBIRS GEO 1-6, HEO 3 & 4, transition to MDP	1	2022	4	2023
Next-Gen OPIR GEO MDP Development	1	2023	4	2023
Next-Gen OPIR Polar MDP Development	4	2023	4	2023

Note

Next-Gen GEO Launch Readiness, SBIRS GEO 2-6 HEO 3&4 transition to MDP, Next-Gen GEO 1-3 MDP Development, and Next-Gen Polar MDP Development are continuing past 2023.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657120 / *Evolved SBIRS Space*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657120: *Evolved SBIRS Space*	-	0.000	0.000	198.705	0.000	198.705	524.259	1,137.532	1,786.568	1,493.335	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Created new Project 657120 Evolved SBIRS Space for transparency between efforts.

A. Mission Description and Budget Item Justification

3. Next-Gen OPIR-Space (Project 657120): The primary mission is to provide initial missile warning of a ballistic missile attack on the US, its deployed forces and its allies. Next-Gen OPIR-Space enhances detection and improves reporting of intercontinental ballistic missile launches, submarine launched ballistic missile launches, and tactical ballistic missile launches. Development consists of the Next-Gen OPIR Polar and Geostationary Earth Orbit (GEO) missile warning satellites with new payloads in a highly resilient bus, providing real-time persistent global infrared coverage to meet validated requirements based on guidance from Air Force Space Command (AFSPC) on current and future space domain demands.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Next-Gen OPIR-Space ***Description:*** Development of the Next-Gen OPIR Polar and Geostationary Earth Orbit (GEO) missile warning satellites with a proven bus, new hardened sensors, and auxiliary payloads for increased resilience. The space segment will consist of GEO and Polar satellites in a resilient architecture, providing real time persistent global infrared coverage. Note: FY2018 funding for Next-Gen OPIR-Space is included in Project 657106 in PEs 1206441F ($4.100M) and 1206442F ($8.050M). ***FY 2019 Plans:*** Acquire Next-Gen OPIR GEO and Polar satellites. Continue maturing payload design for satellite systems that meet new missile warning requirements balancing affability, capability, and resiliency requirements. Develop a PDR-level design and initiate detailed design in preparation for CDR, risk reduction and purchase of flight components. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to studies, program office support, studies, technical analysis, prototyping etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $186.555M. FY2018 funds are in Project 657106 in PEs 1206441F and 1206442F.	-	-	198.705
Accomplishments/Planned Programs Subtotals	-	-	198.705

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657120 / *Evolved SBIRS Space*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

OPIR Enterprise system acquisition will satisfy global strategic Missile Warning coverage for both the GEO and Polar orbits.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657120 / *Evolved SBIRS Space*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next-Gen OPIR - Space	TBD	TBD: TBD : TBD	-	-		-		177.333		-		177.333	Continuing	Continuing	-
Enterprise SE&I	Various	Various : Various	-	-		-		7.120		-		7.120	Continuing	Continuing	-
Technical Mission Analysis	Various	Aerospace Corp. : El Segundo, CA	-	-		-		2.071		-		2.071	Continuing	Continuing	-
		Subtotal	-	-		-		186.524		-		186.524	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Aerospace Corp. : El Segundo, CA	-	-		-		1.220		-		1.220	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		-		6.804		-		6.804	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		-		4.157		-		4.157	Continuing	Continuing	-
		Subtotal	-	-		-		12.181		-		12.181	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		198.705		-		198.705	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657120 / *Evolved SBIRS Space*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Evolved SBIRS*	**Project (Number/Name)** 657120 / *Evolved SBIRS Space*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Next-Gen OPIR Space - Block 0				
Request for Proposal (RFP)	4	2018	4	2018
GEO PDR	2	2019	2	2019
GEO Design	2	2019	1	2021
GEO CDR	1	2021	1	2021
GEO Build & Test	1	2021	4	2023
Polar Design	3	2020	3	2022
Polar Build & Test	3	2022	4	2023
Next-Gen OPIR Space - Block 1				
RFP	3	2021	3	2021
Source Selection	1	2022	1	2023
Design	1	2023	4	2023
PDR	4	2023	4	2023

Note

Next-Gen OPIR efforts continue past 2023.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206853F / *Evolved Expendable Launch Vehicle Program (SPACE) - EMD*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	484.520	381.360	297.572	245.447	0.000	245.447	196.409	197.163	201.258	100.656	103.500	2,207.885
650006: *Next Generation Launch System Investment*	484.520	381.360	297.572	245.447	0.000	245.447	196.409	197.163	201.258	100.656	103.500	2,207.885
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 176

Note

Prior year funding shown in Cost Table are FY 2014 - FY 2016 and was executed in PE 0604853F

A. Mission Description and Budget Item Justification

The Evolved Expendable Launch Vehicle (EELV) program is a space launch system that satisfies the government's National Launch Forecast (NLF) requirements to place National Security Space (NSS) space vehicles on orbit. EELV is a launch service, not a weapon system, which is primarily funded with production funds.

This program, started late FY2014, funds research and development activities and related studies support to invest in new and/or upgraded launch systems to meet NSS launch needs leveraging two or more domestic commercial providers.

The Air Force is investing in public-private partnerships for the development of new and/or upgraded domestic launch systems with commercial launch providers. The end goal is two or more domestic, commercial launch providers that meet all national security launch needs. In addition, the Air Force is continuing a technical maturation program to address the highest risks for rocket propulsion system (RPS) development. Development of the required RPSs will continue under the Launch Service Agreement public-private partnerships.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver EELV system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program element is in Budget Activity 5, System Development and Demonstration, because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206853F / *Evolved Expendable Launch Vehicle Program (SPACE) - EMD*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	296.572	297.572	247.294	0.000	247.294
Current President's Budget	381.360	297.572	245.447	0.000	245.447
Total Adjustments	84.788	0.000	-1.847	0.000	-1.847
• Congressional General Reductions	-1.399	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	100.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-13.813	0.000			
• Other Adjustments	0.000	0.000	-1.847	0.000	-1.847

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2017	FY 2018
Project: 650006: *Next Generation Launch System Investment*		
Congressional Add: *Rocket Propulsion System Development*	100.000	0.000
Congressional Add Subtotals for Project: 650006	100.000	0.000
Congressional Add Totals for all Projects	100.000	0.000

Change Summary Explanation

FY2019: -$1.847M inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Rocket Propulsion System Development (1)	251.086	0.000	0.000

Description: Continued to invest in providers of domestic rocket propulsion systems (RPS) under the Launch Service Agreement Other Transaction Authority (OTA) agreements. This investment enables the transition from the use of non-Allied space launch engines to domestic rocket propulsion systems. Continued to execute OTA agreements and various industry solutions utilizing public-private partnerships. Continued the technical maturation and risk reduction activities started in FY14.

FY 2018 Plans:

N/A

FY 2019 Plans:

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206853F / *Evolved Expendable Launch Vehicle Program (SPACE) - EMD*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
RPS will continue under the Launch Service Agreement (LSA) OTA.			
Title: Launch Service Agreement	30.274	297.572	245.447
Description: Invest in providers of domestic Launch Services. This investment enables the transition from the use of non-Allied space launch engines to commercial launch services that also meet NSS needs. Award Other Transaction Authority (OTA) agreements to develop various industry solutions utilizing public-private partnerships. Continued the technical maturation and risk reduction activities started in FY14. ***FY 2018 Plans:*** Continued investments with public-private partnerships with domestic launch providers for the development of new launch systems or upgrades to existing launch systems with the goal of two or more domestic, commercial launch providers that also meets NSS requirements. Included Rocket Propulsion System Investment and associated technical maturation and risk reduction activities. Continued program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Continue investments with public-private partnerships with domestic launch providers for the development of new launch systems or upgrades to existing launch systems with the goal of two or more domestic, commercial launch providers that also meet NSS requirements. Includes Rocket Propulsion System Investment and associated technical maturation and risk reduction activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decrease compared to FY 2018 by $52.125M. Justification for this decrease is described in plans above.			
Accomplishments/Planned Programs Subtotals	281.360	297.572	245.447

	FY 2017	FY 2018
Congressional Add: Rocket Propulsion System Development	100.000	0.000
FY 2017 Accomplishments: Continued to invest in providers of domestic rocket propulsion systems (RPS) under the Launch Service Agreement Other Transaction Authority (OTA) agreements. This investment enables the transition from the use of non-Allied space launch engines to domestic rocket propulsion systems. Continued		

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206853F / *Evolved Expendable Launch Vehicle Program (SPACE) - EMD*

	FY 2017	FY 2018
to execute OTA agreements and various industry solutions utilizing public-private partnerships. Continued the technical maturation and risk reduction activities started in FY14. ***FY 2018 Plans:*** N/A		
Congressional Adds Subtotals	100.000	0.000

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line Item MSEELV: *Evolved Expendable Launch Veh (Space)*	536.853	606.488	994.555	-	994.555	1,177.664	778.542	1,146.882	1,305.955	15,198.469	21,745.408
• SPAF 01 Line Item MSEELC: *Evolved Expendable Launch Capability*	716.586	957.420	709.981	-	709.981	0.000	0.000	0.000	0.000	0.000	2,383.987

Remarks

E. Acquisition Strategy

The Department intends to pursue a strategy to competitively invest in two or more domestic launch providers' development of new launch systems or upgrades to existing systems for future NSS launch services. This shared investment approach may also leverage commitments to a portion of the planned launch services (between FY2020 and FY2025) to decrease the required up front Government investment.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206853F / *Evolved Expendable Launch Vehicle Program (SPACE) - EMD*	**Project (Number/Name)** 650006 / *Next Generation Launch System Investment*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aerojet Rocketdyne OTA	C/Various	Aerojet Rocketdyne : Canoga Park, CA	141.837	127.723	Jul 2017	-		-		-		-	0.000	269.560	-
United Launch Service OTA	C/Various	United Launch Service : Centennial, CO	45.888	85.367	Jul 2017	-		-		-		-	0.000	131.255	-
Orbital ATK OTA	C/Various	Orbital ATK : Magna, UT	121.523	28.957	Jul 2017	-		-		-		-	0.000	150.480	-
Space X OTA	C/Various	Space X : Hawthorne, CA	33.660	57.639	Jun 2017	-		-		-		-	0.000	91.299	-
Rocket Propulsion System Development	C/TBD	Various : Various	-	-		-		-		-		-	0.000	0.000	-
Broad Agency Announcement Technical Maturation Studies	C/Various	Various : Various	34.619	2.650	Dec 2017	-		-		-		-	0.000	37.269	-
NASA Advance Booster Engine Demonstration Risk Reduction (ABEDRR)	SS/ Various	Various : Various	35.127	5.247	Jul 2017	0.890	Oct 2018	-		-		-	0.000	41.264	-
Georgia Tech Combustion Stability Technical Maturation UARC	SS/ Various	Various : Various	7.740	0.208	Jul 2017	-		-		-		-	0.000	7.948	-
NASA Combustion Stability Technical Maturation Study	SS/ Various	Various : Various	6.800	-		-		-		-		-	0.000	6.800	-
AFRL Combustion Stability Technical Maturation Study	SS/ Various	Various : Various	2.699	0.479	Dec 2017	-		-		-		-	0.000	3.178	-
AFRL Hydrocarbon Boost Technical Maturation Demonstration	SS/ Various	Various : Various	10.691	26.463	Jul 2017	-		-		-		-	0.000	37.154	-
FFRDC Mission Assurance	SS/CPAF	Aerospace : El Segundo, CA	20.141	-		6.840	Nov 2017	6.065	Nov 2018	-		6.065	20.031	53.077	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206853F / *Evolved Expendable Launch Vehicle Program (SPACE) - EMD*	**Project (Number/Name)** 650006 / *Next Generation Launch System Investment*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Launch Enterprise System Engineering and Integration	C/FP	Various : Various	5.573	-		4.039	Mar 2018	1.869	Mar 2019	-		1.869	10.700	22.181	-
Launch Service Agreement (Including the Rocket Propulsion System)	C/TBD	TBD : TBD	-	30.274	Jul 2018	272.350	Jul 2018	219.365	Jan 2018	-		219.365	702.872	1,224.861	-
		Subtotal	466.298	365.007		284.119		227.299		-		227.299	733.603	2,076.326	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Organic Civilian Support	Reqn	DOD : El Segundo, CA	0.952	0.480	Jul 2017	1.876	Oct 2017	1.918	Oct 2018	-		1.918	10.406	15.632	9.723
		Subtotal	0.952	0.480		1.876		1.918		-		1.918	10.406	15.632	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	SS/CPAF	Aerospace : El Segundo, CA	4.700	-		2.014	Oct 2017	2.498	Nov 2018	-		2.498	5.007	14.219	5.263
Advisory and Assistance Services	Various	Various : Various	9.185	3.273	Aug 2017	3.479	Dec 2017	8.636	Dec 2018	-		8.636	33.137	57.710	15.258
Other Support	Various	Various : Various	3.385	12.600	Apr 2017	6.084	Nov 2017	5.096	Nov 2018	-		5.096	16.832	43.997	1.254
		Subtotal	17.270	15.873		11.577		16.230		-		16.230	54.976	115.926	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	484.520	381.360		297.572		245.447		-		245.447	798.985	2,207.884	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206853F / *Evolved Expendable Launch Vehicle Program (SPACE) - EMD*	**Project (Number/Name)** 650006 / *Next Generation Launch System Investment*	

	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		**Date:** February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206853F / *Evolved Expendable Launch Vehicle Program (SPACE) - EMD*	**Project (Number/Name)** 650006 / *Next Generation Launch System Investment*

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206853F / *Evolved Expendable Launch Vehicle Program (SPACE) - EMD*	**Project (Number/Name)** 650006 / *Next Generation Launch System Investment*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Rocket Propulsion System Development				
Advanced Booster Engine Demonstration Risk Reduction (ABEDRR)	1	2017	3	2020
AFRL Combustion Stability	1	2017	4	2018
AFRL Hydrocarbon Boost Technology Demonstration (HCB)	1	2017	4	2018
Rocket Propulsion System Development (RPS OTAs)	1	2017	4	2018
Launch Service Agreement (LSA)				
Launch Service Agreement (Including Rocket Propulsion System)	4	2018	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604256F / *Threat Simulator Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	21.377	35.405	34.256	0.000	34.256	46.393	42.925	29.444	29.977	Continuing	Continuing
662907: *Electronic Combat Intel Support*	-	2.681	2.547	2.556	0.000	2.556	2.603	2.648	2.704	2.753	Continuing	Continuing
663321: *Electronic Warfare Ground Test Resources*	-	12.280	25.695	24.459	0.000	24.459	36.414	32.774	19.081	19.427	Continuing	Continuing
667500: *Foreign Materiel Acquisition/Analysis*	-	6.416	7.163	7.241	0.000	7.241	7.376	7.503	7.659	7.797	Continuing	Continuing

A. Mission Description and Budget Item Justification

The AF requires a comprehensive set of test facilities to implement the Air Force Electronic Warfare (EW) Test Process in order to test EW systems, including Directed Energy (DE). To manage program risk effectively throughout the weapons system acquisition process, and conduct T&E effectively and efficiently, a broad multi-spectrum, integrated set of T&E capabilities for Modeling and Simulation (M&S) through open-air ranges (OAR) is required. The EW Test Process Support task provides for investment management, coordinated technical oversight, and application of EW T&E facilities, including studies, analyses, and related documentation. The National Radar Cross Section (RCS) Test Facility (NRTF) at Holloman AFB, NM, provides timely, accurate, and secure RCS and antenna measurements for tri-service and joint program offices, DoD laboratories, Defense Advanced Research Projects Agency (DARPA) and industry. The NRTF tests fielded and developmental systems and technologies to meet Low Observable (a.k.a. stealth) and EW customer requirements. The Guided Weapons Evaluation Facility (GWEF), 412 EWG/OL-HN and the Digital Integrated Air Defense System (DIADS) provide the ability to realistically evaluate hardware components and simulated weapon systems against manned hardware threat representations throughout the acquisition process. GWEF and 412 EWG/OL-HN provide simulations of advanced Infrared (IR) semi-active Surface-to-Air Missiles (SAMs), Air-to-Air Missiles (AAMs), IR and Laser countermeasure functions; integration of actual threat hardware and ground clutter into advanced threat IR missile simulations. DIADS provides algorithm based enemy command and control (C2) capabilities plus early warning radar detection, limited ground control intercept features and also allows man-in-the-loop interaction for the enemy C2 positions. The Advanced Warfare Test and Evaluation Capability (AWTEC) will replace 90's technology with state-of-the-art stimulators to upgrade the Benefield Anechoic Facility (BAF) at Edwards AFB, CA and provides Electromagnetic Interference/ Electromagnetic Compatibility (EMI/EMC) capabilities at the BAF. Improvement and modernization efforts within this PE are identified for the EW mission area. EW provides planning, improvements, and modernization needed for test capabilities to conduct and support the AF EW Test Process, including DE. This test process provides a scientific methodology to ensure the effective disciplined and efficient testing of EW and avionics systems.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installation or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604256F / *Threat Simulator Development*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	21.630	35.405	28.513	0.000	28.513
Current President's Budget	21.377	35.405	34.256	0.000	34.256
Total Adjustments	-0.253	0.000	5.743	0.000	5.743
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.253	0.000	5.743	0.000	5.743

Change Summary Explanation

FY17 $0.253 million decrease for Small Business Innovation Research (SBIR) tax.

FY19 $5.743 million increase due to $6.000 million increase for 5th Generation Target Emulation Initiative (5GATE) and $0.257 million decrease due to inflation adjustment.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0604256F / *Threat Simulator Development*	**Project (Number/Name)** 662907 / *Electronic Combat Intel Support*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
662907: *Electronic Combat Intel Support*	-	2.681	2.547	2.556	0.000	2.556	2.603	2.648	2.704	2.753	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides funding to support Foreign Materiel Operational Test and Evaluation (FMOT&E), which ensures the ability of operational commands to test and develop effective Electronic Attack/Electronic Protection (EA/EP) techniques and tactics. Funds are required for: deployment of systems to test facilities; travel of personnel to the test sites to evaluate and validate test results; range and laboratory costs; test consumables; costs for instrumentation of systems; and contracted engineering support for the conduct of tests and subsequent reporting. Funding for this program is required to prevent future aircraft losses due to improper and inaccurate aircrew tactics (e.g., lack of evasive action or proper tactics training to avoid missile attack).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: FMOT&E ***Description:*** Supports Foreign Materiel Operational Test and Evaluation (FMOT&E) ***FY 2018 Plans:*** Continue to conduct foreign material operational analysis (FMOA) for fighter and bomber testing; mobility/special operations transport/helicopter testing; classified operational assessments; and extensive evaluations and reporting of system effectiveness. ***FY 2019 Plans:*** Continued operations of electronic combat intelligence support for fighter and bomber testing, mobility special operations transport and helicopter testing, classified operational assessments and extensive evaluations and reporting of system effectiveness. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $0.009 million increase from FY 2018 to FY 2019 due to inflation adjustment.	2.681	2.547	2.556
Accomplishments/Planned Programs Subtotals	2.681	2.547	2.556

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 PE 0604759F: *Major T&E Investment*	64.538	82.874	91.844	-	91.844	181.663	164.005	142.090	82.003	Continuing	Continuing

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0604256F / *Threat Simulator Development*	**Project (Number/Name)** 662907 / *Electronic Combat Intel Support*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 PE 0605807F: *Test and Evaluation Support*	676.417	678.289	692.784	-	692.784	719.900	726.015	760.319	737.765	Continuing	Continuing
• RDTE 06 PE 0605976F: *Facility Restoration and Modernization - T&E*	134.111	135.507	162.216	-	162.216	88.445	69.293	70.730	72.019	Continuing	Continuing
• RDTE 06 PE 0605978F: *Facility Sustainment - T&E Support*	28.091	28.720	28.888	-	28.888	29.424	29.935	30.555	31.112	Continuing	Continuing

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0604256F / *Threat Simulator Development*	**Project (Number/Name)** 663321 / *Electronic Warfare Ground Test Resources*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
663321: *Electronic Warfare Ground Test Resources*	-	12.280	25.695	24.459	0.000	24.459	36.414	32.774	19.081	19.427	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The AF requires a comprehensive set of test facilities to implement the Air Force Electronic Warfare (EW) Test Process in order to test EW systems, including Directed Energy (DE). To manage program risk effectively throughout the weapons system acquisition process, and conduct T&E effectively and efficiently, a broad multi-spectrum, integrated set of T&E capabilities for Modeling and Simulation (M&S) through open-air ranges (OAR) is required. The EW Test Process Support task provides for investment management, coordinated technical oversight, and application of EW T&E facilities, including studies, analyses, and related documentation. The National Radar Cross Section (RCS) Test Facility (NRTF) at Holloman AFB, NM, provides timely, accurate, and secure RCS and antenna measurements for tri-service and joint program offices, DoD laboratories, Defense Advanced Research Projects Agency (DARPA) and industry. The NRTF tests fielded and developmental systems and technologies to meet Low Observable (a.k.a. stealth) and EW customer requirements. The Guided Weapons Evaluation Facility (GWEF), 412 EWG/OL-HN and the Digital Integrated Air Defense System (DIADS) provide the ability to realistically evaluate hardware components and simulated weapon systems against manned hardware threat representations throughout the acquisition process. GWEF and 412 EWG/OL-HN provide simulations of advanced Infrared (IR) semi-active Surface-to-Air Missiles (SAMs), Air-to-Air Missiles (AAMs), IR and Laser countermeasure functions; integration of actual threat hardware and ground clutter into advanced threat IR missile simulations. DIADS provides algorithm based enemy command and control (C2) capabilities plus early warning radar detection, limited ground control intercept features and also allows man-in-the-loop interaction for the enemy C2 positions. The Advanced Warfare Test and Evaluation Capability (AWTEC) will replace 90's technology with state-of-the-art stimulators to upgrade the Benefield Anechoic Facility (BAF) at Edwards AFB, CA and provides Electromagnetic Interference/ Electromagnetic Compatibility (EMI/EMC) capabilities at the BAF. Improvement and modernization efforts within this PE are identified for the EW mission area. EW provides planning, improvements, and modernization needed for test capabilities to conduct and support the AF EW Test Process, including DE. This test process provides a scientific methodology to ensure the effective disciplined and efficient testing of EW and avionics systems.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: I&M	10.650	16.322	22.842
Description: Provides for planning and improvement & modernization (I&M) of test capabilities to conduct and support the AF EW test process, including DE.			
FY 2018 Plans: The 96 TW will continue development of hardware and software upgrades to 5-axis IR threat simulator capabilities. DIADS will complete development and validation of needed architecture and simulation upgrades, including improvements to command and control, sensor reactivity, and jamming models. AWTEC will complete the development, procurement and integration of new state-of-the-art stimulators and threat signal generation capabilities for the BAF. NRTF will continue facility upgrades to			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0604256F / *Threat Simulator Development*	**Project (Number/Name)** 663321 / *Electronic Warfare Ground Test Resources*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
consolidate and enhance operations efficiency and improve RCS measurement accuracy of Low Observable platforms and antennas, including design studies of next generation radar and RCS metrology requirements. ***FY 2019 Plans:*** Red Integrated Air Defense System (Red-IADS), Electronics Warfare Test Capability Improvement Program (EWTCIP), Jammer Electronic Counter Measures Enhancement and Integration, National RCS Test Facility (NRTF) Modernization and Measurement programs begin in FY19. IR EW Simulator Support (IREWTS), NEWEG for J-PRIMES (NEWEG-J) and CIGTF GPS NAVWAR Upgrade (CGNU) programs continue executing development, procurement and integration as appropriate. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $6.520 million increase from FY 2018 to FY 2019 due to new programs Red-IADS, EWTCIP, Jammer ECM Enhancement and Integration program, funding of 5GATE, continued funding of NEWEG-J and inflation rate, offset by decrease of funding for DIADS and AWTEC due to program completion.			
Title: EC Test Process Support ***Description:*** Electronic Combat (EC) Test Process Support. Conduct requirements analyses and other studies in support of Air Force T&E investments in test infrastructure and capabilities. ***FY 2018 Plans:*** Continue to provide SETA support needed to implement planned Air Force test processes and infrastructure I&M capabilities. Team members will continue support to tri-service monitoring and analysis teams established to identify emerging joint investment needs and requirements development. Team members will help manage and monitor I&M program elements and activities. Support directed threat simulator acquisition effort. ***FY 2019 Plans:*** Continued to provide SETA support needed to implement planned Air Force test processes and infrastructure I&M capabilities. Team members will continue to support tri-service monitoring and analysis teams established to identify emerging joint investment needs and requirements development. Team members will help manage and monitor I&M program elements and activities. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $7.756 million decrease from FY 2018 to FY 2019 due to completion of support for directed threat simulator acquisition effort.	1.630	9.373	1.617
Accomplishments/Planned Programs Subtotals	12.280	25.695	24.459

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0604256F / *Threat Simulator Development*	**Project (Number/Name)** 663321 / *Electronic Warfare Ground Test Resources*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 PE 0604759F: *Major T&E Investment*	64.538	82.874	91.844	-	91.844	181.663	164.005	142.090	82.003	Continuing	Continuing
• RDTE 06 PE 0605807F: *Test and Evaluation Support*	676.417	678.289	692.784	-	692.784	719.900	726.015	760.319	737.765	Continuing	Continuing
• RDTE 06 PE 0605976: *Facility Restoration & Modernization - T&E*	134.111	135.507	162.216	-	162.216	88.445	69.293	70.730	72.019	Continuing	Continuing
• RDTE 06 PE 0605978F: *Facilities Sustainment - T&E Support*	28.091	28.720	28.888	-	28.888	29.424	29.935	30.555	31.112	Continuing	Continuing

Remarks

D. Acquisition Strategy

NA

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0604256F / *Threat Simulator Development*	**Project (Number/Name)** 667500 / *Foreign Materiel Acquisition/ Analysis*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
667500: *Foreign Materiel Acquisition/Analysis*	-	6.416	7.163	7.241	0.000	7.241	7.376	7.503	7.659	7.797	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project's specific purpose is to support USAF Foreign Materiel Program requirements through the acquisition and analysis of foreign materiel. Items considered for these Foreign Materiel Acquisition (FMA) funds are included in the prioritized Air Force FMA Top 20 list established each year. Each Major Command (MAJCOM) prepares and approves a Foreign Materiel - Mission Requirements Statement for each requirement. Annually, the MAJCOM commanders establish a list of their top 20 requirements. The MAJCOMs' requirements lists are integrated and prioritized into a classified Air Force requirement list. Each MAJCOM then approves the FMA Top 20 List and final validation comes from the Air Force Vice Chief of Staff. System analyses are based on and driven by acquisitions. The USAF provides assessments and data for threat systems to all DoD components.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: FMP ***Description:*** Supports USAF Foreign Materiel Program (FMP) Requirements through the acquisition and analysis of foreign materiel. ***FY 2018 Plans:*** Continue to fund acquisition of available Foreign Materiel in accordance with the prioritized Air Force Foreign Materiel List; analysis of acquired Foreign Materiel; and operations and maintenance of the specialized Foreign Materiel assets. ***FY 2019 Plans:*** Continue to fund acquisition of available Foreign Materiel in accordance with the prioritized Air Force Foreign Materiel List; analysis of acquired Foreign Materiel; and operations and maintenance of the specialized Foreign Materiel assets. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $0.078M million increase from FY 2018 to FY 2019 due to inflation.	6.416	7.163	7.241
Accomplishments/Planned Programs Subtotals	6.416	7.163	7.241

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0604256F / *Threat Simulator Development*	**Project (Number/Name)** 667500 / *Foreign Materiel Acquisition/ Analysis*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 PE 0604759F: *Major T&E Investment*	64.538	82.874	91.844	-	91.844	181.663	164.005	142.090	82.003	Continuing	Continuing
• RDTE 06 PE 0605807F: *Test and Evaluation Support*	676.417	678.289	692.784	-	692.784	719.900	726.015	760.319	737.765	Continuing	Continuing
• RDTE 06 PE 0605976F: *Facility Restoration & Modernization - T&E*	134.111	135.507	162.216	-	162.216	88.445	69.293	70.730	72.019	Continuing	Continuing
• RDTE 06 PE 0605978F: *Facilities Sustainment -T&E Support*	28.091	28.720	28.888	-	28.888	29.424	29.935	30.555	31.112	Continuing	Continuing

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604759F / *Major T&E Investment*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	64.538	82.874	91.844	0.000	91.844	181.663	164.005	142.090	82.003	Continuing	Continuing
664597: *Air Force Test Investments*	-	64.538	82.874	91.844	0.000	91.844	181.663	164.005	142.090	82.003	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This PE provides planning, improvements, and modernization for test capabilities at four Air Force Test Center (AFTC) organizations: 96 Test Wing at Eglin AFB FL, 704 Test Group at Holloman AFB NM (and operating locations at Wright-Patterson AFB OH), Arnold Engineering Development Complex (AEDC) at Arnold AFB TN, and the 412 Test Wing at Edwards AFB CA. The purpose is to help test organizations improve and develop their test infrastructure and capabilities to keep pace with improvements in weapon system technologies.

The improvement and modernization (I&M) requirements are defined through the AF Test Investment Planning & Programming (TIPP) Process. All projects have been reviewed through the Tri-Service Reliance process (to communicate AF efforts to the other Services and avoid unwarranted duplication of effort) and are documented in the Technology Development Acquisition Program (TDAP) database. Each project has its own planning, development, equipment acquisition, equipment installation, and checkout phases which often require significant differences in funding from one year to the next. As such, the changes in category funding from year to year do not necessarily indicate program growth, but rather a planned phasing of improvement and modernization efforts. The test capabilities at these locations enable testing through all phases of weapon system acquisition, from system concept exploration through component and full-scale integrated weapon system testing to operational testing. These test organizations are a part of the Major Range and Test Facility Base (MRTFB), operated and maintained by the Air Force for DoD Test and Evaluation (T&E). These national test assets are available to others requiring their unique capabilities.

The 96 TW, at Eglin AFB FL, conducts and supports developmental test and evaluation (DT&E) of non-nuclear air armaments; Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance (C4ISR) systems; target acquisition and weapon delivery systems; navigation systems; provides a climatic simulation capability; determines target/test item spectral signatures; and provides Cyber testing capabilities as part of the Joint Information Operations (IO) Range.

AEDC, at Arnold AFB TN, provides pre-flight and reliability ground environmental test support for DoD aeropropulsion, flight systems, and space and missile programs. The center has 53 test facilities providing: aerodynamic testing of scale model aircraft, missiles, and space systems; testing of large and full-scale satellites, sensors, and space vehicles in a simulated space environment; altitude environmental testing for aircraft, missile, and spacecraft propulsion systems; testing of large-scale models such as space boosters together with their propulsion systems and it provides a climatic simulation capability. The 704 TG at Holloman AFB, NM provides independent test and evaluation of inertial navigation systems, Global Positioning System (GPS) and integrated systems used for aircraft navigation and missile guidance systems, including vulnerability to electronic interference; provides the liaison function for coordinating and scheduling all US Air Force test operations at White Sands Missile Range; provides subsonic through hypersonic ground testing of aircraft and missiles in a flight-representative environment under highly instrumented conditions; and executes flight test and test support for advanced avionics and weapons development of joint, international and commercial test programs. The 704 TG, OL-AC at

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604759F / *Major T&E Investment*

Wright-Patterson AFB, OH provides independent T&E in support of aircraft survivability and full-scale aircraft landing gear T&E. These T&E activities include the development, T&E of aircraft landing gear components supporting engineering acquisition, design, safety, and performance evaluations. In addition, they provide an independent T&E capability for component qualification.

The 412th Test Wing, at Edwards AFB CA, conducts and supports DT&E and Operational Test and Evaluation (OT&E) of aircraft and aircraft systems, aerospace research vehicles, unmanned aerial vehicles, cruise missiles, parachute delivery/recovery/systems, and cargo handling systems.

I&M efforts within this PE are identified in four mission area categories: Airframe/Propulsion/Avionics (APA); Armament/Munitions (A/M); Command, Control, Communications, Computers, Intelligence, Surveillance, Reconnaissance (C4ISR)/Cyber; and Space. These categories describe general types of effort that will be conducted in this PE. APA provides planning, improvements, and modernization needed for test capabilities to conduct and support DT&E and OT&E of aircraft and aircraft systems, aerospace research vehicles, unmanned aerial vehicles, cruise missiles, parachute delivery/recovery systems, cargo handling systems, and turbine engines. APA focuses on evaluation of the vehicle airframe, propulsion system, and avionics systems, as well as overall systems integration testing. It encompasses both ground test facilities, on-board test aircraft systems, and open-air range infrastructure, including instrumentation and data processing. A/M provides planning, improvements, and modernization to conduct DT&E of air-to-ground and air-to-air armaments and munitions, which include gun, chaff and flare systems, as well as aerial decoy and target systems. The A/M category encompasses the full range of DT&E from digital modeling and simulation, to precision measurement testing, to hardware-in-the-loop and installed systems testing, to open-air range testing. Elements of A/M DT&E include environmental, warhead effectiveness, arena blast/ fragmentation, guidance navigation and control, aerodynamics, propulsion, electromagnetic interference and compatibility, mass properties, seeker and signature measurement, survivability, lethality, integration, reliability, net-centric and terminal effects testing. A/M also involves the design and development of systems needed to support A/M DT&E including the design and development of high speed sleds, targets, range support systems and various instrumentation and measurement systems. C4ISR provides planning, improvements and modernization to conduct DT&E of systems that support Command and Control (C2) functions which range from air campaign planning at the theater level to wing level C2 operations, to planning individual missions, to putting weapons on target using concepts such as machine to machine targeting. C4ISR includes ground and flight performance testing of airborne C2 networks and tactical data links, air operation centers, mission planning systems, multi-level security systems, radio and communication systems, ISR systems, information assurance systems, and radar systems such as those used by Joint Surveillance Target Attack Radar Systems (JSTARS) and air traffic control systems. C4ISR conducts DT&E on a full range of systems covering the sensor (detection) to the shooter (weapon), including functional and environmental testing of these systems. C4ISR/Cyber also includes DT&E for offensive and defensive Cyber capabilities. Space provides planning, improvements, and modernization needed for test capabilities to perform developmental and operational testing for space and launch acquisition and sustainment programs. Test capabilities include launch vehicle, satellite, missile, sensor, thermal protection system, signature, hardness, and interface testing. The capabilities reside at Vandenberg, Kirtland, Arnold, Patrick, Schriever, Peterson, Holloman Air Force Bases and others. Infrastructure includes launch sites, mobile control units, thermal vacuum chambers, sled tracks, arc heated wind tunnels, ballistic test ranges, signature collection, and the requisite personnel.

This program is in Budget Activity 6, RDT&E Management Support, because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604759F / *Major T&E Investment*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	71.385	82.874	79.536	0.000	79.536
Current President's Budget	64.538	82.874	91.844	0.000	91.844
Total Adjustments	-6.847	0.000	12.308	0.000	12.308
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-6.847	0.000	12.308	0.000	12.308

Change Summary Explanation

FY17 $6.847 million decrease: $5.0 million decrease for cyber test infrastructure associated with the hardware-in-the-loop capability (FY 2017 Request for Additional Appropriations (RAA)) and $1.847 million decrease for Small Business Innovation Research (SBIR) tax.

FY19 $12.308 million increase: $3.0 million to fund Joint Simulation Environment (JSE), $10.0 million to fund cyber activities and $0.692 million decrease for inflation.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Airframe/Propulsion/Avionics T&E I&M	50.052	55.184	53.911
Description: Improvement and modernization of the AF capability to test and evaluate Airframe/Propulsion/Avionics (APA)			
FY 2018 Plans: Advanced Large Military Engine Capability (ALMEC) will complete upgrades for the ETF controls and restoration of the C Plant H1 heater. Improved Transonic Test Capability (IMTTC) will continue to install and integrate hardware and software enhancements for TCC and 16T TACS. The Voice Communications Systems Upgrade (VCSU) program will begin procurement of equipment for the mission control room (MCR).			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604759F / *Major T&E Investment*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Common Range Integrated Instrumental System (CRIIS) Production will continue Lot 1 procurement of OSD Central Test Enhancement Investment Program (CTEIP) developed CRIIS Time Space Position Information (TSPI) Increment two pods, aircraft internal mounts, and ground support infrastructure. Purchase and delivery of initial CRIIS equipment will focus on Eglin AFB IOC. The Landing Gear Test Facility (LGTF) Modernization Program will continue design and fabrication (Phase II) efforts, and system integration (Phase III). The Integrated Networked Enhanced Telemetry (iNET) Systems Integration and Support (ISIS) Program will begin in FY18. The program will begin to define design requirements to integrate and implement the telemetry technologies developed under the CTEIP-funded iNET Program. Common Airborne Network Instrumentation Solutions (CANIS) will continue supporting and complementing the CTEIP-funded iNET Program by implementing the airborne solutions. FY17 activity will include completing the implementation of spirals 0, 1, and 2 of the CANIS acquisition approach. Spiral 0 modifies AFTC telemetry policies and procedures and makes use of tier 1 waveforms; Spiral 1 implements multi-band and C-Band transmitter and transceiver conversions; and Spiral 2 establishes a test asset networked data gathering package. Next Generation Turbine Engine Test Capability (NGTETC) will continue upgrades to exhaust coolers, compressor inbleed, power and thermal management systems. Improved Plant Reliability and Efficiency/Transonic Propulsion Test Capability (IMTPC) will continue to restore the capabilities of the main drive motors (rewind main drive motors M1 and M4), C1 compressor (replace both C1 compressor rotor blades and spacers), main drive motor sub-systems (refurbish/replace), C1 compressor sub-systems (refurbish/replace), and the electrical support systems (refurbish/replace primary PWT facility main drive electrical utilities) to original specifications. Mobile Mission Control Room Upgrade (MMCRU) will continue to support the situational awareness integration (spiral 2) and begin development IO at each range (spiral 3), and applications migration of the MMCRU implementation. The VSCU Program will continue to take receipt of MCR equipment and begin installation and integration activities.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604759F / *Major T&E Investment*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
The T&E Board of Directors will continue to lead tri-service investment planning and joint T&E Reliance efforts as directed by the Service Secretaries.			
FY 2019 Plans: IMTTC will continue to install and integrate hardware and software enhancements for TCC and 16T Test Article Control System (TACS).			
VCSU Program will continue to migrate voice systems for multiple mission control rooms.			
CRIIS Production will complete Lot 2 and start Lot 3 procurement of OSD CTEIP developed CRIIS TSPI increment two pods, aircraft internal mounts and ground support infrastructure.			
Landing Gear Test Facility - Large Dynamometer Replacement (LGTF-LDRP) will begin study and design efforts for dynamometer replacement at the LGTF.			
Integrated Networked Enhanced Telemetry Systems integration support program will initialize and procure the first aircraft to be migrated to the iNET System.			
CANIS will continue supporting and complementing the CTEIP funded iNET Program by implementing the airborne solutions. FY19 activity will include completing the implementation of spirals 0, 1, and 2 of the CANIS acquisition approach.			
NGTETC will continue upgrades to exhaust coolers, compressor inbleed, power and thermal management systems.			
IMTPC will continue to restore the capabilities of the main drive motors (rewind main drive motors M1 and M4), C1 compressor (replace both C1 compressor rotor blades and spacers), main drive motor sub-systems (refurbish/replace), C1 compressor sub-systems (refurbish/replace), and the electrical support systems (refurbish/replace primary Propulsion Wind Tunnel (PWT) facility main drive electrical utilities) to original specifications.			
MMCRU will continue software development and roll out and integration of control room displays across multiple control rooms.			
Wind Tunnel 16S Reactivation efforts will begin to bring the wind tunnel back online to support future test efforts.			
Advanced Small Military High Speed Engine Capability (AMSC) will begin Phase II procurement and integration to accommodate future test efforts.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604759F / *Major T&E Investment*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Pre-Milestone A Studies and Proof of Concepts will be implemented as required to improve future I&M acquisition efforts. The Joint Simulation Environment (JSE) program will begin planning and study efforts to create a USAF high fidelity simulation capability accreditable for test as a supplement to open air environments. As part of the effort, two MILCON facilities will be built for developmental and operational test use. Planning and design will begin in FY19. (In accordance with Public Law 114-92, November 25, 2015-National Defense Authorization Act for Fiscal Year 2016 Sec. 2803b, Congressional authorization is required prior to the start of planning and design work. 1391s attached.) ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $1.273 million decrease from FY 2018 to FY 2019 due to the reduced funding of CRIIS, IMTTC, IMTPC and inflation adjustment; completion of ALMEC and LGTF Upgrade in FY18; and increased funding for the reactivation of Wind Tunnel 16s, ALMEC Phase II, iNET Systems Integration and Support and various smaller efforts. The JSE program received $3.0 million for a FY 2019 start.			
Title: Armament/Munitions T&E I&M	8.361	3.280	6.581
Description: Improvement and modernization of the AF capability to test and evaluate Armament/Munitions (A/M) ***FY 2018 Plans:*** NGMTE will complete upgrades to aging gun and munitions test infrastructure, development and procurement of common data instrumentation and acquisition systems, and replacement of environmental test chambers/facilities supporting gun and arena test capabilities. ***FY 2019 Plans:*** NGMTE will complete upgrades to aging gun and munitions test infrastructure, development and procurement of common data instrumentation and acquisition systems, and replacement of environmental test chambers/facilities supporting gun and arena test capabilities. Gulf Range Enhancement (GRE) begins measured implementation to extend TSPI capabilities south into the Gulf Range for expanded use of the airspace for increased throughput of flight test efforts as well as to support future hypersonic, swarming autonomous vehicles, and LRSO test efforts. Pre-Milestone A Studies and Proof of Concepts will be implemented as required to improve future I&M acquisition efforts. ***FY 2018 to FY 2019 Increase/Decrease Statement:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604759F / *Major T&E Investment*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
$3.301 million increase from FY 2018 to FY 2019 due to: decreased funding of NGMTE ($2.68 million) and $0.039 million decrease for inflation adjustment; and increased funding to GRE ($5.17 million) and Advanced Multi-Spectral Development (AMD) ($0.85 million).			
Title: C4ISR T&E I&M	6.125	24.410	30.064
Description: Improvement and modernization of the AF capability to test and evaluate C4ISR ***FY 2018 Plans:*** Improved Command and Control Test Operations Center (I-C2TOC) will continue development of secure network infrastructure and initiate procurement of software and hardware servers and workstations needed to enhance net-centric C2 battle management operations and test control capabilities, improve communication interfaces and data collection, handling, analysis and display capabilities supporting C4ISR end-to-end weapon system testing at Eglin AFB. The Cyber Defense Test Capability (CDTC) project will continue in FY18. During this phase, implementation of the plan for acquiring and training the workforce necessary for executing the cyber T&E process will begin. The Weapon System Cyber Resiliency (WSCR) team will begin requirements definitization and development of acquisition strategies. In addition, it will conduct advance planning for a future cyber test facility and possibly planning and design of if MILCON funds are identified. The Cyber DT/OT Range (CDORG) will begin with requirements definitization and development of acquisition strategies. ***FY 2019 Plans:*** I-C2TOC will continue development of secure network infrastructure and initiate procurement of software and hardware servers and workstations needed to enhance net-centric C2 battle management operations and test control capabilities, improve communication interfaces and data collection, handling, analysis and display capabilities supporting C4ISR end-to-end weapon system testing at Eglin AFB. CDTC will continue in FY19. During this phase the plan for acquiring and training the workforce necessary for cybersecurity test and evaluation will continue. The planning and design phase for the new cyber test facility will begin. (In accordance with Public Law 114-92, November 25, 2015, National Defense Authorization Act for Fiscal Year 2016, Sec. 2803b, Congressional authorization is required prior to the start of planning and design work. 1391 attached.)			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604759F / *Major T&E Investment*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Cybersecurity DT/OT Range (CDORG) will continue defining requirements and development of acquisition strategies necessary to support cybersecurity range efforts. Improved Data Links (IDL) will begin studies and pre-acquisition work for test solutions for Fourth Gen aircraft systems. Advanced Multi-Spectral Development (AMD) will begin initial planning for hardware in the loop test system for the Guided Weapons Facility. Pre-Milestone A Studies and Proof of Concepts will be implemented as required to improve future I&M acquisition efforts. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $5.654 million increase from FY 2018 to FY 2019 due to: decreased funding of CDTC ($1.50 million) WSCS ($3.50 million) and inflation adjustment ($0.178 million); and increased funding to CDORG ($0.08 million), IDL ($0.90 million) and cyber-related projects ($9.852 million).			
Title: Space ***Description:*** Space provides planning, improvements, and modernization needed for test capabilities to perform developmental and operational testing for space and launch acquisition and sustainment programs. ***FY 2018 Plans:*** Not applicable; effort starts in FY 2019. ***FY 2019 Plans:*** Pre-Milestone A Studies and Proof of Concepts will be implemented as required to improve future I&M acquisition efforts. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $1.288 million increase due to initial need to perform studies for space test requirements and decrease due to inflation adjustment.	0.000	0.000	1.288
Accomplishments/Planned Programs Subtotals	64.538	82.874	91.844

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 PE 0604256F: *Threat Simulator Development*	21.377	35.405	34.256	-	34.256	46.393	42.925	29.444	29.977	Continuing	Continuing

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0604759F / *Major T&E Investment*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 PE 0605807F: *Test and Evaluation Support*	676.417	678.289	692.784	-	692.784	719.900	726.015	760.319	737.765	Continuing	Continuing
• RDTE 06 PE 0605976F: *Facility Restoration & Modernization - T&E*	134.111	135.507	162.216	-	162.216	88.445	69.293	70.730	72.019	Continuing	Continuing
• RDTE 06 PE 0605978F: *Facility Sustainment - T&E Support*	28.091	28.720	28.888	-	28.888	29.424	29.935	30.555	31.112	Continuing	Continuing

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605101F / *RAND Project Air Force*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	33.373	34.346	34.614	0.000	34.614	35.258	35.869	36.614	37.282	Continuing	Continuing
661110: *Project Air Force*	-	33.373	34.346	34.614	0.000	34.614	35.258	35.869	36.614	37.282	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program provides for continuing analytical research across a broad spectrum of aerospace issues and concerns. The Project AIR FORCE (PAF) research agenda is focused primarily on mid to long-term problems; in addition, PAF provides quick response assistance for senior Air Force officials on high priority, near term issues. Within these areas, PAF addresses difficult and complex, far-reaching and inter-related questions linked to future strategies, approaches and policies, in order to enhance Air Force senior leadership's deliberations and decisionmaking on major issues. The Air Force Steering Group, chaired by the Vice Chief of Staff, reviews, monitors, and approves PAF annual research efforts. Each project is initiated, processed, and approved in accordance with PAF Sponsoring Agreement which requires General Officer (or SES equivalent) sponsorship and involvement on a continuing basis.

PAF is organized in four primary research program areas: strategy and doctrine; force modernization employment; manpower, personnel and training; and resource management. Integrative research projects are also conducted at the division level with direct support provided through the most applicable program. Research programs address organizational crosscutting issues as defined by specific research themes approved by the Air Force Steering Group. These research themes encompass a wide spectrum of topics including external challenges to national security; terrorism and homeland defense; joint and coalition operations; integrated roadmap for ISR capabilities; enhancing, tailoring and reducing infrastructure to meet new force requirements; potential changes to the Active/Reserve/National Guard/ Civilian/Contractor manpower mix; and improved weapon system costing.

The research program will continue to build upon research foundations, examining the evolving security environment, emerging threats, national and military strategy, transformation approaches including investment strategies to provide capabilities within changing Defense budgets, operational concepts to meet evolving and increasingly joint missions, exploiting advanced technologies, increasing the effectiveness and efficiency of combat support, and developing the total force (Active/ Reserve/National Guard/Civilian/Contractor). These efforts will continue to inform and support the senior Air Force leadership regarding personnel management and training; improving logistical efficiencies and force sustainment; ongoing conflicts and joint operations; force structure capabilities, limitations, and operational concepts; and making force structure tradeoffs within resource constraints to meet future national security and Air Force needs.

Future research will build upon earlier work to continue to help the Air Force to rapidly and appropriately adapt to the changing world environment and emerging threats; continue to modernize and employ its force structure to provide capabilities within changing DoD budgets; assess lessons learned from recent and ongoing conflicts; develop and utilize its total force; and enhance the support of our aerospace forces, ranging from sustainment of the force structure to agile combat support.

PAF research spans functional and organizational boundaries and is managed in a manner to facilitate independence and freedom from organizational bias thereby providing perspectives and insights to senior Air Force leaders free from parochial influences not necessarily in the best interest of the Air Force at large. Benefits of

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605101F / *RAND Project Air Force*

independent non-Department of Defense analysis of complex present day and emerging issues are shared beyond the immediacy of the Air Force. PAF study results are given wide dissemination within the DOD on a routine basis and are deposited with the Defense Technical Information Center available to a broad range of qualified government and commercial-sector individuals and activities.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	34.641	34.346	34.874	0.000	34.874
Current President's Budget	33.373	34.346	34.614	0.000	34.614
Total Adjustments	-1.268	0.000	-0.260	0.000	-0.260
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.268	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.260	0.000	-0.260

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Strategy & Doctrine	7.915	8.160	8.200
Description: Provides for continuing analytical research across a broad spectrum of aerospace issues and concerns--strategy and doctrine. ***FY 2018 Plans:*** Conducting continuing analytical research across a broad spectrum of aerospace issues and concerns--integrative research/direct support. ***FY 2019 Plans:*** Will conduct continuing analytical research across a broad spectrum of aerospace issues and concerns--integrative research/ direct support. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increase to account for inflation.			
Title: Force Development	7.915	8.162	8.202

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605101F / *RAND Project Air Force*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: Provides analytical research across a broad spectrum of aerospace issues and concerns--force development employment. ***FY 2018 Plans:*** Provides for continuing analytical research across a broad spectrum of aerospace issues and concerns--force development employment. ***FY 2019 Plans:*** Will provide for continuing analytical research across a broad spectrum of aerospace issues and concerns--force development employment. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increased to account for inflation.			
Title: Manpower, Personnel & Training ***Description:*** Provides analytical research across a broad spectrum of aerospace issues and concerns--manpower, personnel and training. ***FY 2018 Plans:*** Conducting continuing analytical research across a broad spectrum of aerospace issues and concerns--manpower, personnel and training. ***FY 2019 Plans:*** Will conduct continuing analytical research across a broad spectrum of aerospace issues and concerns--manpower, personnel and training. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increased to account for inflation.	7.915	8.162	8.202
Title: Resource Management ***Description:*** Provides analytical research across a broad spectrum of aerospace issues and concerns--resource management. ***FY 2018 Plans:*** Conducting continuing analytical research across a broad spectrum of aerospace issues and concerns--manpower, personnel and training. ***FY 2019 Plans:***	7.915	8.162	8.202

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605101F / *RAND Project Air Force*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Will conduct continuing analytical research across a broad spectrum of aerospace issues and concerns--manpower, personnel and training. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increased to account for inflation.			
Title: Integrative Research/Direct Support ***Description:*** Provides for continuing analytical research across a broad spectrum of aerospace issues and concerns--integrative research/direct support. ***FY 2018 Plans:*** Conducting continuing analytical research across a broad spectrum of aerospace issues and concerns--integrative research/direct support. ***FY 2019 Plans:*** Will conduct continuing analytical research across a broad spectrum of aerospace issues and concerns--integrative research/direct support. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increased to account for inflation.	1.713	1.700	1.808
Accomplishments/Planned Programs Subtotals	33.373	34.346	34.614

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605502F / *Small Business Innovation Research*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	407.570	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
663005: *Small Business Innovation Research*	-	407.570	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Implementation of 15 U.S.C., Section 638 to maximize the creative, innovative, and entrepreneurial spirit of small businesses to solve technological problems.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	407.570	0.000	0.000	0.000	0.000
Total Adjustments	407.570	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	407.570	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Small Business Innovation Research	407.570	0.000	0.000
Description: Small Business Innovation Research			
FY 2018 Plans: N/A			
FY 2019 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605502F / *Small Business Innovation Research*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** No change from FY 2018 to FY 2019. The budget for this program is implemented after an appropriation is passed as directed in provisions of 15 U.S.C., Section 638.			
Accomplishments/Planned Programs Subtotals	407.570	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605712F / *Initial Operational Test & Evaluation*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	13.829	15.523	18.043	0.000	18.043	13.793	13.997	14.254	14.513	Continuing	Continuing
660191: *Initial Operational Test and Eval*	-	13.829	15.523	18.043	0.000	18.043	13.793	13.997	14.254	14.513	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element funds Congressionally mandated Initial Operational Test and Evaluation (IOT&E) to support major weapon system acquisition decisions beyond Low-Rate Initial Production (LRIP), Milestone C, full rate production, fielding, and declaration of Initial Operational Capability (IOC). For Major Defense Acquisition Programs (MDAP), the law requires IOT&E be completed under realistic operating conditions before proceeding beyond LRIP. IOT&E will be planned to answer all critical operational issues (COI) as thoroughly as possible. IOT&E is conducted to determine the operational effectiveness and suitability and resolve overall mission capability of systems undergoing research and development (R&D) efforts. It is an evaluation of a system's performance when the complete system is tested and evaluated against operational criteria by personnel with the same qualifications as those who will operate, maintain and support the system when deployed. In general, IOT&E is performed on new systems in development, major modifications, and other systems as directed. This PE funds the Air Force Operational Test Agency's participation in Integrated Test and Evaluation (IT&E), Multiservice Operational Test and Evaluation (MOT&E), and Follow-on Operational Test and Evaluation (FOT&E) when it is the continuation of IOT&E activities past the full rate production decision. FOT&E answers specific questions about unresolved COIs and test issues or completes areas not finished during the IOT&E. This PE also funds related operational test and evaluation (OT&E) activities such as Early Influence, Operational Utility Evaluations (OUE), Early Operational Assessments (EOA), and Operational Assessments (OA) which are independent OT&Es supporting major milestones and decision points prior to Milestone C, full rate production, fielding, or declaration of IOC. IOT&E programs are identified in several system categories: Air; Space; Weapons; Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance (C4ISR); and Combat Support. This program element is driven by Congressional and DoD acquisition mandated requirements for operational testing. AFOTEC schedules and executes tests according to the forecasted test readiness of the MDAP program offices.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605712F / *Initial Operational Test & Evaluation*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	11.529	15.523	13.178	0.000	13.178
Current President's Budget	13.829	15.523	18.043	0.000	18.043
Total Adjustments	2.300	0.000	4.865	0.000	4.865
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	2.300	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	4.865	0.000	4.865

Change Summary Explanation

FY17 reprogramming was to cover additional OT requirements above original TOA. Funds were used for range, cyber and other testing requirements for the test portfolio.

FY19 funding increase: $4.865 million increase to fund cyber activities. For FY19 the funding is being distributed to PEs instead of being centrally managed. The initiative ends in FY19.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Air Systems OT&E	6.242	5.415	5.047
Description: Plan, execute and report OT&E for Air Systems			
FY 2018 Plans: -Advanced Pilot Training (APT T-X): Plan for OA -Airborne Warning and Control System (AWACS) Block 40/45: Plan for FOT&E -B-2 Flex Strike P6.2 Block Upgrade: Conduct IOT&E -B-52 Radar Modernization Program (B-52 RMP): Conduct early influence -C-130J Block Upgrade 8.1: Conduct IOT&E -Combat Rescue Helicopter (CRH): Conduct OA 2 -(Diminishing Manufacturing Sources) Replacement of Avionics for Global Operations and Navigation (E-3 DRAGON): Plan for IOT&E -F-15 Eagle Passive and Active Warning and Survivability System (F-15 EPAWSS): Plan for OA -F-15 Infrared Search and Track System (F-15 IRST): Plan for OA			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605712F / *Initial Operational Test & Evaluation*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
-F-22A 3.2B: Complete IOT&E -Global Hawk Ground Segment Modernization Program GH GSMP): Plan for OA -JSTARS Recapitalization: Plan for OA -KC-46A: Plan for IOT&E -MQ-9 Reaper Hunter-Killer Block 50 Ground Control Station (MQ-9 Block 50 GCS): Plan for OA -Presidential Aircraft Recapitalization (PAR): Conduct OA 1 -RQ-4B Global Hawk Block 30 Multi-Spectral Intelligence (MSI): Conduct OUE -UH-1N Replacement: Conduct early influence -Conduct other planning and operational testing for new air system programs as the requirement becomes known to AFOTEC ***FY 2019 Plans:*** -Advanced Pilot Training (APT T-X): Conduct OA -Airborne Warning and Control System (AWACS) Block 40/45: Conduct FOT&E -B-52 Radar Modernization Program (B-52 RMP): Conduct early influence -C-130J Block Upgrade 8.1: Complete IOT&E -Combat Rescue Helicopter (CRH): Conduct OA 2 -(Diminishing Manufacturing Sources) Replacement of Avionics for Global Operations and Navigation (E-3 DRAGON): Conduct IOT&E -F-15 Eagle Passive and Active Warning and Survivability System (F-15 EPAWSS): Conduct OA -F-15 Infrared Search and Track System (F-15 IRST): Conduct OA -Global Hawk Ground Segment Modernization Program GH GSMP): Conduct OA -JSTARS Recapitalization: Conduct OA -KC-46A: Conduct IOT&E -MQ-9 Reaper Hunter-Killer Block 50 Ground Control Station (MQ-9 Block 50 GCS): Conduct OA -Presidential Aircraft Recapitalization (PAR): Plan for OA2 -RQ-4B Global Hawk Block 30 Multi-Spectral Intelligence (MSI): Plan for IOT&E -UH-1N Replacement: Plan for OA -Conduct other planning and operational testing for new air system programs as the requirement becomes known to AFOTEC ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Projected test requirements based on available Program Office test schedules are currently less than FY18.			
Title: Space Systems OT&E ***Description:*** Plan, execute and report OT&E for Space Systems	2.447	3.090	1.470

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605712F / *Initial Operational Test & Evaluation*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2018 Plans: -Advanced Extremely High Frequency Satellite Communications (Advanced EHF): Conduct early influence -Airborne Launch Control System Replacement (ALCS-R): Conduct early influence -Enhanced Polar System (EPS): Conduct MOT&E -Evolved Strategic SATCOM (ESS): Conduct early influence -Global Broadcast Service (GBS): Conduct early influence -Global Positioning System Block III (GPS III): Plan for OUE -Military GPS User Equipment (GPS MGUE): Plan for OA -Global Positioning System III Contingency Operations (GPS III COps): Plan for OUE -Global Positioning System Military-Code Early Use (GPS MCEU): Conduct early influence -GPS Next Generation Control Segment (GPS OCX): Conduct early involvement -Inter-Continental Ballistic Missile Fuze (ICBM FUZE): Plan for OA -Integrated Strategic Planning and Analysis Network Increment 4 (ISPAN Inc 4): Conduct IOT&E -Integrated Strategic Planning and Analysis Network Increment 5 (ISPAN Inc 5): Conduct early involvement -Joint Space Operations Center (JSpOC) Mission System (JMS): Conduct OUE and IOT&E -Long-Range Discrimination Radar (LRDR): Conduct early influence -Protected Tactical Enterprise Services (PTES): Conduct early influence -Protected Tactical SATCOM (PTS): Conduct early influence -Space Based Infrared System (SBIRS): Plan for IOT&E -Space Based Infrared System Follow-On (SBIRS FO): Conduct early influence -Space Based Space Surveillance Follow-On (SBSS FO): Conduct EOA -Space Fence: Plan for IOT&E -Weather System Follow-On Microwave (WSF-M): Plan for EOA -Conduct other planning and operational testing for new space system programs as the requirement becomes known to AFOTEC			
FY 2019 Plans: -Advanced Extremely High Frequency Satellite Communications (Advanced EHF): Conduct early influence -Airborne Launch Control System Replacement (ALCS-R): Plan for EOA -Evolved Strategic SATCOM (ESS): Conduct early influence -Global Broadcast Service (GBS): Plan for FOT&E -Global Positioning System Block III (GPS III): Plan for OUE -Military GPS User Equipment (GPS MGUE): Complete OA -Global Positioning System III Contingency Operations (GPS III COps): Conduct OUE -Global Positioning System Military-Code Early Use (GPS MCEU): Plan for OUE			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605712F / *Initial Operational Test & Evaluation*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
-GPS Next Generation Control Segment (GPS OCX): Plan for OA -Inter-Continental Ballistic Missile Fuze (ICBM FUZE): Conduct OA -Integrated Strategic Planning and Analysis Network Increment 5 (ISPAN Inc 5): Conduct early influence -Long-Range Discrimination Radar (LRDR): Plan for OA -Protected Tactical Enterprise Services (PTES): Plan for EOA -Protected Tactical SATCOM (PTS): Conduct early influence -Space Based Infrared System (SBIRS): Conduct IOT&E -Space Based Infrared System Follow-On (SBIRS FO): Conduct early influence -Space Based Space Surveillance Follow-On (SBSS FO): Conduct OA -Space Fence: Conduct IOT&E -Weather System Follow-On Microwave (WSF-M): Conduct EOA -Conduct other planning and operational testing for new space system programs as the requirement becomes known to AFOTEC ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Projected test requirements based on available Program Office test schedules are currently less than FY18.			
Title: Weapons Systems OT&E ***Description:*** Plan, execute and report OT&E for Weapons Systems ***FY 2018 Plans:*** -AIM-120C Advanced Electronic Protection Improvement Program (AIM-120C Advanced EPIP): Conduct MOT&E 2 -AIM-120D System Improvement Program 3 (AIM-120D SIP3): Conduct early influence -AIM-9X Block II 9.4xx (AIM-9X Blk II 9.4xx): Plan for FOT&E -B-61 Life Extension Program (B-61 LEP): Conduct OA -Electronic Bomb Fuze FMU-139D/B (FMU-139D/B): Plan for OUE -Offensive Anti-Surface Warfare/Increment I (OASuW Inc I): Complete OUE -Small Diameter Bomb II (SDB II): Conduct MOT&E -Conduct other planning and operational testing for new weapons system programs as the requirement becomes known to AFOTEC ***FY 2019 Plans:*** -AIM-120D System Improvement Program 3 (AIM-120D SIP3): Conduct early influence -AIM-9X Block II 9.4xx (AIM-9X Blk II 9.4xx): Plan for FOT&E -B-61 Life Extension Program (B-61 LEP): Conduct IOT&E -Electronic Bomb Fuze FMU-139D/B (FMU-139D/B): Conduct OUE	2.709	5.531	3.237

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605712F / *Initial Operational Test & Evaluation*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
-Small Diameter Bomb II (SDB II): Complete MOT&E -Conduct other planning and operational testing for new weapons system programs as the requirement becomes known to AFOTEC ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Projected test requirements based on available Program Office test schedules are currently less than FY18.			
Title: C4ISR Systems OT&E ***Description:*** Plan, execute and report OT&E for C4ISR Systems ***FY 2018 Plans:*** -Air Force Integrated Personnel and Pay System (AF-IPPS): Conduct early influence -B-2 EHF Satcom: Conduct early influence -Command and Control Air Operations Suite/Command and Control Information Services (C2AOS-C2IS): Plan for OA & MOT&E -Distributed Common Ground System (DCGS): Conduct OUE 1, 2 & 3 -Enclave Control Node (ECN): Conduct OUE 1 -Family of Advanced Beyond Line Of Sight Terminals (FAB T): Plan for IOT&E -Nuclear Planning and Execution System Recapitalization (NPES): Conduct early influence -Presidential and National Voice Conferencing (PNVC): Conduct EOA -RQ-4 Global Hawk Block 30/Airborne Signals Intelligence Payload (ASIP): Plan for FOT&E -Three Dimensional Expeditionary Long Range Radar (3DELRR): Conduct early influence -Wide Area Surveillance (WAS): Conduct IOT&E -Conduct other planning and operational testing for new C4ISR programs as the requirement becomes known to AFOTEC ***FY 2019 Plans:*** -Air Force Integrated Personnel and Pay System (AF-IPPS): Plan for IOT&E -B-2 EHF Satcom: Plan for OA -Command and Control Air Operations Suite/Command and Control Information Services (C2AOS-C2IS): Conduct OA & MOT&E -Distributed Common Ground System (DCGS): Conduct OUE 4 -Enclave Control Node (ECN): Conduct OUE 2 -Family of Advanced Beyond Line Of Sight Terminals (FAB T): Conduct IOT&E -Nuclear Planning and Execution System Recapitalization (NPES): Plan for OUE -Presidential and National Voice Conferencing (PNVC): Plan for MOT&E -RQ-4 Global Hawk Block 30/Airborne Signals Intelligence Payload (ASIP): Conduct FOT&E -Three Dimensional Expeditionary Long Range Radar (3DELRR): Plan for OA	1.864	1.042	3.254

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605712F / *Initial Operational Test & Evaluation*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
-Wide Area Surveillance (WAS): Conduct FOT&E -Conduct other planning and operational testing for new C4ISR programs as the requirement becomes known to AFOTEC ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Projected test requirements based on available Program Office test schedules are currently more than FY18.			
Title: Combat Support OT&E ***Description:*** Plan, execute and report OT&E for Combat Support OT&E ***FY 2018 Plans:*** -Deliberate and Crisis Action Planning and Execution Segments Increment 2B (DCAPES Inc 2B): Conduct OUE 1 -Integrated Aircrew Ensemble (IAE): Conduct IOT&E -Joint Mission Planning System B-2 (JMPS B-2): Conduct IOT&E -Joint Mission Planning System RQ-4 Mission Planning Element (JMPS RQ-4 MPE): Conduct IOT&E -Maintenance, Repair, and Overhaul Initiative (MROi): Conduct early influence -Mission Planning System Increment 5 (MPS Inc 5): Complete IOT&E 1, 2 & 3 -Modular Handgun System (MHS): Conduct MOT&E 2 -Conduct other planning and operational testing for new combat support programs as the requirement becomes known to AFOTEC ***FY 2019 Plans:*** -Deliberate and Crisis Action Planning and Execution Segments Increment 2B (DCAPES Inc 2B): Conduct OUE 2 -Integrated Aircrew Ensemble (IAE): Complete IOT&E -Maintenance, Repair, and Overhaul Initiative (MROi): Plan for IOT&E -Conduct other planning and operational testing for new combat support programs as the requirement becomes known to AFOTEC ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Projected test requirements based on available Program Office test schedules are currently less than FY18.	0.567	0.445	0.035
Title: NDAA 1647 Cyber Testing ***Description:*** Plan and execute Congressional, DoD and Air Force mandated cyber security testing on AFOTEC programs for NDAA 1647 effort. ***FY 2018 Plans:***	0.000	0.000	5.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605712F / *Initial Operational Test & Evaluation*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Not applicable for FY18. Funds being applied in FY19 ***FY 2019 Plans:*** Execute cyber testing as referenced in NDAA 1647 initiative. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding is being added for FY19 only.			
Accomplishments/Planned Programs Subtotals	13.829	15.523	18.043

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605807F / *Test and Evaluation Support*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	676.417	678.289	692.784	0.000	692.784	719.900	726.015	760.319	737.765	Continuing	Continuing
6606TG: *704th Test Group*	-	36.680	37.485	37.558	0.000	37.558	38.139	38.865	39.679	40.469	Continuing	Continuing
6606TS: *Test and Evaluation Support*	-	639.737	640.804	655.226	0.000	655.226	681.761	687.150	720.640	697.296	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project provides resources to operate the Air Force Test Center (AFTC) test activities which are included in the Department of Defense (DoD) Major Range and Test Facility Base (MRTFB). Test facilities/capabilities operated through this program include wind tunnels, rocket and jet engine test cells, hypersonic and subsonic testing, modeling and simulation, technology, limited space environmental simulation chambers, armament test ranges, hardware-in-the-loop test facilities, climatic test facilities, avionics test facilities, aircraft testbeds, dry lakebed landing sites, instrumented test ranges, and test aircraft maintenance, as well as USAF Test Pilot School.

Test and Evaluation (T&E) Support funds institutional test infrastructure activities including: Command and supervisory staffs; supply stocks; maintenance, repair, and replacement of worn or obsolete test equipment and facilities; test infrastructure for data collection, transmission, reduction, and analysis; civilian salaries; temporary duty travel; range operations and material support contract costs for hardware and software engineering and maintenance; and minor improvement and modernization projects. It also funds institutional test aircraft depot level maintenance such as: Programmed Depot Maintenance (PDM), the calendar-based cyclic scheduling of aircraft into depots for update/inspection; modifications and any other depot level repairs required by the aircraft System Program Directors (SPD); engine overhauls; depot-provided area assistance; and assorted ground support equipment overhauls.

The AFTCs three test wings are supported by this project: (1) Arnold Engineering and Development Complex (AEDC), located at Arnold Air Force Base (AFB), TN, whose institutional test infrastructure supports operations of the largest complex of ground test facilities in the world (includes transonic, supersonic, and hypersonic wind tunnels;rocket motor and turbine engine test cells; space environmental test chambers, hyperballistic ranges; and other specialized facilities). Included are operations at the National Full-Scale Aerodynamic Complex (NFAC) located at NASA's AMES Research Center, California as well as operations at Tunnel 9 located at White Oak, Maryland. (2) 412 Test Wing (TW), located at Edwards AFB, CA, whose institutional test infrastructure supports weapons system development and operational test and evaluation for aircraft, aircraft subsystems and aircraft weapon systems, aerospace research vehicles, unmanned miniature vehicles, cruise missiles, parachute delivery/recovery systems, cargo handling systems, communications, information operations, and Electronic Warfare (EW) systems for DoD and allied forces. The 412TW mission includes the USAF Test Pilot School. (3) 96 TW, located at Eglin AFB, FL, is a joint test and training complex of 724 square miles of land area, and approximately 123,000 square miles of water area. 96TW provides the institutional test infrastructure required to conduct developmental and operational test and evaluation of non-nuclear air armaments (including aircraft guns, ammunition, and air-to-surface and air-to-air guided munitions); Command, Control, Communications, Computers and Intelligence/Surveillance/Reconnaissance (C4ISR) systems; target acquisition and weapon delivery systems; the McKinley Climatic Lab, multi-service climatic simulation capability, located at Eglin AFB, FL; and special operations aircraft systems. 96TW provides a scientific test process that supports the development, production, sustainment, and enhancement of munitions systems that support tri-service digital weapons development. T&E support services contracts are awarded on the basis of full and open competition.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605807F / *Test and Evaluation Support*

This program is in Budget Activity 6. RDT&E Management Support, because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	680.217	678.289	686.379	0.000	686.379
Current President's Budget	676.417	678.289	692.784	0.000	692.784
Total Adjustments	-3.800	0.000	6.405	0.000	6.405
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-3.800	0.000	6.405	0.000	6.405

Change Summary Explanation

FY17: $3.800 million decrease for cyber test infrastructure associated with the hardware-in-the-loop capability (FY17 Request for Additional Appropriations (RAA) not enacted as part of the FY17 PB).

FY19 $6.405 million increase due to: $0.050 million increase in Joint Simulation Environment (JSE) funding and $4.723 million and $5.000 million increases due to restoration of test capacity for B-1 and F-15E, respectively; $0.594 million decrease for civilian pay adjustments and $2.774 million decrease for inflation adjustments.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0605807F / *Test and Evaluation Support*	**Project (Number/Name)** 6606TG / *704th Test Group*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
6606TG: *704th Test Group*	-	36.680	37.485	37.558	0.000	37.558	38.139	38.865	39.679	40.469	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project infrastructure support is provided for the unique capabilities of the 704th Test Group (TG) facilities: Central Inertial and Global Positioning System (GPS) Test Facility (CIGTF/746th Test Squadron), the Holloman High Speed Test Track (HHSTT/846th Test Squadron) and the National Radar Cross Section (RCS) Test Facility (NRTF/704 TG Det 2), the 586th Flight Test Squadron including Detachment 1 (Det 1), 704 TG Operating Location (704 TG OL-AA) at Kirtland AFB, and 704 TG Operation Location (704 TG OL-AC) at Wright-Patterson AFB.

CIGTF provides independent test and evaluation of inertial, Global Positioning System, and integrated systems used for aircraft navigation and missile guidance systems, including vulnerability to electronic interference.

HHSTT capabilities include full-scale testing in flight representative environments, realistic live-fire simulations, test item and target fragment recovery, precision trajectory analysis and high speed photography.

NRTF provides radar cross section (RCS) monostatic and bistatic amplitude and phase measurements, antenna pattern measurements, glint and near field measurements for low observable targets.

The 586th Flight Test Squadron executes flight test and test support for advanced avionics and weapons development of joint, international and commercial test programs. Det 1 provides the liaison function for coordinating and scheduling all US Air Force test and training operations at White Sands Missile Range (WSMR). OL-AA provides test support for the Air Force Research Lab (AFRL) Directed Energy Division.

The 704 TG OL-AC includes the Landing Gear Test Facility (LGTF) with capabilities such as variable and fixed inertia dynamometers, compression/tension load applicators, 4 drop towers, a burst pit and a dynamic load simulator. The 704 TG OL-AC also includes the Air Vehicle Survivability Office that provides support for Air Force aircraft acquisition programs. The 704th TG support services contracts are awarded on the basis of full and open competition.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: 704th Test Group	36.680	37.485	37.558
Description: Provide infrastructure at the 704th Test Group (TG) to support testing of DoD, other Government Agencies, foreign military sales, and commercial weapon systems.			
FY 2018 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0605807F / *Test and Evaluation Support*	**Project (Number/Name)** 6606TG / *704th Test Group*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Total consists of utilities, contractor services, and civilian pay. ***FY 2019 Plans:*** Total consists of utilities, contractor services, and civilian pay. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $0.073 million increase due to inflation adjustment (increase), civ pay raise assumptions (decrease), and military to civilian conversion (decrease).			
Accomplishments/Planned Programs Subtotals	36.680	37.485	37.558

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600 / 6					R-1 Program Element (Number/Name) PE 0605807F / *Test and Evaluation Support*				Project (Number/Name) 6606TS / *Test and Evaluation Support*			
COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
6606TS: *Test and Evaluation Support*	-	639.737	640.804	655.226	0.000	655.226	681.761	687.150	720.640	697.296	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project provides resources to operate the Air Force Test Center (AFTC) test activities which are included in the Department of Defense (DoD) Major Range and Test Facility Base (MRTFB). Test facilities/capabilities operated through this program include wind tunnels, rocket and jet engine test cells, hypersonic and subsonic testing, modeling and simulation, technology, limited space environmental simulation chambers, armament test ranges, hardware-in-the-loop test facilities, climatic test facilities, avionics test facilities, aircraft testbeds, dry lakebed landing sites, instrumented test ranges, and test aircraft maintenance, as well as USAF Test Pilot School.

Test and Evaluation (T&E) Support funds institutional test infrastructure activities including: Command and supervisory staffs; supply stocks; maintenance, repair, and replacement of worn or obsolete test equipment and facilities; test infrastructure for data collection, transmission, reduction, and analysis; civilian salaries; temporary duty travel; range operations and material support contract costs for hardware and software engineering and maintenance; and minor improvement and modernization projects. It also funds institutional test aircraft depot level maintenance such as: Programmed Depot Maintenance (PDM), the calendar-based cyclic scheduling of aircraft into depots for update/inspection; modifications and any other depot level repairs required by the aircraft System Program Directors (SPD); engine overhauls; depot-provided area assistance; and assorted ground support equipment overhauls.

The AFTCs three test wings are supported by this project: (1) Arnold Engineering and Development Complex (AEDC), located at Arnold Air Force Base (AFB), TN, whose institutional test infrastructure supports operations of the largest complex of ground test facilities in the world (includes transonic, supersonic, and hypersonic wind tunnels;rocket motor and turbine engine test cells; space environmental test chambers, hyperballistic ranges; and other specialized facilities). Included are operations at the National Full-Scale Aerodynamic Complex (NFAC) located at NASA's AMES Research Center, California as well as operations at Tunnel 9 located at White Oak, Maryland.(2) 412 Test Wing (TW), located at Edwards AFB, CA, whose institutional test infrastructure supports weapons system development and operational test and evaluation for aircraft, aircraft subsystems and aircraft weapon systems, aerospace research vehicles, unmanned miniature vehicles, cruise missiles, parachute delivery/recovery systems, cargo handling systems, communications, information operations, and Electronic Warfare (EW) systems for DoD and allied forces. The 412TW mission includes the USAF Test Pilot School. (3) 96 TW, located at Eglin AFB, FL, is a joint test and training complex of 724 square miles of land area, and approximately 123,000 square miles of water area. 96TW provides the institutional test infrastructure required to conduct developmental and operational test and evaluation of non-nuclear air armaments (including aircraft guns, ammunition, and air-to-surface and air-to-air guided munitions); Command, Control, Communications, Computers and Intelligence/Surveillance/Reconnaissance (C4ISR) systems; target acquisition and weapon delivery systems; the McKinley Climatic Lab, multi-service climatic simulation capability, located at Eglin AFB, FL; and special operations aircraft systems. 96TW provides a scientific test process that supports the development, production, sustainment, and enhancement of munitions systems that support tri-service digital weapons development. T&E support services contracts are awarded on the basis of full and open competition.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0605807F / *Test and Evaluation Support*	**Project (Number/Name)** 6606TS / *Test and Evaluation Support*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: AEDC, 412TW, 96TW	639.737	640.804	655.226
Description: Provide infrastructure to support testing at Arnold Engineering and Development Complex (AEDC), the 412TW and USAF Test Pilot School at Edwards AFB, and the 96TW at Eglin AFB. ***FY 2018 Plans:*** Total consists of utilities, contractor services, civilian pay, and the test and evaluation flying hour program. ***FY 2019 Plans:*** Total consists of utilities, contractor services, civilian pay, and the test and evaluation flying hour program. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $14.422 million increase from FY 2018 to FY 2019 due to civilian pay reprice, inflation adjustment, restoring B-1 test capacity to 50 percent, starting Joint Simulation Environment (JSE), F-15 DT&E capability increase, and fuel reprice.			
Accomplishments/Planned Programs Subtotals	639.737	640.804	655.226

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605826F / *Acq Workforce- Global Power*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	219.809	233.924	0.000	233.924	228.689	234.310	240.107	245.111	Continuing	Continuing
664127: *Acq Workforce - Direct*	-	0.000	219.809	233.924	0.000	233.924	228.689	234.310	240.107	245.111	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element is one of eight direct funded AFLCMC acquisition workforce program elements. The other seven AFLCMC acquisition workforce civilian pay program elements are 0605827F Global Vigilance and Combat Systems, 0605828F Global Reach, 0605829F Global Cyber, Network, and Business Systems, 0605830F Global Battle Management, 0605831F Capability Integration, 0605832F Advanced Program Technology, and 0605898F Management Headquarters.

The Air Force Life Cycle Management Center (AFLCMC) equips U.S. and allied forces with operational weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. This program element supports both civilian pay and non-pay support requirements.

This program element is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test, and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test, and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	219.809	217.853	0.000	217.853
Current President's Budget	0.000	219.809	233.924	0.000	233.924
Total Adjustments	0.000	0.000	16.071	0.000	16.071
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	16.071	0.000	16.071

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605826F / *Acq Workforce- Global Power*

Change Summary Explanation

In FY19, the additional $16.071M supports the realignment of authorizations per mission requirements, pricing adjustments to account for updated actual work year costs and OSD escalation rates.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605827F / *Acq Workforce- Global Vig & Combat Sys*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	223.179	263.488	0.000	263.488	275.405	281.564	288.304	294.219	Continuing	Continuing
664127: *Acq Workforce - Direct*	-	0.000	223.179	263.488	0.000	263.488	275.405	281.564	288.304	294.219	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element is one of eight direct funded AFLCMC acquisition workforce program elements. The other seven acquisition workforce civilian pay program elements are 0605826F Global Power, 0605828F Global Reach, 0605829F Global Cyber, Network, and Business Systems, 0605830F Global Battle Management, 0605831F Capability Integration, 0605832F Advanced Program Technology, and 0605898F Management Headquarters.

The Air Force Life Cycle Management Center (AFLCMC) equips U.S. and allied forces with operational weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. These program elements support both civilian pay and non-pay support requirements.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	223.179	222.317	0.000	222.317
Current President's Budget	0.000	223.179	263.488	0.000	263.488
Total Adjustments	0.000	0.000	41.171	0.000	41.171
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	41.171	0.000	41.171

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605827F / *Acq Workforce- Global Vig & Combat Sys*

Change Summary Explanation

In FY19, the additional $41.171M supports the realignment of authorizations per mission requirements, pricing adjustments to account for updated actual work year costs and OSD escalation rates.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605828F / *Acq Workforce- Global Reach*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	138.556	153.591	0.000	153.591	165.310	169.285	173.383	176.942	Continuing	Continuing
664127: *Acq Workforce - Direct*	-	0.000	138.556	153.591	0.000	153.591	165.310	169.285	173.383	176.942	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element is one of eight direct funded AFLCMC acquisition workforce program elements. The other seven acquisition workforce civilian pay program elements are 0605826F Global Power, 0605827 Global Vigilance and Combat Systems, 0605829F Global Cyber, Network, and Business Systems, 0605830F Global Battle Management, 0605831F Capability Integration, 0605832F Advanced Program Technology, and 0605898F Management Headquarters.

The Air Force Life Cycle Management Center (AFLCMC) equips U.S. and allied forces with operational weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. These program elements support both civilian pay and non-pay support requirements.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	138.556	144.632	0.000	144.632
Current President's Budget	0.000	138.556	153.591	0.000	153.591
Total Adjustments	0.000	0.000	8.959	0.000	8.959
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	8.959	0.000	8.959

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605828F / *Acq Workforce- Global Reach*

Change Summary Explanation

In FY19, the additional $8.959M supports the realignment of authorizations per mission requirements, pricing adjustments to account for updated actual work year costs and OSD escalation rates.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605829F / *Acq Workforce- Cyber, Network, & Bus Sys*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	221.393	232.315	0.000	232.315	235.178	244.125	255.878	261.184	Continuing	Continuing
664127: *Acq Workforce - Direct*	-	0.000	221.393	232.315	0.000	232.315	235.178	244.125	255.878	261.184	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

ions and Maintenance appropriation to the Research Development Test and Evaluation appropriation. This program element is one of eight direct funded AFLCMC acquisition workforce program elements. The other seven acquisition workforce civilian pay program elements are 0605826F Global Power, 0605827 Global Vigilance and Combat Systems, 0605828F Global Reach, 0605830F Global Battle Management, 0605831F Capability Integration, 0605832F Advanced Program Technology, and 0605898F Management Headquarters.

The Air Force Life Cycle Management Center (AFLCMC) equips U.S. and allied forces with operational weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. These program elements support both civilian pay and non-pay support requirements.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	221.393	221.944	0.000	221.944
Current President's Budget	0.000	221.393	232.315	0.000	232.315
Total Adjustments	0.000	0.000	10.371	0.000	10.371
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	10.371	0.000	10.371

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605829F / *Acq Workforce- Cyber, Network, & Bus Sys*

Change Summary Explanation

In FY19, the additional $10.371M supports the realignment of authorizations per mission requirements, pricing adjustments to account for updated actual work year costs and OSD escalation rates.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605830F / *Acq Workforce- Global Battle Mgmt*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	152.577	169.868	0.000	169.868	154.608	162.149	166.117	169.548	Continuing	Continuing
664127: *Acq Workforce - Direct*	-	0.000	152.577	169.868	0.000	169.868	154.608	162.149	166.117	169.548	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element is one of eight direct funded AFLCMC acquisition workforce program elements. The other seven acquisition workforce civilian pay program elements are 0605826F Global Power, 0605827 Global Vigilance and Combat Systems, 0605828F Global Reach, 0605829F Global Cyber, Network, and Business Systems, 0605831F Capability Integration, 0605832F Advanced Program Technology, and 0605898F Management Headquarters.

The Air Force Life Cycle Management Center (AFLCMC) equips U.S. and allied forces with operational weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. These program elements support both civilian pay and non-pay support requirements.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	152.577	145.671	0.000	145.671
Current President's Budget	0.000	152.577	169.868	0.000	169.868
Total Adjustments	0.000	0.000	24.197	0.000	24.197
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	24.197	0.000	24.197

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605830F / *Acq Workforce- Global Battle Mgmt*

Change Summary Explanation

In FY19, the additional $24.197M supports the realignment of authorizations per mission requirements, pricing adjustments to account for updated actual work year costs and OSD escalation rates.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605831F / *Acq Workforce- Capability Integration*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	196.561	226.219	0.000	226.219	208.122	213.035	218.216	222.723	Continuing	Continuing
664127: *Acq Workforce - Direct*	-	0.000	196.561	226.219	0.000	226.219	208.122	213.035	218.216	222.723	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element is one of eight direct funded AFLCMC acquisition workforce program elements. The other seven acquisition workforce civilian pay program elements are 0605826F Global Power, 0605827 Global Vigilance and Combat Systems, 0605828F Global Reach, 0605829F Global Cyber, Network, and Business Systems, 0605830F Global Battle Management, 0605832F Advanced Program Technology, and 0605898F Management Headquarters.

The Air Force Life Cycle Management Center (AFLCMC) equips U.S. and allied forces with operational weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. These program elements support both civilian pay and non-pay support requirements.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	196.561	195.221	0.000	195.221
Current President's Budget	0.000	196.561	226.219	0.000	226.219
Total Adjustments	0.000	0.000	30.998	0.000	30.998
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	30.998	0.000	30.998

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605831F / *Acq Workforce- Capability Integration*

Change Summary Explanation

In FY19, the additional $30.998M supports the realignment of authorizations per mission requirements, pricing adjustments to account for updated actual work year costs and OSD escalation rates.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605832F / *Acq Workforce- Advanced Prgm Technology*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	28.322	38.400	0.000	38.400	37.697	38.595	39.515	40.336	Continuing	Continuing
664127: *Acq Workforce - Direct*	-	0.000	28.322	38.400	0.000	38.400	37.697	38.595	39.515	40.336	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element is one of eight direct funded AFLCMC acquisition workforce program elements. The other seven acquisition workforce civilian pay program elements are 0605826F Global Power, 0605827F Global Vigilance and Combat Systems, 0605828F Global Reach, 0605829F Global Cyber, Network, and Business Systems, 0605830F Global Battle Management, 0605831F Capability Integration, and 0605898F Management Headquarters.

The Air Force Life Cycle Management Center (AFLCMC) equips U.S. and allied forces with operational weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. These program elements support both civilian pay and non-pay support requirements.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	28.322	28.060	0.000	28.060
Current President's Budget	0.000	28.322	38.400	0.000	38.400
Total Adjustments	0.000	0.000	10.340	0.000	10.340
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	10.340	0.000	10.340

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605832F / *Acq Workforce- Advanced Prgm Technology*

Change Summary Explanation

In FY19, the additional $10.340M supports the realignment of authorizations per mission requirements, pricing adjustments to account for updated actual work year costs and OSD escalation rates.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605833F / *Acq Workforce- Nuclear Systems*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	126.611	125.761	0.000	125.761	135.548	147.751	160.198	164.037	Continuing	Continuing
664127: *ACQ Workforce - Direct*	-	0.000	126.611	125.761	0.000	125.761	135.548	147.751	160.198	164.037	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element directly funds the Air Force Nuclear Weapons Center acquisition workforce.

The AFNWC equips U.S. forces with operational Nuclear Systems weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee Nuclear Systems acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. These program elements support both civilian pay and non-pay support requirements.

This program element is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test, and evaluation.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	126.611	129.846	0.000	129.846
Current President's Budget	0.000	126.611	125.761	0.000	125.761
Total Adjustments	0.000	0.000	-4.085	0.000	-4.085
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-4.085	0.000	-4.085

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605833F / *Acq Workforce- Nuclear Systems*

Change Summary Explanation

In FY19, $2.674M was realigned to higher Air Force priorities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605860F / *Rocket Systems Launch Program (SPACE)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	10.899	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
661023: *Rocket System Launch Program (RSLP)*	-	10.899	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0605860F, Rocket Systems Launch Program efforts were transferred to PE 1206860F, Rocket Systems Launch Program, due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206860F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	11.198	0.000	0.000	0.000	0.000
Current President's Budget	10.899	0.000	0.000	0.000	0.000
Total Adjustments	-0.299	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.299	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: RSLP ***Description:*** In FY2018, PE 0605860F, Rocket Systems Launch Program efforts were transferred to PE 1206860F, Rocket Systems Launch Program, due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206860F.	10.899	-	-
Accomplishments/Planned Programs Subtotals	10.899	-	-

D. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605860F / *Rocket Systems Launch Program (SPACE)*

D. Other Program Funding Summary ($ in Millions)

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605864F / *Space Test Program (STP)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	40.507	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
662617: *Free-Flyer Spacecraft Missions*	-	40.507	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0605864F, Space Test Program (STP) efforts were transferred to PE 1206864F, Space Test Program (STP) due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206864F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	27.070	0.000	0.000	0.000	0.000
Current President's Budget	40.507	0.000	0.000	0.000	0.000
Total Adjustments	13.437	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	15.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.379	0.000			
• SBIR/STTR Transfer	-1.184	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: STP ***Description:*** In FY2018, PE 0605864F, Space Test Program (STP) efforts were transferred to PE 1206864F, Space Test Program (STP) due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206864F.	40.507	-	-
Accomplishments/Planned Programs Subtotals	40.507	-	-

D. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605864F / *Space Test Program (STP)*

D. Other Program Funding Summary ($ in Millions)

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605898F / *Management HQ - R&D*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	9.154	10.642	0.000	10.642	10.427	10.677	10.937	11.160	Continuing	Continuing
6606TS: *Test and Evaluation Support*	-	0.000	3.644	4.655	0.000	4.655	3.735	3.827	3.923	4.005	Continuing	Continuing
664127: *ACQ Workforce - Direct*	-	0.000	5.510	5.987	0.000	5.987	6.692	6.850	7.014	7.155	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Management Headquarters program element 0605898F includes management headquarters personnel for Air Force Life Cycle management Center and Air Force Flight Test Center. Air Force Life Cycle Management Center personnel are included in Budget Program Activity Code 664127 and Air Force Fight Test Center personnel are included in Budget Program Activity Code 6606TS.

The Air Force Life Cycle Management Center (AFLCMC) equips U.S. and allied forces with operational weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. This program element supports both civilian pay and non-pay support requirements.

This program element is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test, and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test, and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	9.154	9.168	0.000	9.168
Current President's Budget	0.000	9.154	10.642	0.000	10.642
Total Adjustments	0.000	0.000	1.474	0.000	1.474
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	1.474	0.000	1.474

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605898F / *Management HQ - R&D*

Change Summary Explanation

In FY19, the additional $1.474M supports the realignment of authorizations per mission requirements, pricing adjustments to account for updated actual work year costs and OSD escalation rates.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0605898F / *Management HQ - R&D*	**Project (Number/Name)** 6606TS / *Test and Evaluation Support*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
6606TS: *Test and Evaluation Support*	-	0.000	3.644	4.655	0.000	4.655	3.735	3.827	3.923	4.005	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element includes Air Force Flight Test Center management headquarters personnel to lead, guide and direct the operation of the Air Force Test Center (AFTC) test activities which are included in the Department of Defense (DoD) Major Range and Test Facility Base (MRTFB).

Test and Evaluation (T&E) Support funds institutional test infrastructure activities including: Command and supervisory staffs; supply stocks; maintenance, repair, and replacement of worn or obsolete test equipment and facilities; test infrastructure for data collection, transmission, reduction, and analysis; civilian salaries; temporary duty travel; range operations and material support contract costs for hardware and software engineering and maintenance; and minor improvement and modernization projects. It also funds institutional test aircraft depot level maintenance such as: Programmed Depot Maintenance (PDM), the calendar-based cyclic scheduling of aircraft into depots for update/inspection; modifications and any other depot level repairs required by the aircraft System Program Directors (SPD); engine overhauls; depot-provided area assistance; and assorted ground support equipment overhauls.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Test and Evaluation Support ***Description:*** Air Force Flight Test Center management headquarters personnel. ***FY 2018 Plans:*** Air Force Flight Test Center management headquarters personnel. ***FY 2019 Plans:*** Air Force Flight Test Center management headquarters personnel. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increased resources required for management headquarters personnel.	-	3.644	4.655
Accomplishments/Planned Programs Subtotals	-	3.644	4.655

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0605898F / *Management HQ - R&D*	**Project (Number/Name)** 6606TS / *Test and Evaluation Support*

D. Acquisition Strategy

N/A

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600 / 6					R-1 Program Element (Number/Name) PE 0605898F / *Management HQ - R&D*				Project (Number/Name) 664127 / *ACQ Workforce - Direct*			
COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
664127: *ACQ Workforce - Direct*	-	0.000	5.510	5.987	0.000	5.987	6.692	6.850	7.014	7.155	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Management Headquarters program element 0605898F includes management headquarters personnel for Air Force Life Cycle management Center and Air Force Flight Test Center. Air Force Life Cycle Management Center personnel are included in Budget Program Activity Code 664127 and Air Force Fight Test Center personnel are included in Budget Program Activity Code 6606TS.

The Air Force Life Cycle Management Center (AFLCMC) equips U.S. and allied forces with operational weapon systems in support of military and national security operations. The acquisition and product support workforce provides cutting edge weapon systems, sustainment capabilities, and is charged with providing management, tools, and technical and business capabilities needed to oversee acquisition programs throughout their life cycle. The direct funded acquisition workforce funded in this program element will support all phases of acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel. This program element supports both civilian pay and non-pay support requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Acquisition Workforce	-	5.510	5.987
Description: Life Cycle Management Center management headquarters personnel. ***FY 2018 Plans:*** Life Cycle Management Center management headquarters personnel. ***FY 2019 Plans:*** Life Cycle Management Center management headquarters personnel. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Increased resources required.			
Accomplishments/Planned Programs Subtotals	-	5.510	5.987

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0605898F / *Management HQ - R&D*	**Project (Number/Name)** 664127 / *ACQ Workforce - Direct*

D. Acquisition Strategy

N/A

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605976F / *Facilities Restoration and Modernization - Test and Evaluation Support*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	134.111	135.507	162.216	0.000	162.216	88.445	69.293	70.730	72.019	Continuing	Continuing
6606MC: *Facility Restoration and Modernization - T&E*	-	134.111	135.507	162.216	0.000	162.216	88.445	69.293	70.730	72.019	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Restoration includes repair and replacement work to restore damaged facilities due to accident or failure attributable to inadequate sustainment, excessive age, or other causes. Modernization includes alteration of facilities to implement a new, higher standard (including regulatory changes), to accommodate new functions, or to replace building components that typically last more than 50 years (such as foundations and structural components). Other tasks associated with facilities operations (such as custodial services, grass cutting, and the provision of central utilities) are not included. These restoration/modernization funds support the following Air Force test organizations and their associated test and evaluation facilities, including: remote locations, the 96th Test Wing (TW) at Eglin AFB, FL, Arnold Engineering and Development Complex (AEDC) at Arnold AFB, TN, including AEDC's 704th Test Group (TG) at Holloman AFB, NM, 704 TG Landing Gear Test Facility (LGTF) at Wright-Patterson AFB, OH, AEDC's Hypersonic Wind Tunnel 9 at White Oak, MD, AEDC's National Full-Scale Aerodynamics Complex (NFAC) at Moffett Field, CA, AEDC's McKinley Climatic Lab (MCL) at Eglin AFB, FL, and the 412th TW at Edwards AFB, CA.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	134.111	135.507	125.437	0.000	125.437
Current President's Budget	134.111	135.507	162.216	0.000	162.216
Total Adjustments	0.000	0.000	36.779	0.000	36.779
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	36.779	0.000	36.779

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605976F / *Facilities Restoration and Modernization - Test and Evaluation Support*

Change Summary Explanation

FY19: $36.779 million increase due to $25.000 million increase for restoration and modernization repairs to MCL, $3.000 million increase for the ARC Hypersonics Project, and $10.000 million increase for restoration and modernization repairs to National Full-Scale Aerodynamics Complex (NFAC) due to infrastructure failures, offset by a $1.221 million decrease to inflation adjustment for ongoing Service Life Extension Projects (SLEP).

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Facility restoration and modernization at the 96 TW ***Description:*** Facility restoration and modernization at the 96th TW. ***FY 2018 Plans:*** Projected repairs include fire suppression system and structural repair at the 300' Tower, Hanger 71 switchboard and panel feeds, wash racks, pole barns, electrical feeds and pads at test sites. ***FY 2019 Plans:*** Continue Restoration and Modernization (R&M) efforts across the range complex including storm water drainage, fencing & paving, Heating, Ventilation, and Air Conditioning (HVAC) repair/replacement, water system upgrades and lightning protection. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $2.15 million increase from FY 2018 to FY 2019 due to preventing future capability failures from infrastructure.	11.267	3.047	5.197
Title: Facility restoration and modernization at AEDC ***Description:*** Facility restoration and modernization at AEDC. ***FY 2018 Plans:*** Continue execution of the four AEDC SLEPs initiated in FY 2017 to restore and modernize the Propulsion Wing Tunnel (PWT), Von Karman Facility (VKF), and Engine Test Facility (ETF) infrastructure (Medium Turbine Engine A&B Plant and the Large Turbine Engine C-Plant mechanical systems, control valves, electrical systems, temperature controls and automate the control systems) at Arnold AFB, TN and McKinley Climatic Lab (MCL) at Eglin AFB, FL. Continued design/construction of FY 2017 SLEPs Facilities Acquisitions for Restoration and Modernization (FARM) contracts. Continue award of contracts for additional SLEP Task Orders (TOs) to be executed during FY 2018-19 facilities outages. Complete programmed SLEPs effort at MCL facility at Eglin AFB, FL. Build new munitions operating location for the Holloman High Speed Test Track (HHSTT). Begin to modernize Landing Gear Test Facility (LGTF) utility room. Replace (second of five) LGTF Test Machine servo valves, accumulators, and hydraulic hoses. Refurbish 168i dynamometer and 120 MOD dynamometer south carriage cylinder. Replace second of six hanger doors on the large hanger. Begin refurbishment of National Radar Cross Section (RCS) Test Facility (NRTF) Radar Target Scatter (RATSCAT)	114.823	120.289	130.492

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605976F / *Facilities Restoration and Modernization - Test and Evaluation Support*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Central Measurement System (RCMS). Refurbish NRTF Calibration Pit. Building upgrades for the Central Inertial and Global Positioning System (GPS) Test Facility (CIGTF). Continue planning for HHSTT South 5 thousand foot restoration project. ***FY 2019 Plans:*** Continue execution of the three remaining AEDC SLEPS to restore and modernize the PWT, VKF, & ETF infrastructure. Continued design/construction of FY 2018 SLEP efforts using Facilities Acquisitions for Restoration and Modernization (FARM) and other contracts. Continue award of contracts for additional Service Life Extension Projects (SLEPs) Task Orders (TOs) to be executed during FY 2019-2020 facilities outages. Continue modernization of the Landing Gear Test Facility (LGTF) utility room. Replace (three of five) LGTF Test Machine servo valves, accumulators, and hydraulic hoses. Data acquisition improvements to the LGTF 120 MOD dynamometer operator GUI. Replace the third hanger door on the large hanger. Continue refurbishment of National Radar Cross Section (RCS) Test Facility (NRTF) Advanced Measurement Systems (RAMS) Central Measurement System (RCMS). Continue refurbishment of NRTF Calibration Pit. Continue building renovations for Central Inertial and Global Positioning System (GPS) Test Facility (CIGTF) and Holloman High Speed Test Track (HHSTT). Rainfield repairs at HHSTT. Begin HHSTT South 5 thousand foot restoration project. During FY19, initiate repairs due to infrastructure failures to MCL, ARC Hypersonics Project, and National Full-Scale Aerodynamics Complex (NFAC). ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $10.203 million increase from FY 2018 to FY 2019 due to increased restoration and modernization repairs due to infrastructure failures for MCL and for National Full-Scale Aerodynamics Complex (NFAC), and the ARC Hypersonics Project along with a decrease from FY 2018 to FY 2019 due to partial completion of Service Life Extension Projects (SLEPs) projects at MCL facility at Eglin AFB, FL and at AEDC.			
Title: Facility restoration and modernization at 412 TW ***Description:*** Facility restoration and modernization at the 412 TW. ***FY 2018 Plans:*** Continue effort to restore and modernize Benefield Anechoic Facility (BAF) components. Continue to: modernize anechoic chamber 40 ton hoist to increase capacity above 100 tons, fire pumps, generator, UPS Connectivity for avionics simulators, 400 HZ frequency Converter, and installation of DAC pitfall protection and repairing electrical substation. ***FY 2019 Plans:*** Phase 1 Chamber Deluge System Replacement/Upgrade, Aircraft power upgrade; Phase 2 Shielded 270 VDC and Seal Radio Frequency (RF) Enclosure in DAC bldg. 1030; G-19 Test Equipment Accountability Upgrade bldg. 1030; repair shielded door SEC	8.021	12.171	26.527

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605976F / *Facilities Restoration and Modernization - Test and Evaluation Support*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
RF Chamber for the Benefield Anechoic Chamber, bldg. 1030; bathroom renovations for bldg. 1020; repair/replace water line from bldg. 5780 to bldg. 5790; C-A-N Power upgrade; expand garage bay for bldg. 9509; modify room 136 to hard wall in bldg. 1440. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $14.356 million increase from FY 2018 to FY 2019 due to replacing the Radar Absorbing Material (RAM) in the Benefield Anechoic Facility (BAF) at Edwards AFB.			
Accomplishments/Planned Programs Subtotals	134.111	135.507	162.216

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 PE 0604256F: *Threat Simulator Development*	21.377	35.405	34.256	-	34.256	46.393	42.925	29.444	29.977	Continuing	Continuing
• RDTE 06 PE 0604759F: *Major T&E Investment*	64.538	82.874	91.844	-	91.844	181.663	164.005	142.090	82.003	Continuing	Continuing
• RDTE 06 PE 0605807F: *Test and Evaluation Support*	676.417	678.289	692.784	-	692.784	719.900	726.015	760.319	737.765	Continuing	Continuing
• RDTE 06 PE 0605978F: *Facility Sustainment - T&E Support*	28.091	28.720	28.888	-	28.888	29.424	29.935	30.555	31.112	Continuing	Continuing

Remarks

E. Acquisition Strategy

N/A.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605978F / *Facilities Sustainment - Test and Evaluation Support*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	28.091	28.720	28.888	0.000	28.888	29.424	29.935	30.555	31.112	Continuing	Continuing
6606MR: *Facility Sustainment-T&E Support*	-	28.091	28.720	28.888	0.000	28.888	29.424	29.935	30.555	31.112	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Provides resources for sustainment activities required for an inventory of Air Force Material Command (AFMC) Test and Evaluation (T&E) facilities. Facility sustainment includes regularly scheduled adjustments and inspections, preventative maintenance tasks, and emergency response and service calls for minor repairs. It also includes major repairs or replacement of facility components that are expected to occur periodically. In addition to standard facility sustainment, such as roof replacement, refinishing of wall and floor surfaces, and repairing and replacing of heating and cooling systems, this work includes inspections and repairs of heavy plant machinery in large industrial facilities. This work includes, but is not limited to, inspection and repair of high-power electrical switching gear, hydraulic, lubrication, forced-air and fluid cooling systems, high pressure vessel health monitoring, facility control and remote monitoring systems, liquid oxygen systems, steam systems, test instrumentation, and fire detection and suppression systems. Other tasks associated with facilities operations (such as custodial services, grass cutting, and landscaping, waste disposal, and the provision of central utilities) are not included. These sustainment funds support the following Air Force organizations and their associated test and evaluation facilities, including: remote locations, the 96th Test Wing (TW) at Eglin AFB, FL, Arnold Engineering and Development Complex (AEDC) at Arnold AFB, TN, AEDC's 704th Test Group (TG) at Holloman AFB, NM, AEDC's 704 TG Landing Gear Test Facility (LGTF) at Wright-Patterson AFB, OH, AEDC's Hypersonic Wind Tunnel 9 at White Oak, MD, AEDC's National Full-Scale Aerodynamics Complex (NFAC) at Moffett Field, CA, AEDC's McKinley Climatic Laboratory (MCL) at Eglin AFB, FL and the 412 Test Wing (TW) at Edwards AFB, CA.

This program is in Budget Activity 6, RDT&E Management Support, because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605978F / *Facilities Sustainment - Test and Evaluation Support*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	28.091	28.720	29.105	0.000	29.105
Current President's Budget	28.091	28.720	28.888	0.000	28.888
Total Adjustments	0.000	0.000	-0.217	0.000	-0.217
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.217	0.000	-0.217

Change Summary Explanation

FY19: $.217 million decrease due to inflation adjustment.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Facility sustainment at the 96 TW. ***Description:*** Facility sustainment at the 96 TW. ***FY 2018 Plans:*** Continue to work through several hundred Direct Scheduled Work Orders (DSWs) within the test infrastructure. ***FY 2019 Plans:*** Continue to work through several hundred Direct Scheduled Work Orders (DSWs) within the test infrastructure. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $0.260 million increase from FY 2018 to FY 2019 due to increase in maintenance cost projections due to aging facilities.	1.311	0.791	1.051
Title: Facility sustainment at the AEDC. ***Description:*** Facility sustainment at the AEDC. ***FY 2018 Plans:*** Continue to perform calendar based scheduled preventative maintenance on Engine Test Facility Plant and associated engine test cells, Propulsion Wind Tunnel Plant and associated wind tunnels, Von Karman Facility (VKF) Plant Core and associated test cells, arc heaters, rocket test facility, space chambers, and hypersonic engine test facilities, along with associated infrastructure	24.330	25.513	25.170

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605978F / *Facilities Sustainment - Test and Evaluation Support*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
that supports all test operations. Sustainment projects include painting buildings, carpet replacement, heating, ventilation, air conditioning (HVAC) repairs and roof repairs throughout the 704 Test Group (TG). ***FY 2019 Plans:*** Continue to perform calendar based scheduled preventative maintenance on Engine Test Facility Plant and associated engine test cells, Propulsion Wind Tunnel Plant and associated wind tunnels, Von Karman Facility (VKF) Plant Core and associated test cells, arc heaters, rocket test facility, space chambers, and hypersonic engine test facilities, along with associated infrastructure that supports all test operations. Sustainment project includes painting buildings, carpet replacement, heating, ventilation, air conditioning (HVAC) repairs and roof repairs throughout the 704 TG. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $0.343 million decrease from FY 2018 to FY 2019 due to previous PE 0605978F expenditures for preventative maintenance to aging facilities.			
Title: Facility sustainment at the 412 TW. ***Description:*** Facility sustainment at the 412 TW. ***FY 2018 Plans:*** Continue sustainment of test unique infrastructure in 412 TW Electronic Warfare, Range, and other T&E facilities located at Edwards AFB, CA. ***FY 2019 Plans:*** Continue sustainment of test unique infrastructure in 412 TW Electronic Warfare, Range, and other T&E facilities located at Edwards AFB, CA. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** $0.251 million increase from FY 2018 to FY 2019 due to increase in maintenance cost projections due to aging facilities.	2.450	2.416	2.667
Accomplishments/Planned Programs Subtotals	28.091	28.720	28.888

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 PE 0604256F: *Threat Simulator Development*	21.377	35.405	34.256	-	34.256	46.393	42.925	29.444	29.977	Continuing	Continuing
• RDTE 06 PE 0604759F: *Major T&E Investment*	64.538	82.874	91.844	-	91.844	181.663	164.005	142.090	82.003	Continuing	Continuing

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0605978F / *Facilities Sustainment - Test and Evaluation Support*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• RDTE 06 PE 0605807F: *Test & Evaluation Support*	676.417	678.289	692.784	-	692.784	719.900	726.015	760.319	737.765	Continuing	Continuing
• RDTE 06 PE 0605976F: *Facility Restoration and Modernization-T&E*	134.111	135.507	162.216	-	162.216	88.445	69.293	70.730	72.019	Continuing	Continuing

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606017F / *Requirements Analysis and Maturation*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	45.134	35.453	35.285	0.000	35.285	59.433	64.395	58.828	35.476	Continuing	Continuing
666157: *Development Planning*	-	21.011	12.946	12.007	0.000	12.007	12.251	12.494	12.753	12.984	Continuing	Continuing
666158: *INTEGRATED SIMULATION AND ANALYSIS*	-	24.123	22.507	23.278	0.000	23.278	47.182	51.901	46.075	22.492	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Requirements Analysis and Maturation (RAM) program funds development planning (DP) to include early systems engineering and integrated simulation and analysis. These activities include requirements analysis, capability decomposition and trade space characterization, concept development (system of systems, air, space, and cyber), cost analysis, modeling and simulation of representative or prototype systems, and costs associated with these activities to include analytical tools and travel. Outcomes of these activities are fiscally and technologically informed requirements, mature concepts that are technically feasible, and areas for science and technology (S&T) investment to reduce technology risks. These activities provide the analytic basis for cost and capability trades driving non-materiel solutions as well as weapon systems requirements, acquisition milestones, decision points, and phases. A number of Department of Defense (DoD), Government Accountability Office (GAO), and independent studies point to a need for more disciplined, early systems engineering and pre-systems acquisition planning and analysis to produce decision quality acquisition information that previously did not surface until after the initiation of a program. Early-phase systems engineering and technical planning activities funded by this program provide the foundation for informed investment decisions leading to successful acquisition programs. DP efforts have been coordinated with the Air Force Capability Development Council to ensure funding supports the highest Air Force priorities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver development planning and integrated simulation and analysis capabilities.

This program is in Budget Activity 6, RDT&E Management Support, because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606017F / *Requirements Analysis and Maturation*

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	129.100	35.453	33.578	0.000	33.578
Current President's Budget	45.134	35.453	35.285	0.000	35.285
Total Adjustments	-83.966	0.000	1.707	0.000	1.707
• Congressional General Reductions	-0.353	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	17.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.595	0.000			
• SBIR/STTR Transfer	-1.208	0.000			
• Other Adjustments	-100.000	0.000	1.707	0.000	1.707

Congressional Add Details ($ in Millions, and Includes General Reductions)	**FY 2017**	**FY 2018**
Project: 666157: *Development Planning*		
Congressional Add: *Program Increase*	4.900	0.000
Congressional Add: *Program Increase - nuclear command, control, and communications development.*	6.895	0.000
Congressional Add Subtotals for Project: 666157	11.795	0.000
Project: 666158: *INTEGRATED SIMULATION AND ANALYSIS*		
Congressional Add: *Program Increase*	4.844	0.000
Congressional Add Subtotals for Project: 666158	4.844	0.000
Congressional Add Totals for all Projects	16.639	0.000

Change Summary Explanation

Other adjustment decrease of $100 million in FY 2017 because FY 2017 Request for Additional Appropriations (RAA) for Planning for Development (PFD) and Joint Simulation Environment (JSE) was not appropriated.

Increase in FY 2019 for JSE Simulation and Analysis Facility (SIMAF) activities.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0606017F / *Requirements Analysis and Maturation*	**Project (Number/Name)** 666157 / *Development Planning*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
666157: *Development Planning*	-	21.011	12.946	12.007	0.000	12.007	12.251	12.494	12.753	12.984	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Development Planning (DP) project funds activities to analyze Air Force capability needs and requirements to identify potential shortfalls and opportunities; formulate candidate concepts and solution options to address Air Force capability needs and shortfalls; and conduct coordinated analysis and assessment activities to address requirements, technology needs, capability trades, schedule, cost, and pre-systems acquisition planning. Emphasis is placed on activities to inform strategic planning, analyzing multi-domain capabilities that look first at non-materiel solutions before generating materiel needs and requirements.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Long-range Capability Analyses ***Description:*** Conduct long-range capability analyses by analyzing warfighter capability needs and requirements to identify potential shortfalls and opportunities. ***FY 2018 Plans:*** Identify and assess enduring and future Air Force capability challenges and opportunities. Develop capability roadmaps, advanced concept studies and analyses, and derive technology needs required to realize future solutions to warfighter capability needs. ***FY 2019 Base Plans:*** Continue to identify and assess enduring and future Air Force capability challenges and opportunities. Continue to develop capability roadmaps, advanced concept studies and analyses, and derive technology needs required to realize future solutions to warfighter capability needs. ***FY 2019 OCO Plans:*** Not applicable. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $0.380 million. Justification for this decrease is described in plans above.	5.278	5.240	4.860	0.000	4.860
Title: Concept Development	2.600	4.750	4.405	0.000	4.405

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0606017F / *Requirements Analysis and Maturation*	**Project (Number/Name)** 666157 / *Development Planning*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: Conduct concept development activities to inform strategic investment decisions. Formulate and explore multi-domain options (materiel and non-materiel) to better understand operational decision space. ***FY 2018 Plans:*** Formulate and explore multi-domain options (materiel and non-materiel) to better understand operational decision space. ***FY 2019 Base Plans:*** Continue to formulate and explore multi-domain options (materiel and non-materiel) to better understand operational decision space. ***FY 2019 OCO Plans:*** Not applicable. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $0.345 million. Justification for this decrease is described in plans above.					
Title: Pre-systems Acquisition Planning	1.338	2.956	2.742	0.000	2.742
Description: Conduct coordinated pre-systems acquisition planning activities that address requirements, schedule, cost, technology, and acquisition strategy. ***FY 2018 Plans:*** Perform pre-systems acquisition planning activities, including concept refinement, cost estimates, acquisition courses of action, and acquisition milestone documentation. ***FY 2019 Base Plans:*** Continue to perform pre-systems acquisition planning activities, including concept refinement, cost estimates, acquisition courses of action, and acquisition milestone documentation. ***FY 2019 OCO Plans:*** Not applicable. ***FY 2018 to FY 2019 Increase/Decrease Statement:***					

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0606017F / *Requirements Analysis and Maturation*	**Project (Number/Name)** 666157 / *Development Planning*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
FY 2019 decreased compared to FY 2018 by $0.214 million. Justification for this decrease is described in plans above.					
Accomplishments/Planned Programs Subtotals	9.216	12.946	12.007	0.000	12.007

	FY 2017	FY 2018
Congressional Add: Program Increase ***FY 2017 Accomplishments:*** Conducted Congressionally-directed effort. ***FY 2018 Plans:*** Not applicable.	4.900	0.000
Congressional Add: Program Increase - nuclear command, control, and communications development. ***FY 2017 Accomplishments:*** Conducted Congressionally-directed effort. ***FY 2018 Plans:*** Not applicable.	6.895	0.000
Congressional Adds Subtotals	11.795	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0606017F / *Requirements Analysis and Maturation*	**Project (Number/Name)** 666158 / *INTEGRATED SIMULATION AND ANALYSIS*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
666158: *INTEGRATED SIMULATION AND ANALYSIS*	-	24.123	22.507	23.278	0.000	23.278	47.182	51.901	46.075	22.492	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Integrated Simulation and Analysis project provides system-of-systems synthetic environments for modeling, simulation, and analysis of systems and concepts under assessment. This effort accomplishes system performance representations and models, environments, architectures, and tools that underpin variable fidelity; stand-alone, interactive, and distributed simulations; and virtual prototyping using high performance computing for rapid assessment of warfighting capabilities. Integrated simulation and analyses combines real-time and constructive simulations, operators-in-the-loop, experimental and operational software and hardware engineered in synthesized environments to conduct air, space, cyber, and multi-domain capabilities assessments in support of development planning, experimentation, and related activities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Integrated Simulation and Analysis	19.279	22.507	23.278	0.000	23.278

Description: Develop cross-domain system-of-systems modeling, simulation, and analysis capabilities to support development planning, capabilities assessment, and acquisition decisions.

FY 2018 Plans:
Reconfigure and mature models and toolsets to provide integrated simulation capabilities with variable levels of fidelity and realistic representation of battlespace environments. Provide a core set of composable models and a common suite of cross-domain, reusable frameworks at the engineering, engagement, mission, and campaign levels that can be used to support robust development planning and experimentation for high-priority capability gaps, needs, and warfighting challenges identified by Air Force leadership.

FY 2019 Base Plans:
Continue to reconfigure and mature models and toolsets to provide integrated simulation capabilities with variable levels of fidelity and realistic representation of battlespace environments. Begin to mature capabilities into a high-fidelity, multi-platform, multi-domain, operationally representative virtual environment to supplement open air testing. Provide a core set of composable models and a common suite of cross-domain, reusable frameworks at the engineering, engagement, mission, and campaign levels that can be used to support robust

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0606017F / *Requirements Analysis and Maturation*	**Project (Number/Name)** 666158 / *INTEGRATED SIMULATION AND ANALYSIS*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
development planning and experimentation for high-priority capability gaps, needs, and warfighting challenges identified by Air Force leadership. ***FY 2019 OCO Plans:*** Not applicable. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $0.771 million. Justification for this increase is described in plans above.					
Accomplishments/Planned Programs Subtotals	19.279	22.507	23.278	0.000	23.278

	FY 2017	FY 2018
Congressional Add: Program Increase ***FY 2017 Accomplishments:*** Conducted Congressionally-directed effort. ***FY 2018 Plans:*** Not applicable.	4.844	0.000
Congressional Adds Subtotals	4.844	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Not applicable.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606116F / *Space Test and Training Range Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	17.912	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
666156: *Space Test and Training Range Development*	-	17.912	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0606116F, Space Test and Training Range Development efforts were transferred to PE 1206116F, Space Test and Training Range Development due to the creation of a new Major Force Program for Space. FY2017 funding is documented in the exhibits for PE 1206116F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	18.528	0.000	0.000	0.000	0.000
Current President's Budget	17.912	0.000	0.000	0.000	0.000
Total Adjustments	-0.616	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.616	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606392F / *Space and Missile Center (SMC) Civilian Workforce*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	171.666	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
664280: *SMC Civilian Pay*	-	171.666	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2018, PE 0606392F, Space and Missile Center (SMC) Civilian Workforce efforts were transferred to PE 1206392F, Space and Missile Center (SMC) Civilian Workforce due to the creation of a new Major Force Program for Space. FY2017 funding is now documented in the exhibits for PE 1206392F.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	176.666	0.000	0.000	0.000	0.000
Current President's Budget	171.666	0.000	0.000	0.000	0.000
Total Adjustments	-5.000	0.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-5.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: SMC Civ Workforce ***Description:*** In FY2018, PE 0606392F, Space and Missile Center (SMC) Civilian Workforce efforts were transferred to PE 1206392F, Space and Missile Center (SMC) Civilian Workforce due to the creation of a new Major Force Program for Space. FY2016 and FY2017 funding is now documented in the exhibits for PE 1206392F.	171.666	-	-
Accomplishments/Planned Programs Subtotals	171.666	-	-

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0606392F / *Space and Missile Center (SMC) Civilian Workforce*

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0308602F / *ENTEPRISE INFORMATION SERVICES (EIS)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	4.265	29.049	20.545	0.000	20.545	24.119	10.719	7.843	7.986	Continuing	Continuing
66ACSI: *ACQ and Command Support Integration*	-	4.265	29.049	20.545	0.000	20.545	24.119	10.719	7.843	7.986	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Enterprise Information Services (EIS) is a portfolio of integrated programs/technologies/services that enables and sustains Air Force Information Management and Knowledge Operations. EIS provides Air Force personnel access to, and management of, timely, accurate, and trusted mission data, information, and knowledge supporting information/decision superiority. The environment will utilize the services provided by the Common Computing Environment (CCE).

CCE provides standardized platforms, common application support services, data center migration strategy, and security services for hosting AF mission applications. This acquisition is critical for multiple hosting environments leveraging DoD Joint Information Environment (JIE) Core Data Centers (CDC), commercial cloud capabilities and DISA brokered cloud capabilities in compliance with the Air Force Information Technology (AF IT) baselines. This effort also provides technical expertise, programmatic guidance, and policy navigation that supports AF approved application rationalization processes to multiple hosting environments and enterprise IT Lifecycle Capabilities Integration Environment (CIE) testing of CCE services.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapons system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826F, 0605827F, 0605828F, 0605829F, 0605830F, 0605831F, 0605832F, 0605898F, and 0605833F.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0308602F / *ENTEPRISE INFORMATION SERVICES (EIS)*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	4.410	29.049	20.700	0.000	20.700
Current President's Budget	4.265	29.049	20.545	0.000	20.545
Total Adjustments	-0.145	0.000	-0.155	0.000	-0.155
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.145	0.000			
• Other Adjustments	0.000	0.000	-0.155	0.000	-0.155

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Platform Provisioning / Technical Baseline (TB) Aligned Platform Configuration	0.526	0.526	0.285
Description: This task provides the engineering analysis of the Target Baseline platform configurations leading to development of design patterns and templates to be used at the enterprise level by Air Force Information Technology capabilities. These standards will be developed against multiple hosting environments to include DISA MilCloud, commercial cloud, and Installation Processing Nodes. ***FY 2018 Plans:*** - Continue development of Common Computing Environment (CCE) platforms and services to ensure standardization and compliance across all infrastructure hosting environments - Continue providing engineering analysis of applications requiring migration to all infrastructure hosting environments ***FY 2019 Plans:*** - Continue development of CCE platforms and services, compliance across environments and engineering analysis ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased because the commercial cloud environment engineering analyses, design patterns and templates will mostly be completed in FY18.			
Title: Managed Service Office (MSO)	2.438	2.419	0.135
Description: This task develops the process flows for engaging mission application program offices, gathering infrastructure requirements and performing engineering analysis to determine optimum hosting platforms for Air Force IT capabilities. This provides the foundation for initial capabilities supporting the JIE stand-up.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0308602F / *ENTEPRISE INFORMATION SERVICES (EIS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2018 Plans: - Provide engineering analysis and support to new applications requiring migration to data centers in compliance with Federal Data Center Consolidation Initiative (FDCCI) mandates - Continue to refine engagement process to provide more efficient application migration support process ***FY 2019 Plans:*** - Continue engineering analysis efforts to support application compliance with FDCCI mandates ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased because the completion of the commercial cloud environment engineering analyses, design patterns and templates, along with completion of the common set of enterprise tools is mostly planned for FY18.			
Title: Enterprise Services Extended to the Commercial Cloud ***Description:*** This effort develops the design patterns and templates for taking the standardized platforms and enterprise application support services to commercial cloud environments. As more commercial cloud environments receive certifications for hosting DoD applications, this ensures the proper tools are developed and integrated for use in the commercial cloud environments. ***FY 2018 Plans:*** - Provide engineering analysis and support to greater than 100 applications requiring migration to data centers in compliance with Federal Data Center Consolidation Initiative mandates - Refine engagement process to provide more efficient application migration support process - Develop automated platform provisioning tools to be used across multiple infrastructure hosting environments ***FY 2019 Plans:*** - Continue to provide application engineering analyses, engagement process and develop automated platform tools ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased because the application engineering analyses and engagement process will be mostly completed in FY18.	0.500	0.500	0.420
Title: Common Tool Development ***Description:*** Develop and deploy a common set of enterprise tools to support application development and testing. These tools allow the Common Computing Environment to provide Test as a Service to mission application development teams; allowing for standardize development and test environments. ***FY 2018 Plans:***	0.801	0.404	0.160

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0308602F / *ENTEPRISE INFORMATION SERVICES (EIS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
- Provide engineering analysis and support to greater than 100 applications requiring migration to data centers in compliance with Federal Data Center Consolidation Initiative mandates - Refine engagement process to provide more efficient application migration support process - Develop automated platform provisioning tools to be used across multiple infrastructure hosting environments ***FY 2019 Plans:*** - Continue engineering and analysis activities to develop and incorporate common test processes ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased because the common test tool activity will be mostly completed in FY18.			
Title: Enterprise Resource Planning Consolidation ***Description:*** Design, develop and deliver consolidated common services for Enterprise Resource Planning applications. Target environments are development, test, production and disaster recovery across at least two geographically separated locations. This effort includes completing cybersecurity requirements and acquisition of supporting hardware, software and management resources. ***FY 2018 Plans:*** - Provide development, test, production and disaster recovery environments - Continue cybersecurity requirements to be deployment for development/test environments plus begin production/disaster recovery environments - Provide supporting hardware and software plus begin transition of licensing from applications to common service provider ***FY 2019 Plans:*** - Will continue to provide development, test, production and disaster recovery environments - Will continue cybersecurity requirements and independent testing of services to be deployment for development/test environments and continue production/disaster recovery environments - Will continue to procure supporting hardware and software - Will continue the transition of licensing from applications to common service provider ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Funding decreased due to the planned ramping down of work as effort is delivered and transitioned to sustainment.	0.000	25.200	19.545
Accomplishments/Planned Programs Subtotals	4.265	29.049	20.545

D. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0308602F / *ENTEPRISE INFORMATION SERVICES (EIS)*

D. Other Program Funding Summary ($ in Millions)

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0702806F / *Acquisition and Management Support*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	14.168	14.980	12.367	0.000	12.367	18.300	19.169	18.187	18.530	0.000	115.701
66ACSI: *ACQ and Command Support Integration*	-	14.168	14.980	12.367	0.000	12.367	18.300	19.169	18.187	18.530	0.000	115.701

Note

In FY18, PE 0702806F, Project 66ACSI, Civilian Pay, was transferred to PE 0605829F Acquisition Workforce - Cyber, Network, and Business Systems.

A. Mission Description and Budget Item Justification

The program funds efforts to meet the Defense Acquisition Workforce Improvement Act (DAWIA), as well as Congressional, SECDEF, and SECAF mandates to provide program management execution tools, systems integration and architectural analysis, information technology infrastructure development, and technical workforce management. Funding also provides the framework for Air Force business and acquisition transformation in developing capabilities-based architectures, re-engineering and enabling technologies, integrating robust systems engineering into early acquisition processes, acquisition process improvement analysis, and developing and managing a technical workforce with the expertise to uniformly implement OSD and Air Force engineering guidance and policies. These efforts provide stability in Air Force Acquisition by integrating major processes to reverse trends toward unpredictable program cost, schedule, and performance to facilitate quick response to urgent operational needs from across the entire spectrum of potential conflicts. These integrated capabilities will provide OSD and AF acquisition leadership insights needed to effectively manage a complex portfolio of acquisition programs through more timely and reliable access to authoritative acquisition data.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	14.613	14.980	15.861	0.000	15.861
Current President's Budget	14.168	14.980	12.367	0.000	12.367
Total Adjustments	-0.445	0.000	-3.494	0.000	-3.494
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.445	0.000	-3.494	0.000	-3.494

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0702806F / *Acquisition and Management Support*	**Project (Number/Name)** 66ACSI / *ACQ and Command Support Integration*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
66ACSI: *ACQ and Command Support Integration*	-	14.168	14.980	12.367	0.000	12.367	18.300	19.169	18.187	18.530	0.000	115.701
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY18, Project 66ACSI, Civilian Pay, was transferred to PE 0605829F Acquisition Workforce - Cyber, Network, and Business Systems.

A. Mission Description and Budget Item Justification

The program funds efforts to meet the Defense Acquisition Workforce Improvement Act (DAWIA), as well as Congressional, SECDEF, and SECAF mandates to provide program management execution tools, systems integration and architectural analysis, information technology infrastructure development, and technical workforce management. Funding also provides the framework for Air Force business and acquisition transformation in developing capabilities-based architectures, re-engineering and enabling technologies, integrating robust systems engineering into early acquisition processes, acquisition process improvement analysis, and developing and managing a technical workforce with the expertise to uniformly implement OSD and Air Force engineering guidance and policies. These efforts provide stability in Air Force Acquisition by integrating major processes to reverse trends toward unpredictable program cost, schedule, and performance to facilitate quick response to urgent operational needs from across the entire spectrum of potential conflicts. These integrated capabilities will provide OSD and AF acquisition leadership insights needed to effectively manage a complex portfolio of acquisition programs through more timely and reliable access to authoritative acquisition data.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Acquisition Mandates	0.710	1.800	0.534
Description: Supporting Congressional, SECDEF, and SECAF mandates. Program funding provides the framework for Air Force business and acquisition.			
FY 2018 Plans: Continue program management and resources management oversight.			
FY 2019 Plans: Continue program management and resources management oversight.			
FY 2018 to FY 2019 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0702806F / *Acquisition and Management Support*	**Project (Number/Name)** 66ACSI / *ACQ and Command Support Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
N/A			
Title: Performance Measurements ***Description:*** Develops and upgrades performance measures for capability-based planning constructs. ***FY 2018 Plans:*** Continue to develop and analyze acquisition processes to provide process improvement and efficiencies. ***FY 2019 Plans:*** Continue to develop and analyze acquisition processes to provide process improvement and efficiencies. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	0.600	1.937	0.533
Title: Technical and Analytical Support ***Description:*** Supports Acquisition Domain-level effort to integrate existing acquisition business systems/services, data, and processes supporting key Acquisition capabilities at the enterprise level (via the Acquisition Domain Capabilities Integration (ADCI) activities). This support entails analysis required to architect an integrated environment on multiple hosting platforms to support the portfolio of acquisition business systems by solving problems across/outside of individual system boundaries with the goal of reducing redundancy, improving systems operations, and improving management of data resulting in dramatically improved transparency, efficiency, and effective management of the Acquisition process. This support also helps implement standards for data management and service-oriented design methodology to facilitate efficiency and interoperability as well as providing some business intelligence services. The creation and support of domain-level requirements and governance processes as well as the creation of domain-wide data standards are additional support items provided. ***FY 2018 Plans:*** Continuation of work supporting the automation of key Life Cycle Management Center (LCMC) and Space & Missile Systems Center (SMC) acquisition processes. Continuation of work supporting the onboarding of new capabilities for the Acquisition Workbench/Acquisition Application Store. ***FY 2019 Plans:*** Continuation of work supporting the automation of key Life Cycle Management Center (LCMC) and Space & Missile Systems Center (SMC) acquisition processes. Continuation of work supporting the onboarding of new capabilities across the Acquisition Domain. ***FY 2018 to FY 2019 Increase/Decrease Statement:***	2.044	3.133	1.918

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0702806F / *Acquisition and Management Support*	**Project (Number/Name)** 66ACSI / *ACQ and Command Support Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
N/A			
Title: Associated Tool Development ***Description:*** Upgrade the enterprise tools that assists PMs and acquisition professionals with the day-to-day tasking involved in defining, managing, and reporting health and status information throughout an Acquisition program's lifecycle. ***FY 2018 Plans:*** Continue expansion of the integrated IT operational environment (Acquisition Application Store) to include additional Acquisition Program Office automation and additional application development. Continue assessment of appropriate tools. ***FY 2019 Plans:*** Continue expansion of the integrated IT operational environment (Acquisition Application Store) to include additional Acquisition Program Office automation and additional application development. Continue assessment of appropriate tools. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	4.052	3.805	4.319
Title: Project Management Resource Tools (PMRT) ***Description:*** Upgrade enterprise PMRT tools that provide program/project resource management support to the Acquisition community. ***FY 2018 Plans:*** Continued enhancement of PMRT to allow increased visibility to acquisition programmatic and financial information for all AF Acquisition Investment programs. Re-engineering and implementation of process improvements in PMRT supporting acquisition reporting. Development of additional acquisition dashboard data visualizations. Migration PMRT to a Core Data Center (CDC) in order to comply with the Federal Data Center Consolidation Initiative (FDCCI). ***FY 2019 Plans:*** Continued enhancement of PMRT to allow increased visibility to acquisition programmatic and financial information for all AF Acquisition Investment programs. Continued expansion of critical PMRT interfaces via the Acquisition Data Service Broker (ADSB). Development of additional PMRT acquisition dashboard data visualizations. Upgrades to provide additional capability to enable and track AF small business initiatives. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	1.964	1.965	2.446
Title: Capabilities Integration Environment (CIE)	1.805	1.840	2.117

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0702806F / *Acquisition and Management Support*	**Project (Number/Name)** 66ACSI / *ACQ and Command Support Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: Provides a development, testing and integration environment for Information Technology (IT) system development, prototypes and proofs of concept. ***FY 2018 Plans:*** Continues a secure, scalable environment to support Research and Development (R&D), Development Test/Operational Test (DT/OT), integration, exercises, experimentation, acquisition development and direct Warfighter support. ***FY 2019 Plans:*** Continues a secure, scalable environment to support Research and Development (R&D), Development Test/Operational Test (DT/OT), integration, exercises, experimentation, acquisition development and direct Warfighter support. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A			
Title: Development and Retention ***Description:*** Supports activities to develop, manage and retain the acquisition workforce. ***FY 2018 Plans:*** Performs activities to develop, manage, and retain the acquisition workforce by providing training on enhanced business and engineering processes that enable the effective management of complex acquisition processes, and allows continued interface with the academic community. ***FY 2019 Plans:*** Performs activities to develop, manage, and retain the acquisition workforce by providing training on enhanced business and engineering processes that enable the effective management of complex acquisition processes, and allows continued interface with the academic community. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	0.500	0.500	0.500
Title: Civilian Pay ***Description:*** This program supports Civilian Full-Time Equivalents (FTEs) to administer Federally Funded Research and Development Center (FFRDC) contracts at the Massachusetts Institute of Technology Lincoln Laboratory (MIT-LL) and the Carnegie Mellon University Software Engineering Institute (CMU-SEI). The FFRDCs enable the Air Force to use private sector resources to accomplish tasks that are integral to Air Force's mission and operation.	2.493	0.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 6	**R-1 Program Element (Number/Name)** PE 0702806F / *Acquisition and Management Support*	**Project (Number/Name)** 66ACSI / *ACQ and Command Support Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2018 Plans: Transferred to AF LCMC RDT&E Civ Pay. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	14.168	14.980	12.367

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0804731F / *General Skill Training*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	1.353	1.434	1.448	0.000	1.448	1.475	1.500	1.531	1.559	Continuing	Continuing
665297: *Technical Training Information Systems*	-	1.353	1.434	1.448	0.000	1.448	1.475	1.500	1.531	1.559	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

TECHNICAL TRAINING MANAGEMENT SYSTEM (TTMS): TTMS provides AETC organizations with a world class commercial-off-the-shelf (COTS) / government-off-the-shelf (GOTS) learning management system which supports six functions: course design and development; student evaluation; instructor management; student management; data analysis; and resource administration. TTMS is a centralized web-based system which provides productivity enhancements and higher degree of efficiency to AETC. The primary requirement objectives currently under development are: 1) Integration of Basic Training Management System (BTMS) capabilities and student records into the TTMS.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

required Funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	1.404	1.434	1.459	0.000	1.459
Current President's Budget	1.353	1.434	1.448	0.000	1.448
Total Adjustments	-0.051	0.000	-0.011	0.000	-0.011
• Congressional General Reductions	-0.051	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.011	0.000	-0.011

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Technical Training Management System (TTMS)	1.353	1.434	1.448

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 0804731F / *General Skill Training*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: Provided TTMS productivity enhancements and higher degree of efficiency to AETC (i.e., Military Training Leader and Basic Training Management System). ***FY 2018 Plans:*** Will continue to enhance TTMS productivity focusing on Military Training Leader and Basic Training Management Capabilities. ***FY 2019 Plans:*** Will continue to enhance TTMS productivity focusing on Military Training Leader and Basic Training Management Capabilities. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Will continue to enhance TTMS productivity focusing on Military Training Leader and Basic Training Management Capabilities.			
Accomplishments/Planned Programs Subtotals	1.353	1.434	1.448

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Not applicable

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1001004F / *International Activities*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	4.626	4.569	3.998	0.000	3.998	4.071	4.142	4.228	4.306	Continuing	Continuing
664645: *International Cooperative Research & Development*	-	4.626	4.569	3.998	0.000	3.998	4.071	4.142	4.228	4.306	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The mission of this program is to establish, sustain, expand, and enhance mutually beneficial international partnerships through the implementation of air, space, and cyber international armament cooperation (IAC) agreements thereby supporting USAF and DoD goals and objectives. These International Agreements (IAs) will: significantly improve US and allied conventional defense capacity and capabilities; accelerate the availability of defense systems; realize solutions to meet capability gaps; acquire, upgrade, sustain, and/or support common or interoperable equipment with our allies; create cooperative acquisition, production, or logistic partnerships; promote mutual and equitable sharing of effort, cost, information, and risk; provide operational access; leverage economies of scale; and promote interoperability and commonality with our allies.

The USAF is party to numerous (+500) air, space, and cyber bilateral and multilateral IAs to solve common US and allied military capability gaps, develop materiel solutions, harmonize requirements, and build interoperability with our international partners. This program element funds the USAF to identify, develop, process, negotiate, conclude, implement, and manage IAs in compliance with statutory provisions, legal authorities, fiscal constraints, technology transfer controls, intellectual property rights, third party transfer provisions, equitability criteria, industrial base factors, and political-military interests. Included in this budget are: air, space, and cyber IAC IAs activities; technology assessments; specialized working groups; Air Senior National Representative (ASNR) activities; IAC program and project reviews; bilateral and multilateral staff talks; Engineering and Scientist Exchange Program (ESEP); and Administrative and Professional Exchange Program (APEP).

This program is in Budget Activity 6, Management and Support, because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation. These funds are not to be used for civilian salaries or the construction of permanent facilities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1001004F / *International Activities*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	4.784	4.569	4.028	0.000	4.028
Current President's Budget	4.626	4.569	3.998	0.000	3.998
Total Adjustments	-0.158	0.000	-0.030	0.000	-0.030
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.158	0.000	-0.030	0.000	-0.030

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: International Partnership Activities	2.095	2.156	1.870

Description: Funds USAF management, support, and oversight of IAC goals and objectives to build global partnerships in support of national security objectives. Funds USAF participation in NATO forums to promote harmonization and interoperability. Funds USAF support and participation in OSD bi-lateral IAC forums. Funds SAF/IA Australian liaison office. Funds technical assessments and discussions that support technology development activities and interoperability. Funds USAF efforts to enhance existing relationships with: Australia, Canada, Denmark, France, Germany, Israel, Italy, Japan, NATO, Netherlands, Norway, South Korea, Singapore, Spain, Sweden, and UK. Funds USAF efforts to strengthen/build IAC relationships with: Czech Republic, Hungary, Poland, India, Finland, and Turkey. Funds USAF efforts to establish IAC relationships with: South Africa, Egypt, Brazil, Chile, and Taiwan.

FY 2018 Plans:
Will continue ongoing management, support, and oversight of IAC goals and objectives to establish, sustain, expand and enhance mutually beneficial partnerships between the US and coalition partners to meet current and emerging global strategic challenges through optimization of interoperability, integration, and interdependence between coalition forces. Continuing efforts will have an enhanced focus on mutually beneficial partnerships in Asia.

FY 2019 Plans:
Will continue ongoing management, support, and oversight of IAC goals and objectives to establish, sustain, expand and enhance mutually beneficial partnerships between the US and coalition partners to meet current and emerging global strategic challenges

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1001004F / *International Activities*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
through optimization of interoperability, integration, and interdependence between coalition forces. Continuing efforts will have an enhanced focus on mutually beneficial partnerships in Asia. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Priorities will be adjusted to meet budget allocation. Current activities will be prioritized higher than new efforts to establish mutually beneficial partnership.			
Title: International Armaments Cooperation (IAC) Agreement Activities ***Description:*** Funds the USAF's ability to identify, develop, process, negotiate, conclude, implement, and manage an increasing number of research, development, test, and evaluation (RDT&E) bilateral and multilateral IAC Agreements that meet the goals, objectives, and mission of the USAF and DoD in the Air Domain. IAC activities will meet warfighter needs and enhance interoperability by exploring cooperation with our partners in the areas of: materials and composites, human effectiveness, robotics, nanotechnology, coalition information sharing, biometrics, munitions design, hypersonics, alternative energy, improvised explosive devices (IED) defeat, weapons of mass destruction (WMD) defeat, autonomous control, distributed missions, training systems, lasers, weapon systems, remotely piloted aircraft, armaments interface, intelligence, surveillance and reconnaissance (ISR) capabilities, sustainment, gap analysis, simulators, combined logistics, software updates, mission planning systems, world-wide flight requirements, electronic warfare, safety, aging aircraft, airlift, tankers, trainers, system modifications, directed energy, weapon stores, acquisition, development, co-production, interoperability, maintenance, system development, and upgrades. ***FY 2018 Plans:*** Will continue to identify, develop, process, negotiate, conclude, implement, and manage the increasing number of RDT&E bilateral and multilateral IAs that meet the goals, objectives, and mission of the USAF and DoD in the Air Domain. Negotiations will continue on IAs not concluded during FY17. New Air Domain agreements and amendments will be initiated. ***FY 2019 Plans:*** Will continue to identify, develop, process, negotiate, conclude, implement, and manage the increasing number of RDT&E bilateral and multilateral IAs that meet the goals, objectives, and mission of the USAF and DoD in the Air Domain. Negotiations will continue on IAs not concluded during FY18. New Air Domain agreements and amendments will be initiated. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Priorities will be adjusted to meet budget allocation. Current agreement activities will be prioritized higher than developing new IAC efforts to identify, develop, negotiate, and conclude international agreements.	1.131	1.013	0.978
Title: International Space Cooperation ***Description:*** Funds the USAF's RDT&E efforts in the area of space cooperation with our international partners. Space cooperation with our allies enables the USAF access to critical geography for distributed ground systems, and remote test ranges	0.500	0.500	0.450

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1001004F / *International Activities*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
for test and evaluation of space capabilities in electronically challenged environments, joint development and acquisition of space systems, and provides a foundation for long-term, full spectrum operational cooperation. ***FY 2018 Plans:*** Will continue to identify, develop, process, negotiate, conclude, implement, and manage the bilateral and multilateral RDT&E IAs that meet the goals, objectives, and mission of the USAF and DoD in the Space Domain. Development and negotiation will continue on IAs not concluded during FY17. New Space Domain agreements and amendments will be initiated. ***FY 2019 Plans:*** Will continue to identify, develop, process, negotiate, conclude, implement, and manage the bilateral and multilateral RDT&E IAs that meet the goals, objectives, and mission of the USAF and DoD in the Space Domain. Development and negotiation will continue on IAs not concluded during FY18. New Space Domain agreements and amendments will be initiated. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** Priorities will be adjusted to meet budget allocation. Current space activities will be prioritized higher than initiating new efforts in the Space domain with international partners.			
Title: International Cyberspace Cooperation ***Description:*** Funds the USAF's ability to establish cooperative relationships with allies in the Cyberspace Domain to ensure interoperability, sharing of information on threats, and developing new capabilities to defeat threats to our critical information systems. Cyberspace requires significant research and development efforts and responsiveness to avoid technological surprises. ***FY 2018 Plans:*** Will continue to establish relationships and identify, develop, process, negotiate, conclude, implement, and manage bilateral and multilateral RDT&E IAs that meet the goals, objectives, and mission of the USAF and DoD in the Cyberspace Domain. Development and negotiation will continue on IAs not concluded during FY17. New Cyberspace Domain agreements and amendments will be initiated. ***FY 2019 Plans:*** Will continue to establish relationships and identify, develop, process, negotiate, conclude, implement, and manage bilateral and multilateral RDT&E IAs that meet the goals, objectives, and mission of the USAF and DoD in the Cyberspace Domain. Development and negotiation will continue on IAs not concluded during FY18. New Cyberspace Domain agreements and amendments will be initiated. ***FY 2018 to FY 2019 Increase/Decrease Statement:***	0.300	0.300	0.250

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1001004F / *International Activities*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Priorities will be adjusted to meet budget allocation. Current cyberspace activities will be prioritized higher than initiating new efforts in the Cyberspace domain with international partners.			
Title: Engineer and Scientist Exchange Program/Administrative and Professional Exchange Program (ESEP/APEP) ***Description:*** Funds the USAF execution and management oversight of ESEP and APEP programs and personnel. Funds eight to ten field level military and civilian personnel from Air Force Materiel Command Facilities, Product Centers, Test Centers, and Logistic Centers for tours at selected allied partner government laboratories and facilities. ***FY 2018 Plans:*** Will continue USAF execution and management oversight of the ESEP and APEP programs and personnel. ***FY 2019 Plans:*** Will continue USAF execution and management oversight of the ESEP and APEP programs and personnel. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** The number of USAF ESEP/APEP placements overseas will be adjusted down based on funding available.	0.450	0.450	0.300
Title: Air Force Materiel Command (AFMC) ***Description:*** Funds AFMC's ability to support IAC RDT&E activities which directly promotes international collaboration. Funds field level technical assessments and discussions that support technology identification and development activities in support of interoperability. ***FY 2018 Plans:*** Will continue support of AFMC's ability to identify, assess, continue RDT&E activities from 2017 and pursue new areas of cooperation which support interoperability and relationship building efforts with our international partners. ***FY 2019 Plans:*** Will continue support of AFMC's ability to identify, assess, continue RDT&E activities from 2018 and pursue new areas of cooperation which support interoperability and relationship building efforts with our international partners.	0.150	0.150	0.150
Accomplishments/Planned Programs Subtotals	4.626	4.569	3.998

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

There is no other program funding for the activities pursued under 1001004F International Activities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1001004F / *International Activities*

E. Acquisition Strategy

This program element is the only source of USAF funds to identify, develop, process, negotiate, conclude, implement, and manage IAC opportunities to: (a) acquire, develop, upgrade, sustain, and support common or interoperable equipment with our allies; (b) leverage USAF resources through cost sharing and economies of scale with our partners; (c) exploit the best US and allied technologies for equipping coalition forces; and (d) foster interoperability and commonality with our allies. We obtain these benefits only after IAC opportunities are identified, explored, assessed, developed and IAs are negotiated and concluded. This PE provides funds to execute up-front IAC responsibilities, realize cooperative opportunities, assess allied technologies and generate sound, cost-effective cooperative programs between the USAF and our international partners in the areas of Air, Space and Cyberspace. Once IAs are concluded they are transferred to the appropriate technology or systems program office and are then funded by the program office.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206116F / *Space Test and Training Range Development*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	17.912	25.773	23.254	0.000	23.254	19.942	20.288	20.709	21.086	Continuing	Continuing
666156: *Space Test and Training Range Development*	-	17.912	25.773	23.254	0.000	23.254	19.942	20.288	20.709	21.086	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Supports the development of Space Test and Training Range (STTR) capabilities critical for developmental and operational test, training, exercises and tactics development for Space Control systems and Joint National Space Architecture. Includes development, demonstration and delivery of test assets, special test equipment, capabilities and systems required to test, validate, and verify performance of integrated space control systems. Provides a safe, secure, controllable and repeatable environment for the testing and training of Space Control mission systems and operators that is both realistic and relevant. Additionally, this program develops test range assets for both the fixed node Space Range Operation Center (SROC) at Schriever AFB and a deployable capability to support complex Joint and AF exercises. The virtual range as part of the Family of Systems (FoS), called Big Top, is being developed to accomplish the STTR mission. Big Top integrates to a Distributed Mission Architecture, tying into both the Information Operations (IO) and Air ranges for increased realism and complexity required to prepare space operators for real-world threats. This technology will allow for the first-ever use of a realistic signal environment to increase the realism and efficiency of space control squadron training.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver STTR weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206116F / *Space Test and Training Range Development*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	18.528	25.773	23.429	0.000	23.429
Current President's Budget	17.912	25.773	23.254	0.000	23.254
Total Adjustments	-0.616	0.000	-0.175	0.000	-0.175
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.616	0.000	-0.175	0.000	-0.175

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Range Control	17.912	25.554	23.031
Description: Development and acquisition of mobile, transportable, virtual, and fixed range monitoring, emulation, and communications capabilities for the space range. ***FY 2018 Plans:*** Continue development and acquisition of mobile, transportable, and fixed range monitoring and communications capabilities for the space range. Integrate STTR into other Air Force Range capabilities. Address Risk Management Framework (RMF) compliance, general obsolescence, outdated servers, database overhaul, Windows 10 migration, further hardening of hard drives, upgraded encryption, and software upgrades. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Continue development and acquisition of mobile, transportable, virtual, and fixed range monitoring, emulation, and communications capabilities for the space range. Integrate STTR into the Air Force Range capabilities. Address Risk Management Framework (RMF) compliance, general obsolescence, outdated servers, database overhaul, Windows 10 migration, further hardening of hard drives, upgrade encryption, and software upgrades. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $2.523M. Justification for this decrease is described in plans above.			
Title: Bandwidth Support	0.000	0.219	0.223

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206116F / *Space Test and Training Range Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: Provides for leased Satellite Communication (SATCOM) bandwidth for STTR operations. ***FY 2018 Plans:*** Provide required space range satellite communications bandwidth for exercises, tests, and training of both offensive and defensive space control systems of the space range. Continue program office support and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Provide required space range satellite communications bandwidth for exercises, tests, and training of both offensive and defensive space control systems of the space range. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $0.004M. Justification for this increase is described in plans above.			
Accomplishments/Planned Programs Subtotals	17.912	25.773	23.254

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible.

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206392F / *Space and Missile Center (SMC) Civilian Workforce*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	171.666	169.887	169.912	0.000	169.912	171.736	175.098	178.789	182.544	Continuing	Continuing
664280: *SMC Civilian Pay*	-	171.666	169.887	169.912	0.000	169.912	171.736	175.098	178.789	182.544	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space and Missile Systems Center (SMC) equips US and allied forces with operational space and missile systems, launch systems, and command and control infrastructure in support of global military and national security operations. SMC operates with over 6,300 people and an annual budget exceeding $6.4B providing joint warfighters navigation, communication, weather, warning, force application, and space control capabilities. In FY12, as an AF pilot initiative, SMC acquisition workforce civilian personnel funding was transferred from O&M to RDT&E, AF funds.

SMC is authorized to employ approximately 1,501 civilian acquisition professionals providing the management, tools, and technical capabilities needed to oversee acquisition programs to include material solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel supporting the Los Angeles AFB 61 Air Base Group. Funding SMC civilian payroll from the RDT&E appropriation provides program managers the flexibility to hire additional civilian personnel with program dollars versus additional contractors in concert with Air Force initiatives in response to the Defense Acquisition Workforce Improvement Act. This program element supports both civilian pay and non-pay support requirements.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206392F / *Space and Missile Center (SMC) Civilian Workforce*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	176.666	169.887	171.780	0.000	171.780
Current President's Budget	171.666	169.887	169.912	0.000	169.912
Total Adjustments	-5.000	0.000	-1.868	0.000	-1.868
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-5.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-1.868	0.000	-1.868

Change Summary Explanation

FY 2017: -$5.000M Congressional Reduction for prior year carryover

FY 2019: $0.040M for Air Force RDT&E re-price, -$1.908M for Civ Pay Assumptions.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: SMC Acquisition Workforce	171.666	169.887	169.912
Description: Provide professional government civilian acquisition workforce in support of all Space and Missile Systems Center programs. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 Plans:*** Provide professional government civilian acquisition workforce in support of all Space and Missile Systems Center programs. Note: 75 civilian manpower authorizations transferred to PE 1206398F/SMC Management HQ Activities. ***FY 2019 Plans:*** Provide professional government civilian acquisition workforce in support of all Space and Missile Systems Center programs. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $0.025M. Justification for this increase is normal Cost of an Airman inflation.			
Accomplishments/Planned Programs Subtotals	171.666	169.887	169.912

D. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2, **RDT&E Budget Item Justification:** PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206392F / *Space and Missile Center (SMC) Civilian Workforce*

D. Other Program Funding Summary ($ in Millions)

Remarks

N/A

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206398F / *Space & Missile Systems Center - MHA*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	0.000	9.531	10.508	0.000	10.508	9.772	10.016	10.266	10.481	Continuing	Continuing
664280: *SMC Civilian Pay*	-	0.000	9.531	10.508	0.000	10.508	9.772	10.016	10.266	10.481	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space and Missile Systems Center (SMC) equips US and allied forces with operational space and missile systems, launch systems, and command and control infrastructure in support of global military and national security operations. SMC operates with over 6,300 people and an annual budget exceeding $6.4B providing joint warfighters navigation, communication, weather, warning, force application, and space control capabilities. In FY2012, as an AF pilot initiative, SMC acquisition workforce civilian personnel funding was transferred from O&M to RDT&E, AF funds.

Program Element 1206398F, BPAC: 664281 Space and Missile Systems Center - Major Headquarters Activities (MHA) was established to improve overall performance, strengthen business operations, and achieve efficiencies, effectives and cost savings that can be transferred to higher priority needs.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This Program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206398F / *Space & Missile Systems Center - MHA*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	0.000	9.531	9.702	0.000	9.702
Current President's Budget	0.000	9.531	10.508	0.000	10.508
Total Adjustments	0.000	0.000	0.806	0.000	0.806
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	0.806	0.000	0.806

Change Summary Explanation

FY2019: $0.924M for Air Force RDT&E re-price, -$0.118M for Civ Pay Assumptions.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: SMC - Major Headquarters Activities	-	9.531	10.508
Description: Provide professional government civilian acquisition workforce in support of all Space and Missile Systems Center Management Headquarters Activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to SMC Staff support, studies, technical analysis, prototyping, etc. ***FY 2018 Plans:*** Provide professional government civilian acquisition workforce in support of all Space and Missile Systems Center Management Headquarters Activities. ***FY 2019 Plans:*** Provide professional government civilian acquisition workforce in support of all Space and Missile Systems Center Management Headquarters Activities. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $0.977M due to Cost of an Airman inflation adjustment.			
Accomplishments/Planned Programs Subtotals	-	9.531	10.508

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206398F / *Space & Missile Systems Center - MHA*

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206860F / *Rocket Systems Launch Program (SPACE)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	10.899	20.975	19.721	0.000	19.721	17.692	17.999	18.374	18.709	Continuing	Continuing
661023: *Rocket System Launch Program (RSLP)*	-	10.899	20.975	19.721	0.000	19.721	17.692	17.999	18.374	18.709	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Rocket Systems Launch Program (RSLP) provides responsive space and Research, Development, Test and Evaluation (RDT&E) launch vehicle support to DoD and other government agencies using commercial launch systems and excess ballistic missile assets. The RSLP mission was established by the Secretary of Defense in 1972. It provides mission planning, payload integration, vehicle acquisition, processing, launch operations, booster storage and disposition, aging surveillance, maintenance and logistics support for selected DoD responsive space and RDT&E launches. Costs directly attributable to a specific launch or program (e.g. reliability of flight testing, maintenance of launch vehicle processing infrastructure) are paid by the user (Air Force, Navy, Army, Missile Defense Agency (MDA), Defense Advanced Research Project Agency (DARPA), National Reconnaissance Office (NRO), etc.). RSLP maintains exclusive control of deactivated Minuteman and Peacekeeper assets used in testing to include refurbishment, transportation and handling, storage, aging surveillance, and launch services. RSLP also funds general research, development, and supplemental reliability of flight testing efforts for launch to enhance the reliability of the Minotaur and other fleet vehicles (e.g., updates to the Modular Mechanical Ordnance Destruct System).

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206860F / *Rocket Systems Launch Program (SPACE)*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	11.198	20.975	19.869	0.000	19.869
Current President's Budget	10.899	20.975	19.721	0.000	19.721
Total Adjustments	-0.299	0.000	-0.148	0.000	-0.148
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.299	0.000			
• Other Adjustments	0.000	0.000	-0.148	0.000	-0.148

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Storage/Refurbishment/Demil	6.947	16.160	15.773
Description: Storage, refurbishment, inventory control, and demil/disposal of deactivated Minuteman, Peacekeeper and other missile flight test assets ***FY 2018 Plans:*** Continue storage, refurbishment, inventory control, and demil/disposal of deactivated Minuteman, Peacekeeper and other missile flight test assets and perform research and development support operations as required. Investigate and develop shipping throughput capacity to maximize opportunity for motor disposal. Continue support activities to include but not limited to sustainment replacement and refurbishment of support equipment, mission support, special studies etc. Initiate support to extend certification period of refurbished motors. ***FY 2019 Plans:*** Continue storage, refurbishment, inventory control, and demil/disposal of deactivated Minuteman, Peacekeeper and other missile flight test assets and perform research and development support operations as required. Investigate and develop shipping throughput capacity to maximize opportunity for motor disposal. Continue support activities to include but not limited to sustainment replacement and refurbishment of support equipment, mission support, special studies etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $0.387M. This reduction reflects a slight decrease in planned motor demil disposal actions.			
Title: Aging Surveillance	3.952	4.215	3.848

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206860F / *Rocket Systems Launch Program (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Description: Perform aging surveillance-related activities on stored motors ***FY 2018 Plans:*** Continue performing aging surveillance-related activities on stored motors; continue performing analysis/studies to identify and evaluate potential safety-related issues affecting stored motors; continue program office support and related support activities such as, but not limited to mission support, special studies, etc. ***FY 2019 Plans:*** Continue performing aging surveillance-related activities on stored motors; continue performing analysis/studies to identify and evaluate potential safety-related issues affecting stored motors; continue program office support and related support activities such as, but not limited to mission support, special studies, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $0.367M. This reduction reflects a slight decrease in aging surveillance costs.			
Title: Other Launch Support Services ***Description:*** Perform launch services activities ***FY 2018 Plans:*** Continue launch vehicle acquisition, processing, launch services support, mission assurance, and operations to launch RDT&E payloads. ***FY 2019 Plans:*** Continue launch vehicle acquisition, processing, launch services support, mission assurance, and operations to launch RDT&E payloads. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decrease compared to FY 2018 by $0.500M. This reduction reflects reduced scope of launch study/service planned identified for FY 2019.	0.000	0.600	0.100
Accomplishments/Planned Programs Subtotals	10.899	20.975	19.721

D. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206860F / *Rocket Systems Launch Program (SPACE)*

D. Other Program Funding Summary ($ in Millions)

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206864F / *Space Test Program (STP)*

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
Total Program Element	-	40.507	25.398	25.620	0.000	25.620	26.097	26.550	27.103	27.596	Continuing	Continuing
662617: *Free-Flyer Spacecraft Missions*	-	40.507	25.398	25.620	0.000	25.620	26.097	26.550	27.103	27.596	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Test Program (STP) conducts space test missions for the purpose of accelerating DoD space technology transformation while lowering developmental risk. The program flies an optimally selected number of DoD-sponsored experiments consistent with Space Experiments Review Board (SERB) priority, opportunity, and funding. STP missions provide a cost-effective way to flight test new militarily relevant space system technologies, concepts, and designs, providing a way to:

- Support the acquisition block development approach
- Demonstrate and develop responsive research and development (R&D) space capabilities
- Provide early operational capabilities to quickly react to new developments
- Perform operational risk reduction through direct flight test of prototype components
- Improve operational design by characterizing the space environment, event, or sensor physics proposed for an operational system/system upgrade
- Develop, integrate, test, and acquire advanced payload support hardware for launch vehicles (LV), commercial launch services, and human-rated spaceflight vehicles

The Deputy Secretary of Defense Space Test Program Management & Funding Policy, issued in July 2002, reaffirmed STP as the primary provider of spaceflight for the DoD space research community. The July 2002 policy statement also reaffirmed STP's role as the single manager for all DoD payloads on the International Space Station (ISS).

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

This program element may include necessary civilian pay expenses required to manage, execute, and deliver STP weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	**Date:** February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206864F / *Space Test Program (STP)*

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	27.070	25.398	25.812	0.000	25.812
Current President's Budget	40.507	25.398	25.620	0.000	25.620
Total Adjustments	13.437	0.000	-0.192	0.000	-0.192
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	15.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.379	0.000			
• SBIR/STTR Transfer	-1.184	0.000			
• Other Adjustments	0.000	0.000	-0.192	0.000	-0.192

Congressional Add Details ($ in Millions, and Includes General Reductions)	**FY 2017**	**FY 2018**
Project: 662617: *Free-Flyer Spacecraft Missions*		
Congressional Add: *Rapid Agile Launch Initiative (RALI) Services and Support*	14.500	-
Congressional Add Subtotals for Project: 662617	14.500	-
Congressional Add Totals for all Projects	14.500	-

Change Summary Explanation

FY2017: +$15.000M reflects the Congressional Add program increase to execute the Rapid Agile Launch Initiative (RALI)

C. Accomplishments/Planned Programs ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019**
Title: Payload Integration	17.476	17.355	17.193
Description: Integrate payloads onto spaceflight missions, including free-flyer payloads, hosted payloads, sounding rockets, experiments on the International Space Station, and commercial missions. Includes acquisition of associated spacecraft and integration hardware.			
FY 2018 Plans: Continue payload integration on to STPSat-6, STP-H6, and other efforts onto spaceflight missions.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206864F / *Space Test Program (STP)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Complete development, launch, and deploy STPSat-4 from the International Space Station (ISS) in FY 2019. Complete payload integration and launch STP-H6 in FY 2019. Complete payload integration efforts and launch-based processing and launch operations for STPSat-6 and other efforts onto spaceflight missions. Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $0.162M. Justification for this decrease is described in plans above.			
Title: Launch Vehicle and Launch Services ***Description:*** Purchase launch services, launch vehicles and launch vehicle support for free-flyer payloads, hosted payloads, sounding rockets, experiments on the ISS, and commercial spaceflight missions, and support the spaceflight worthiness and "Do No Harm" certification for Space and Missile Systems Center (SMC) and Air Force Space Command. ***FY 2018 Plans:*** Continue purchase of launch services, launch vehicles, and launch vehicle support for free-flyer payloads, hosted payloads, sounding rockets, experiments on the ISS, and commercial spaceflight missions. Plan to launch STPSat-5, EAGLE on the AFSPC-11, and additional payloads to the ISS in FY18. ***FY 2019 Plans:*** Continue purchase of launch services, launch vehicles, and launch vehicle support for free-flyer payloads, hosted payloads, sounding rockets, experiments on the ISS, and commercial spaceflight missions. Plan to launch STPSat-6 and additional payloads to the ISS. Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $2.997M. Justification for this increase is described in plans above.	3.835	4.161	7.158
Title: On Orbit Satellite Operations ***Description:*** Execute first-year operations and operations support for STP-sponsored missions.	4.696	3.882	1.269

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force	Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206864F / *Space Test Program (STP)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
FY 2018 Plans: Continue first-year operations and/or operations support for STP-sponsored missions, the Demonstration and Science Experiment (DSX) and NASA's Green Propellant Infusion Mission (GPIM). Continue support of forecasted launch and early orbit checkout of the GPIM and DSX missions on STP-2. ***FY 2019 Plans:*** Complete first year operations for STPSat-5, EAGLE, and STP-2's payloads, DSX and GPIM. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $2.613M. Justification for this decrease is described in plans above.			
Accomplishments/Planned Programs Subtotals	26.007	25.398	25.620

	FY 2017	FY 2018
Congressional Add: Rapid Agile Launch Initiative (RALI) Services and Support ***FY 2017 Accomplishments:*** Procure Venture-Class launch vehicles (LVs) and mission assurance support to deliver prototype and other RDT&E payloads to space. RALI will demonstrate rapid, responsive procurement by using Other Transaction Authority (OTA) and commercial launch approaches. The FY 2017 Congressional Add funds, less $0.5M SBIR transfer, were used to award to Rocket Labs ($5.7M) a dedicated launch mission and to VOX Space ($4.8M) a rideshare mission on 11 Oct 2017. The Air Force projects to award a third OTA in the second quarter of FY 2018.	14.500	-
Congressional Adds Subtotals	14.500	-

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

F. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.