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**Department of Defense
Fiscal Year (FY) 2021 Budget Estimates**

February 2020



Air Force

Justification Book Volume 3b of 3

Research, Development, Test & Evaluation, Air Force

Vol-III Part 2

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Air Force • Budget Estimates FY 2021 • RDT&E Program

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Department of Defense
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 Exhibit R-1 FY 2021 President's Budget
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 (Dollars in Thousands)

22 Jan 2020

Summary Recap of Budget Activities	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Basic Research	545,223	549,761			549,761
Applied Research	1,482,434	1,656,126			1,656,126
Advanced Technology Development	876,008	1,066,453			1,066,453
Advanced Component Development & Prototypes	6,386,187	8,244,911		44,335	8,289,246
System Development & Demonstration	5,377,043	6,690,641			6,690,641
Management Support	3,769,578	2,878,071			2,878,071
Operational Systems Development	22,982,541	24,480,992		83,913	24,564,905
Software & Digital Technology Pilot Programs					
Total Research, Development, Test & Evaluation	41,419,014	45,566,955		128,248	45,695,203

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Summary Recap of Budget Activities	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Basic Research	492,294				492,294
Applied Research	1,540,623				1,540,623
Advanced Technology Development	778,548				778,548
Advanced Component Development & Prototypes	9,049,227				9,049,227
System Development & Demonstration	6,359,375				6,359,375
Management Support	3,149,790				3,149,790
Operational Systems Development	26,199,822		5,304	5,304	26,205,126
Software & Digital Technology Pilot Programs	149,742				149,742
Total Research, Development, Test & Evaluation	47,719,421		5,304	5,304	47,724,725

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	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Summary Recap of FYDP Programs -----					
Strategic Forces	933,653	846,784			846,784
General Purpose Forces	3,020,691	3,748,342		5,200	3,753,542
Intelligence and Communications	1,530,574	1,340,238			1,340,238
Mobility Forces	894,433	936,221			936,221
Research and Development	13,189,310	14,528,474		26,450	14,554,924
Central Supply and Maintenance	93,964	37,505			37,505
Training Medical and Other	2,488	8,542			8,542
Administration and Associated Activities	117,431	90,730			90,730
Support of Other Nations	3,866	4,071			4,071
Space	4,800,166	6,240,052		17,885	6,257,937
Classified Programs	16,832,438	17,785,996		78,713	17,864,709
Total Research, Development, Test & Evaluation	41,419,014	45,566,955		128,248	45,695,203

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	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Summary Recap of FYDP Programs					
Strategic Forces	1,065,581				1,065,581
General Purpose Forces	4,019,405		5,304	5,304	4,024,709
Intelligence and Communications	1,090,263				1,090,263
Mobility Forces	1,048,447				1,048,447
Research and Development	14,101,988				14,101,988
Central Supply and Maintenance	95,633				95,633
Training Medical and Other	7,073				7,073
Administration and Associated Activities	78,515				78,515
Support of Other Nations	3,599				3,599
Space	6,798,195				6,798,195
Classified Programs	19,410,722				19,410,722
Total Research, Development, Test & Evaluation	47,719,421		5,304	5,304	47,724,725

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	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Summary Recap of Budget Activities					
-----	-----	-----	-----	-----	-----
Basic Research	545,223	549,761			549,761
Applied Research	1,482,434	1,656,126			1,656,126
Advanced Technology Development	876,008	1,066,453			1,066,453
Advanced Component Development & Prototypes	6,386,187	8,244,911		44,335	8,289,246
System Development & Demonstration	5,377,043	6,690,641			6,690,641
Management Support	3,769,578	2,878,071			2,878,071
Operational Systems Development	22,982,541	24,480,992		83,913	24,564,905
Total Research, Development, Test & Evaluation	41,419,014	45,566,955		128,248	45,695,203
Summary Recap of FYDP Programs					
-----	-----	-----	-----	-----	-----
Strategic Forces	933,653	846,784			846,784
General Purpose Forces	3,020,691	3,748,342		5,200	3,753,542
Intelligence and Communications	1,530,574	1,340,238			1,340,238
Mobility Forces	894,433	936,221			936,221
Research and Development	13,189,310	14,528,474		26,450	14,554,924
Central Supply and Maintenance	93,964	37,505			37,505
Training Medical and Other	2,488	8,542			8,542
Administration and Associated Activities	117,431	90,730			90,730
Support of Other Nations	3,866	4,071			4,071

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Summary Recap of Budget Activities	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
-----	-----	-----	-----	-----	-----
Basic Research	492,294				492,294
Applied Research	1,409,749				1,409,749
Advanced Technology Development	778,548				778,548
Advanced Component Development & Prototypes	7,737,916				7,737,916
System Development & Demonstration	2,615,359				2,615,359
Management Support	2,891,280				2,891,280
Operational Systems Development	21,466,680		5,304	5,304	21,471,984
Total Research, Development, Test & Evaluation	37,391,826		5,304	5,304	37,397,130
Summary Recap of FYDP Programs					

Strategic Forces	1,065,581				1,065,581
General Purpose Forces	4,019,405		5,304	5,304	4,024,709
Intelligence and Communications	1,090,263				1,090,263
Mobility Forces	1,048,447				1,048,447
Research and Development	14,101,988				14,101,988
Central Supply and Maintenance	95,633				95,633
Training Medical and Other	7,073				7,073
Administration and Associated Activities	78,515				78,515
Support of Other Nations	3,599				3,599

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Summary Recap of Budget Activities	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted (Base+Emerg+ OCO)
Space	4,800,166	6,240,052		17,885	6,257,937
Classified Programs	16,832,438	17,785,996		78,713	17,864,709
Total Research, Development, Test & Evaluation	41,419,014	45,566,955		128,248	45,695,203

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Summary Recap of Budget Activities	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Space	103,466				103,466
Classified Programs	15,777,856				15,777,856
Total Research, Development, Test & Evaluation	37,391,826		5,304	5,304	37,397,130

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

Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted S (Base+Emerg+ e OCO)	c
1	0601102F	Defense Research Sciences	01	374,047	356,107			356,107	U
2	0601103F	University Research Initiatives	01	159,073	178,859			178,859	U
3	0601108F	High Energy Laser Research Initiatives	01	12,103	14,795			14,795	U
		Basic Research		545,223	549,761			549,761	
4	0602020F	Future AF Capabilities Applied Research	02						U
5	0602102F	Materials	02	172,109	215,851			215,851	U
6	0602201F	Aerospace Vehicle Technologies	02	150,625	157,724			157,724	U
7	0602202F	Human Effectiveness Applied Research	02	109,598	134,795			134,795	U
8	0602203F	Aerospace Propulsion	02	202,638	226,775			226,775	U
9	0602204F	Aerospace Sensors	02	168,897	219,912			219,912	U
10	0602212F	Defense Laboratories R&D Projects (10 U.S.C, Sec 2358)	02	86,165					U
11	0602298F	Science and Technology Management - Major Headquarters Activities	02	8,288	7,968			7,968	U
12	0602602F	Conventional Munitions	02	100,573	142,772			142,772	U
13	0602605F	Directed Energy Technology	02	129,579	124,379			124,379	U
14	0602788F	Dominant Information Sciences and Methods	02	182,221	216,062			216,062	U
15	0602890F	High Energy Laser Research	02	40,400	48,221			48,221	U

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

Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Se
1	0601102F	Defense Research Sciences	01	315,348				315,348	U
2	0601103F	University Research Initiatives	01	161,861				161,861	U
3	0601108F	High Energy Laser Research Initiatives	01	15,085				15,085	U
		Basic Research		492,294				492,294	
4	0602020F	Future AF Capabilities Applied Research	02	100,000				100,000	U
5	0602102F	Materials	02	140,781				140,781	U
6	0602201F	Aerospace Vehicle Technologies	02	349,225				349,225	U
7	0602202F	Human Effectiveness Applied Research	02	115,222				115,222	U
8	0602203F	Aerospace Propulsion	02						U
9	0602204F	Aerospace Sensors	02	211,301				211,301	U
10	0602212F	Defense Laboratories R&D Projects (10 U.S.C, Sec 2358)	02						U
11	0602298F	Science and Technology Management - Major Headquarters Activities	02	8,926				8,926	U
12	0602602F	Conventional Munitions	02	132,425				132,425	U
13	0602605F	Directed Energy Technology	02	128,113				128,113	U
14	0602788F	Dominant Information Sciences and Methods	02	178,668				178,668	U
15	0602890F	High Energy Laser Research	02	45,088				45,088	U

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

Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted S (Base+Emerg+ e OCO)	c
16	1206601F	Space Technology	02	131,341	161,667			161,667	U
		Applied Research		1,482,434	1,656,126			1,656,126	
17	0603030F	AF Foundational Development/Demos	03						U
18	0603032F	Future AF Integrated Technology Demos	03						U
19	0603033F	Next Gen Platform Dev/Demo	03						U
20	0603034F	Persistent Knowledge, Awareness, & C2 Tech	03						U
21	0603035F	Next Gen Effects Dev/Demos	03						U
22	0603112F	Advanced Materials for Weapon Systems	03	44,099	60,086			60,086	U
23	0603199F	Sustainment Science and Technology (S&T)	03	13,353	16,249			16,249	U
24	0603203F	Advanced Aerospace Sensors	03	41,462	42,292			42,292	U
25	0603211F	Aerospace Technology Dev/Demo	03	115,406	127,949			127,949	U
26	0603216F	Aerospace Propulsion and Power Technology	03	140,247	170,973			170,973	U
27	0603270F	Electronic Combat Technology	03	53,704	48,408			48,408	U
28	0603401F	Advanced Spacecraft Technology	03	65,727	80,525			80,525	U
29	0603444F	Maui Space Surveillance System (MSSS)	03	10,268	11,878			11,878	U
30	0603456F	Human Effectiveness Advanced Technology Development	03	32,624	37,542			37,542	U
31	0603601F	Conventional Weapons Technology	03	191,704	225,817			225,817	U

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Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Se
16	1206601F	Space Technology	02						U
		Applied Research		1,409,749				1,409,749	
17	0603030F	AF Foundational Development/Demos	03	103,280				103,280	U
18	0603032F	Future AF Integrated Technology Demos	03	157,619				157,619	U
19	0603033F	Next Gen Platform Dev/Demo	03	199,556				199,556	U
20	0603034F	Persistent Knowledge, Awareness, & C2 Tech	03	102,276				102,276	U
21	0603035F	Next Gen Effects Dev/Demos	03	215,817				215,817	U
22	0603112F	Advanced Materials for Weapon Systems	03						U
23	0603199F	Sustainment Science and Technology (S&T)	03						U
24	0603203F	Advanced Aerospace Sensors	03						U
25	0603211F	Aerospace Technology Dev/Demo	03						U
26	0603216F	Aerospace Propulsion and Power Technology	03						U
27	0603270F	Electronic Combat Technology	03						U
28	0603401F	Advanced Spacecraft Technology	03						U
29	0603444F	Maui Space Surveillance System (MSSS)	03						U
30	0603456F	Human Effectiveness Advanced Technology Development	03						U
31	0603601F	Conventional Weapons Technology	03						U

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32	0603605F	Advanced Weapons Technology	03	39,438	37,404			37,404	U
33	0603680F	Manufacturing Technology Program	03	62,187	130,916			130,916	U
34	0603788F	Battlespace Knowledge Development and Demonstration	03	58,369	56,414			56,414	U
35	0604445F	Wide Area Surveillance	03		20,000			20,000	U
36	0303467F	SENSR Spectrum Pipeline SRF	03	7,265					U
37	0303567F	Non-SENSR Spectrum Pipeline SRF	03	155					U
		Advanced Technology Development		876,008	1,066,453			1,066,453	
38	0603260F	Intelligence Advanced Development	04	5,568	5,672			5,672	U
39	0603742F	Combat Identification Technology	04	17,561	32,085			32,085	U
40	0603790F	NATO Research and Development	04	2,221	4,955			4,955	U
41	0603851F	Intercontinental Ballistic Missile - Dem/Val	04	24,994	30,969			30,969	U
42	0603859F	Pollution Prevention - Dem/Val	04	193	3,000			3,000	U
43	0604002F	Air Force Weather Services Research	04		772			772	U
44	0604003F	Advanced Battle Management System (ABMS)	04		8,000			8,000	U
45	0604004F	Advanced Engine Development	04	696,099	671,442			671,442	U
46	0604015F	Long Range Strike - Bomber	04	2,189,945	2,982,499			2,982,499	U
47	0604032F	Directed Energy Prototyping	04	48,316	44,000			44,000	U
48	0604033F	Hypersonics Prototyping	04	494,485	576,000			576,000	U

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Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Se
32	0603605F	Advanced Weapons Technology	03						U
33	0603680F	Manufacturing Technology Program	03						U
34	0603788F	Battlespace Knowledge Development and Demonstration	03						U
35	0604445F	Wide Area Surveillance	03						U
36	0303467F	SENSR Spectrum Pipeline SRF	03						U
37	0303567F	Non-SENSR Spectrum Pipeline SRF	03						U
		Advanced Technology Development		778,548				778,548	
38	0603260F	Intelligence Advanced Development	04	4,320				4,320	U
39	0603742F	Combat Identification Technology	04	26,396				26,396	U
40	0603790F	NATO Research and Development	04	3,647				3,647	U
41	0603851F	Intercontinental Ballistic Missile - Dem/Val	04	32,959				32,959	U
42	0603859F	Pollution Prevention - Dem/Val	04						U
43	0604002F	Air Force Weather Services Research	04	869				869	U
44	0604003F	Advanced Battle Management System (ABMS)	04	302,323				302,323	U
45	0604004F	Advanced Engine Development	04	636,495				636,495	U
46	0604015F	Long Range Strike - Bomber	04	2,848,410				2,848,410	U
47	0604032F	Directed Energy Prototyping	04	20,964				20,964	U
48	0604033F	Hypersonics Prototyping	04	381,862				381,862	U

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

Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted S (Base+Emerg+ e OCO)	c
49	0604201F	PNT Resiliency, Mods, and Improvements	04	86,445	124,600			124,600	U
50	0604257F	Advanced Technology and Sensors	04	34,585	23,145			23,145	U
51	0604288F	National Airborne Ops Center (NAOC) Recap	04	7,168	12,669			12,669	U
52	0604317F	Technology Transfer	04	18,754	37,614			37,614	U
53	0604327F	Hard and Deeply Buried Target Defeat System (HDBTDS) Program	04	41,259	113,121			113,121	U
54	0604414F	Cyber Resiliency of Weapon Systems-ACS	04	57,671	56,325			56,325	U
55	0604776F	Deployment & Distribution Enterprise R&D	04	27,301	28,034			28,034	U
56	0604858F	Tech Transition Program	04	163,132	288,476		26,450	314,926	U
57	0605230F	Ground Based Strategic Deterrent	04	401,244	557,495			557,495	U
58	0207100F	Light Attack Armed Reconnaissance (LAAR) Squadrons	04		2,000			2,000	U
59	0207110F	Next Generation Air Dominance	04	413,938	905,000			905,000	U
60	0207455F	Three Dimensional Long-Range Radar (3DELRR)	04	24,716	23,190			23,190	U
61	0207522F	Airbase Air Defense Systems (ABADS)	04						U
62	0208099F	Unified Platform (UP)	04	28,327	10,000			10,000	U
63	0305236F	Common Data Link Executive Agent (CDL EA)	04	41,880	36,910			36,910	U

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

Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	See
49	0604201F	PNT Resiliency, Mods, and Improvements	04						U
50	0604257F	Advanced Technology and Sensors	04	24,747				24,747	U
51	0604288F	National Airborne Ops Center (NAOC) Recap	04	76,417				76,417	U
52	0604317F	Technology Transfer	04	3,011				3,011	U
53	0604327F	Hard and Deeply Buried Target Defeat System (HDBTDS) Program	04	52,921				52,921	U
54	0604414F	Cyber Resiliency of Weapon Systems-ACS	04	69,783				69,783	U
55	0604776F	Deployment & Distribution Enterprise R&D	04	25,835				25,835	U
56	0604858F	Tech Transition Program	04	219,252				219,252	U
57	0605230F	Ground Based Strategic Deterrent	04	1,524,759				1,524,759	U
58	0207100F	Light Attack Armed Reconnaissance (LAAR) Squadrons	04						U
59	0207110F	Next Generation Air Dominance	04	1,044,089				1,044,089	U
60	0207455F	Three Dimensional Long-Range Radar (3DELRR)	04	19,356				19,356	U
61	0207522F	Airbase Air Defense Systems (ABADS)	04	8,737				8,737	U
62	0208099F	Unified Platform (UP)	04	5,990				5,990	U
63	0305236F	Common Data Link Executive Agent (CDL EA)	04	39,293				39,293	U

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

Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted S (Base+Emerg+ e OCO)	c
64	0305251F	Cyberspace Operations Forces and Force Support	04		35,000			35,000	U
65	0305601F	Mission Partner Environments	04	9,694	8,550			8,550	U
66	0306250F	Cyber Operations Technology Development	04	237,393	202,364			202,364	U
67	0306415F	Enabled Cyber Activities	04	15,728	16,632			16,632	U
68	0401310F	C-32 Executive Transport Recapitalization	04						U
69	0901410F	Contracting Information Technology System	04	16,998	20,830			20,830	U
70	1203164F	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04	236,786	320,598			320,598	U
71	1203710F	EO/IR Weather Systems	04	7,786	125,964			125,964	U
72	1206422F	Weather System Follow-on	04	128,600	205,660			205,660	U
73	1206425F	Space Situation Awareness Systems	04	32,351	29,776			29,776	U
74	1206427F	Space Systems Prototype Transitions (SSPT)	04		142,045			142,045	U
75	1206434F	Midterm Polar MILSATCOM System	04	370,353					U
76	1206438F	Space Control Technology	04	68,604	58,231			58,231	U
77	1206730F	Space Security and Defense Program	04	45,542	56,385			56,385	U
78	1206760F	Protected Tactical Enterprise Service (PTES)	04	45,009	105,003			105,003	U
79	1206761F	Protected Tactical Service (PTS)	04	28,754	163,694			163,694	U
80	1206855F	Evolved Strategic SATCOM (ESS)	04	28,498	167,206			167,206	U

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64	0305251F	Cyberspace Operations Forces and Force Support	04						U
65	0305601F	Mission Partner Environments	04	11,430				11,430	U
66	0306250F	Cyber Operations Technology Development	04	259,823				259,823	U
67	0306415F	Enabled Cyber Activities	04	10,560				10,560	U
68	0401310F	C-32 Executive Transport Recapitalization	04	9,908				9,908	U
69	0901410F	Contracting Information Technology System	04	8,662				8,662	U
70	1203164F	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04						U
71	1203710F	EO/IR Weather Systems	04						U
72	1206422F	Weather System Follow-on	04						U
73	1206425F	Space Situation Awareness Systems	04						U
74	1206427F	Space Systems Prototype Transitions (SSPT)	04	8,787				8,787	U
75	1206434F	Midterm Polar MILSATCOM System	04						U
76	1206438F	Space Control Technology	04						U
77	1206730F	Space Security and Defense Program	04	56,311				56,311	U
78	1206760F	Protected Tactical Enterprise Service (PTES)	04						U
79	1206761F	Protected Tactical Service (PTS)	04						U
80	1206855F	Evolved Strategic SATCOM (ESS)	04						U

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81	1206857F	Space Rapid Capabilities Office	04	288,289	9,000		17,885	26,885	U
		Advanced Component Development & Prototypes		6,386,187	8,244,911		44,335	8,289,246	
82	0604200F	Future Advanced Weapon Analysis & Programs	05	262	5,000			5,000	U
83	0604201F	PNT Resiliency, Mods, and Improvements	05	45,363	142,782			142,782	U
84	0604222F	Nuclear Weapons Support	05	4,311	4,406			4,406	U
85	0604270F	Electronic Warfare Development	05	1,839	2,066			2,066	U
86	0604281F	Tactical Data Networks Enterprise	05	242,328	189,631			189,631	U
87	0604287F	Physical Security Equipment	05	13,893	9,700			9,700	U
88	0604329F	Small Diameter Bomb (SDB) - EMD	05	75,345	45,241			45,241	U
89	0604429F	Airborne Electronic Attack	05	5,948					U
90	0604602F	Armament/Ordnance Development	05	44,788	28,043			28,043	U
91	0604604F	Submunitions	05	2,989	3,045			3,045	U
92	0604617F	Agile Combat Support	05	22,739	26,944			26,944	U
93	0604618F	Joint Direct Attack Munition	05						U
94	0604706F	Life Support Systems	05	10,334	14,624			14,624	U
95	0604735F	Combat Training Ranges	05	42,383	52,365			52,365	U
96	0604800F	F-35 - EMD	05	67,999	7,628			7,628	U
97	0604932F	Long Range Standoff Weapon	05	646,800	712,539			712,539	U
98	0604933F	ICBM Fuze Modernization	05	124,457	161,199			161,199	U

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81	1206857F	Space Rapid Capabilities Office	04						U
		Advanced Component Development & Prototypes		7,737,916				7,737,916	
82	0604200F	Future Advanced Weapon Analysis & Programs	05	25,161				25,161	U
83	0604201F	PNT Resiliency, Mods, and Improvements	05	38,564				38,564	U
84	0604222F	Nuclear Weapons Support	05	35,033				35,033	U
85	0604270F	Electronic Warfare Development	05	2,098				2,098	U
86	0604281F	Tactical Data Networks Enterprise	05	131,909				131,909	U
87	0604287F	Physical Security Equipment	05	6,752				6,752	U
88	0604329F	Small Diameter Bomb (SDB) - EMD	05	17,280				17,280	U
89	0604429F	Airborne Electronic Attack	05						U
90	0604602F	Armament/Ordnance Development	05	23,076				23,076	U
91	0604604F	Submunitions	05	3,091				3,091	U
92	0604617F	Agile Combat Support	05	20,609				20,609	U
93	0604618F	Joint Direct Attack Munition	05	7,926				7,926	U
94	0604706F	Life Support Systems	05	23,660				23,660	U
95	0604735F	Combat Training Ranges	05	8,898				8,898	U
96	0604800F	F-35 - EMD	05	5,423				5,423	U
97	0604932F	Long Range Standoff Weapon	05	474,430				474,430	U
98	0604933F	ICBM Fuze Modernization	05	167,099				167,099	U

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99	0605030F	Joint Tactical Network Center (JTNC)	05		2,414			2,414	U
100	0605056F	Open Architecture Management	05		30,000			30,000	U
101	0605221F	KC-46	05	77,852	59,561			59,561	U
102	0605223F	Advanced Pilot Training	05	236,840	340,373			340,373	U
103	0605229F	Combat Rescue Helicopter	05	430,483	247,047			247,047	U
104	0605931F	B-2 Defensive Management System	05	244,638	250,100			250,100	U
105	0101125F	Nuclear Weapons Modernization	05	42,001	27,564			27,564	U
106	0207171F	F-15 EPAWSS	05	133,382	47,322			47,322	U
107	0207328F	Stand In Attack Weapon	05	14,542	162,840			162,840	U
108	0207701F	Full Combat Mission Training	05	978	9,797			9,797	U
109	0303267F	Auctioned Spectrum Relocation Fund	05	44,652					U
110	0305176F	Combat Survivor Evader Locator	05						U
111	0401221F	KC-46A Tanker Squadrons	05						U
112	0401310F	C-32 Executive Transport Recapitalization	05	5,989	9,930			9,930	U
113	0401319F	VC-25B	05	713,633	757,923			757,923	U
114	0701212F	Automated Test Systems	05	13,153	2,787			2,787	U
115	0804772F	Training Developments	05						U
116	0901299F	AF A1 Systems	05						U
117	1203176F	Combat Survivor Evader Locator	05	913	2,000			2,000	U

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99	0605030F	Joint Tactical Network Center (JTNC)	05						U
100	0605056F	Open Architecture Management	05	30,547				30,547	U
101	0605221F	KC-46	05						U
102	0605223F	Advanced Pilot Training	05	248,669				248,669	U
103	0605229F	Combat Rescue Helicopter	05	63,169				63,169	U
104	0605931F	B-2 Defensive Management System	05						U
105	0101125F	Nuclear Weapons Modernization	05	9,683				9,683	U
106	0207171F	F-15 EPAWSS	05	170,679				170,679	U
107	0207328F	Stand In Attack Weapon	05	160,438				160,438	U
108	0207701F	Full Combat Mission Training	05	9,422				9,422	U
109	0303267F	Auctioned Spectrum Relocation Fund	05						U
110	0305176F	Combat Survivor Evader Locator	05	973				973	U
111	0401221F	KC-46A Tanker Squadrons	05	106,262				106,262	U
112	0401310F	C-32 Executive Transport Recapitalization	05						U
113	0401319F	VC-25B	05	800,889				800,889	U
114	0701212F	Automated Test Systems	05	10,673				10,673	U
115	0804772F	Training Developments	05	4,479				4,479	U
116	0901299F	AF A1 Systems	05	8,467				8,467	U
117	1203176F	Combat Survivor Evader Locator	05						U

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118	1203269F	GPS III Follow-On (GPS IIIIF)	05	412,202	447,875			447,875	U
119	1203940F	Space Situation Awareness Operations	05	35,569	56,829			56,829	U
120	1206421F	Counterspace Systems	05	19,637	27,037			27,037	U
121	1206422F	Weather System Follow-on	05		2,237			2,237	U
122	1206425F	Space Situation Awareness Systems	05	139,172	362,894			362,894	U
123	1206426F	Space Fence	05	18,841					U
124	1206431F	Advanced EHF MILSATCOM (SPACE)	05	139,927	117,290			117,290	U
125	1206432F	Polar MILSATCOM (SPACE)	05	25,480	412,400			412,400	U
126	1206433F	Wideband Global SATCOM (SPACE)	05	3,833	1,920			1,920	U
127	1206441F	Space Based Infrared System (SBIRS) High EMD	05	58,765	1			1	U
128	1206442F	Next Generation OPIR	05	736,389	1,470,278			1,470,278	U
129	1206445F	Commercial SATCOM (COMSATCOM) Integration	05	47,869	5,000			5,000	U
130	1206853F	National Security Space Launch Program (SPACE) - EMD	05	428,525	432,009			432,009	U
		System Development & Demonstration		5,377,043	6,690,641			6,690,641	
131	0604256F	Threat Simulator Development	06	33,666	59,693			59,693	U
132	0604759F	Major T&E Investment	06	213,273	106,663			106,663	U
133	0605101F	RAND Project Air Force	06	33,308	35,258			35,258	U
134	0605502F	Small Business Innovation Research	06	795,378					U

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118	1203269F	GPS III Follow-On (GPS IIIIF)	05						U
119	1203940F	Space Situation Awareness Operations	05						U
120	1206421F	Counterspace Systems	05						U
121	1206422F	Weather System Follow-on	05						U
122	1206425F	Space Situation Awareness Systems	05						U
123	1206426F	Space Fence	05						U
124	1206431F	Advanced EHF MILSATCOM (SPACE)	05						U
125	1206432F	Polar MILSATCOM (SPACE)	05						U
126	1206433F	Wideband Global SATCOM (SPACE)	05						U
127	1206441F	Space Based Infrared System (SBIRS) High EMD	05						U
128	1206442F	Next Generation OPIR	05						U
129	1206445F	Commercial SATCOM (COMSATCOM) Integration	05						U
130	1206853F	National Security Space Launch Program (SPACE) - EMD	05						U
		System Development & Demonstration		2,615,359				2,615,359	
131	0604256F	Threat Simulator Development	06	57,725				57,725	U
132	0604759F	Major T&E Investment	06	208,680				208,680	U
133	0605101F	RAND Project Air Force	06	35,803				35,803	U
134	0605502F	Small Business Innovation Research	06						U

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135	0605712F	Initial Operational Test & Evaluation	06	17,383	13,793			13,793	U
136	0605807F	Test and Evaluation Support	06	692,784	717,895			717,895	U
137	0605826F	Acq Workforce- Global Power	06	229,904	255,667			255,667	U
138	0605827F	Acq Workforce- Global Vig & Combat Sys	06	243,647	249,992			249,992	U
139	0605828F	Acq Workforce- Global Reach	06	149,306	149,191			149,191	U
140	0605829F	Acq Workforce- Cyber, Network, & Bus Sys	06	227,337	235,360			235,360	U
141	0605830F	Acq Workforce- Global Battle Mgmt	06	157,258	160,196			160,196	U
142	0605831F	Acq Workforce- Capability Integration	06	237,297	228,255			228,255	U
143	0605832F	Acq Workforce- Advanced Prgm Technology	06	36,739	39,392			39,392	U
144	0605833F	Acq Workforce- Nuclear Systems	06	126,681	133,231			133,231	U
145	0605898F	Management HQ - R&D	06	11,024	5,590			5,590	U
146	0605976F	Facilities Restoration and Modernization - Test and Evaluation Support	06	187,216	88,445			88,445	U
147	0605978F	Facilities Sustainment - Test and Evaluation Support	06	28,888	29,424			29,424	U
148	0606017F	Requirements Analysis and Maturation	06	46,145	86,715			86,715	U
149	0606398F	Management HQ - T&E	06		5,013			5,013	U

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135	0605712F	Initial Operational Test & Evaluation	06	13,557				13,557	U
136	0605807F	Test and Evaluation Support	06	764,606				764,606	U
137	0605826F	Acq Workforce- Global Power	06						U
138	0605827F	Acq Workforce- Global Vig & Combat Sys	06						U
139	0605828F	Acq Workforce- Global Reach	06						U
140	0605829F	Acq Workforce- Cyber, Network, & Bus Sys	06						U
141	0605830F	Acq Workforce- Global Battle Mgmt	06						U
142	0605831F	Acq Workforce- Capability Integration	06	1,362,038				1,362,038	U
143	0605832F	Acq Workforce- Advanced Prgm Technology	06	40,768				40,768	U
144	0605833F	Acq Workforce- Nuclear Systems	06	179,646				179,646	U
145	0605898F	Management HQ - R&D	06	5,734				5,734	U
146	0605976F	Facilities Restoration and Modernization - Test and Evaluation Support	06	70,985				70,985	U
147	0605978F	Facilities Sustainment - Test and Evaluation Support	06	29,880				29,880	U
148	0606017F	Requirements Analysis and Maturation	06	63,381				63,381	U
149	0606398F	Management HQ - T&E	06	5,785				5,785	U

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150	0303255F	Command, Control, Communication, and Computers (C4) - STRATCOM	06						U
151	0308602F	ENTEPRISE INFORMATION SERVICES (EIS)	06	17,258	10,628			10,628	U
152	0702806F	Acquisition and Management Support	06	12,130	5,913			5,913	U
153	0804731F	General Skill Training	06	432	6,475			6,475	U
154	0909999F	Financing for Cancelled Account Adjustments	06	3,593					U
155	1001004F	International Activities	06	3,866	4,071			4,071	U
156	1206116F	Space Test and Training Range Development	06	22,408	14,942			14,942	U
157	1206392F	ACQ Workforce - Space & Missile Systems	06	180,512	167,810			167,810	U
158	1206398F	Space & Missile Systems Center - MHA	06	10,508	10,170			10,170	U
159	1206860F	Rocket Systems Launch Program (SPACE)	06	21,906	13,192			13,192	U
160	1206862F	Tactically Responsive Launch	06		19,000			19,000	U
161	1206864F	Space Test Program (STP)	06	29,731	26,097			26,097	U
		Management Support		3,769,578	2,878,071			2,878,071	
162	0604003F	Advanced Battle Management System (ABMS)	07	27,883	35,611			35,611	U
163	0604233F	Specialized Undergraduate Flight Training	07	10,974	2,584			2,584	U

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150	0303255F	Command, Control, Communication, and Computers (C4) - STRATCOM	06	24,564				24,564	U
151	0308602F	ENTEPRISE INFORMATION SERVICES (EIS)	06	9,883				9,883	U
152	0702806F	Acquisition and Management Support	06	13,384				13,384	U
153	0804731F	General Skill Training	06	1,262				1,262	U
154	0909999F	Financing for Cancelled Account Adjustments	06						U
155	1001004F	International Activities	06	3,599				3,599	U
156	1206116F	Space Test and Training Range Development	06						U
157	1206392F	ACQ Workforce - Space & Missile Systems	06						U
158	1206398F	Space & Missile Systems Center - MHA	06						U
159	1206860F	Rocket Systems Launch Program (SPACE)	06						U
160	1206862F	Tactically Responsive Launch	06						U
161	1206864F	Space Test Program (STP)	06						U
		Management Support		2,891,280				2,891,280	
162	0604003F	Advanced Battle Management System (ABMS)	07						U
163	0604233F	Specialized Undergraduate Flight Training	07	8,777				8,777	U

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164	0604776F	Deployment & Distribution Enterprise R&D	07	257	903			903	U
165	0604840F	F-35 C2D2	07		642,371			642,371	U
166	0605018F	AF Integrated Personnel and Pay System (AF-IPPS)	07	39,794	40,567			40,567	U
167	0605024F	Anti-Tamper Technology Executive Agency	07	32,182	47,193			47,193	U
168	0605117F	Foreign Materiel Acquisition and Exploitation	07	68,368	70,083			70,083	U
169	0605278F	HC/MC-130 Recap RDT&E	07	15,641	17,218			17,218	U
170	0606018F	NC3 Integration	07	18,633	25,917			25,917	U
171	0606942F	Assessments and Evaluations Cyber Vulnerabilities	07	84,908					U
172	0101113F	B-52 Squadrons	07	290,097	323,624			323,624	U
173	0101122F	Air-Launched Cruise Missile (ALCM)	07	5,741	10,217			10,217	U
174	0101126F	B-1B Squadrons	07	58,175	1,000			1,000	U
175	0101127F	B-2 Squadrons	07	101,827	93,076			93,076	U
176	0101213F	Minuteman Squadrons	07	185,640	104,219			104,219	U
177	0101316F	Worldwide Joint Strategic Communications	07	17,767	26,177			26,177	U
178	0101324F	Integrated Strategic Planning & Analysis Network	07	22,231	24,261			24,261	U
179	0101328F	ICBM Reentry Vehicles	07	13,747	65,671			65,671	U
181	0102110F	UH-1N Replacement Program	07	190,523	170,975			170,975	U

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164	0604776F	Deployment & Distribution Enterprise R&D	07	499				499	U
165	0604840F	F-35 C2D2	07	785,336				785,336	U
166	0605018F	AF Integrated Personnel and Pay System (AF-IPPS)	07	27,035				27,035	U
167	0605024F	Anti-Tamper Technology Executive Agency	07	50,508				50,508	U
168	0605117F	Foreign Materiel Acquisition and Exploitation	07	71,229				71,229	U
169	0605278F	HC/MC-130 Recap RDT&E	07	24,705				24,705	U
170	0606018F	NC3 Integration	07	26,356				26,356	U
171	0606942F	Assessments and Evaluations Cyber Vulnerabilities	07						U
172	0101113F	B-52 Squadrons	07	520,023				520,023	U
173	0101122F	Air-Launched Cruise Missile (ALCM)	07	1,433				1,433	U
174	0101126F	B-1B Squadrons	07	15,766				15,766	U
175	0101127F	B-2 Squadrons	07	187,399				187,399	U
176	0101213F	Minuteman Squadrons	07	116,569				116,569	U
177	0101316F	Worldwide Joint Strategic Communications	07	27,235				27,235	U
178	0101324F	Integrated Strategic Planning & Analysis Network	07	24,227				24,227	U
179	0101328F	ICBM Reentry Vehicles	07	112,753				112,753	U
181	0102110F	UH-1N Replacement Program	07	44,464				44,464	U

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182	0102326F	Region/Sector Operation Control Center Modernization Program	07	5,904					U
183	0102412F	North Warning System (NWS)	07						U
184	0205219F	MQ-9 UAV	07	105,088	127,296			127,296	U
185	0205671F	Joint Counter RCIED Electronic Warfare	07	4,000			4,000	4,000	U
186	0207131F	A-10 Squadrons	07	27,537	31,916			31,916	U
187	0207133F	F-16 Squadrons	07	182,190	193,013			193,013	U
188	0207134F	F-15E Squadrons	07	196,035	684,229			684,229	U
189	0207136F	Manned Destructive Suppression	07	13,609	15,521			15,521	U
190	0207138F	F-22A Squadrons	07	563,635	546,298			546,298	U
191	0207142F	F-35 Squadrons	07	490,319	99,943			99,943	U
192	0207146F	F-15EX	07						U
193	0207161F	Tactical AIM Missiles	07	29,042	10,314			10,314	U
194	0207163F	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07	50,728	55,384			55,384	U
195	0207227F	Combat Rescue - Pararescue	07	623	281			281	U
196	0207247F	AF TENCAP	07		21,365			21,365	U
197	0207249F	Precision Attack Systems Procurement	07	14,346	10,696			10,696	U
198	0207253F	Compass Call	07	43,466	31,888			31,888	U
199	0207268F	Aircraft Engine Component Improvement Program	07	116,808	112,505			112,505	U

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182	0102326F	Region/Sector Operation Control Center Modernization Program	07	5,929				5,929	U
183	0102412F	North Warning System (NWS)	07	100				100	U
184	0205219F	MQ-9 UAV	07	162,080				162,080	U
185	0205671F	Joint Counter RCIED Electronic Warfare	07			4,080	4,080	4,080	U
186	0207131F	A-10 Squadrons	07	24,535				24,535	U
187	0207133F	F-16 Squadrons	07	223,437				223,437	U
188	0207134F	F-15E Squadrons	07	298,908				298,908	U
189	0207136F	Manned Destructive Suppression	07	14,960				14,960	U
190	0207138F	F-22A Squadrons	07	665,038				665,038	U
191	0207142F	F-35 Squadrons	07	132,229				132,229	U
192	0207146F	F-15EX	07	159,761				159,761	U
193	0207161F	Tactical AIM Missiles	07	19,417				19,417	U
194	0207163F	Advanced Medium Range Air-to-Air Missile (AMRAAM)	07	51,799				51,799	U
195	0207227F	Combat Rescue - Pararescue	07	669				669	U
196	0207247F	AF TENCAP	07	21,644				21,644	U
197	0207249F	Precision Attack Systems Procurement	07	9,261				9,261	U
198	0207253F	Compass Call	07	15,854				15,854	U
199	0207268F	Aircraft Engine Component Improvement Program	07	95,896				95,896	U

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200	0207325F	Joint Air-to-Surface Standoff Missile (JASSM)	07	40,933	78,498			78,498	U
201	0207410F	Air & Space Operations Center (AOC)	07	98,854	114,864			114,864	U
202	0207412F	Control and Reporting Center (CRC)	07	6,216	8,109			8,109	U
203	0207417F	Airborne Warning and Control System (AWACS)	07	108,795	67,996			67,996	U
204	0207418F	AFSPECWAR - TACP	07	2,562	2,462			2,462	U
206	0207431F	Combat Air Intelligence System Activities	07	10,316	13,668			13,668	U
207	0207438F	Theater Battle Management (TBM) C4I	07						U
208	0207444F	Tactical Air Control Party-Mod	07	6,135	4,117			4,117	U
209	0207448F	C2ISR Tactical Data Link	07	538					U
210	0207452F	DCAPES	07	14,649	19,910			19,910	U
211	0207521F	Air Force Calibration Programs	07						U
212	0207573F	National Technical Nuclear Forensics	07	1,723	1,788			1,788	U
213	0207590F	Seek Eagle	07	24,618	28,237			28,237	U
214	0207601F	USAF Modeling and Simulation	07	16,572	15,725			15,725	U
215	0207605F	Wargaming and Simulation Centers	07	5,916	4,316			4,316	U
216	0207610F	Battlefield Abn Comm Node (BACN)	07	42,349	26,946			26,946	U
217	0207697F	Distributed Training and Exercises	07	3,699	4,303			4,303	U

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200	0207325F	Joint Air-to-Surface Standoff Missile (JASSM)	07	70,792				70,792	U
201	0207410F	Air & Space Operations Center (AOC)	07	51,187				51,187	U
202	0207412F	Control and Reporting Center (CRC)	07	16,041				16,041	U
203	0207417F	Airborne Warning and Control System (AWACS)	07	138,303				138,303	U
204	0207418F	AFSPECWAR - TACP	07	4,223				4,223	U
206	0207431F	Combat Air Intelligence System Activities	07	16,564				16,564	U
207	0207438F	Theater Battle Management (TBM) C4I	07	7,858				7,858	U
208	0207444F	Tactical Air Control Party-Mod	07	12,906				12,906	U
209	0207448F	C2ISR Tactical Data Link	07						U
210	0207452F	DCAPES	07	14,816				14,816	U
211	0207521F	Air Force Calibration Programs	07	1,970				1,970	U
212	0207573F	National Technical Nuclear Forensics	07	396				396	U
213	0207590F	Seek Eagle	07	29,680				29,680	U
214	0207601F	USAF Modeling and Simulation	07	17,666				17,666	U
215	0207605F	Wargaming and Simulation Centers	07	6,353				6,353	U
216	0207610F	Battlefield Abn Comm Node (BACN)	07	6,827				6,827	U
217	0207697F	Distributed Training and Exercises	07	3,390				3,390	U

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218	0208006F	Mission Planning Systems	07	61,164	71,465			71,465	U
219	0208007F	Tactical Deception	07	6,687	7,446			7,446	U
220	0208064F	OPERATIONAL HQ - CYBER	07		7,602			7,602	U
221	0208087F	Distributed Cyber Warfare Operations	07	38,857	35,178			35,178	U
222	0208088F	AF Defensive Cyberspace Operations	07	36,953	38,609			38,609	U
223	0208097F	Joint Cyber Command and Control (JCC2)	07	12,553	11,603			11,603	U
224	0208099F	Unified Platform (UP)	07	26,093	84,702			84,702	U
228	0208288F	Intel Data Applications	07	1,200			1,200	1,200	U
229	0301017F	Global Sensor Integrated on Network (GSIN)	07	3,468					U
230	0301025F	GeoBase	07		2,723			2,723	U
231	0301112F	Nuclear Planning and Execution System (NPES)	07	28,623	44,190			44,190	U
238	0301401F	Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness	07	6,633	3,575			3,575	U
239	0302015F	E-4B National Airborne Operations Center (NAOC)	07	55,707	60,173			60,173	U
240	0303131F	Minimum Essential Emergency Communications Network (MEECN)	07	62,146	13,543			13,543	U
241	0303133F	High Frequency Radio Systems	07	49,912	15,881			15,881	U
242	0303140F	Information Systems Security Program	07	35,775	27,726			27,726	U

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218	0208006F	Mission Planning Systems	07	91,768				91,768	U
219	0208007F	Tactical Deception	07	2,370				2,370	U
220	0208064F	OPERATIONAL HQ - CYBER	07	5,527				5,527	U
221	0208087F	Distributed Cyber Warfare Operations	07	68,279				68,279	U
222	0208088F	AF Defensive Cyberspace Operations	07	15,165				15,165	U
223	0208097F	Joint Cyber Command and Control (JCC2)	07	38,480				38,480	U
224	0208099F	Unified Platform (UP)	07	84,645				84,645	U
228	0208288F	Intel Data Applications	07			1,224	1,224	1,224	U
229	0301017F	Global Sensor Integrated on Network (GSIN)	07						U
230	0301025F	GeoBase	07	2,767				2,767	U
231	0301112F	Nuclear Planning and Execution System (NPES)	07	32,759				32,759	U
238	0301401F	Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness	07	2,904				2,904	U
239	0302015F	E-4B National Airborne Operations Center (NAOC)	07	3,468				3,468	U
240	0303131F	Minimum Essential Emergency Communications Network (MEECN)	07	61,887				61,887	U
241	0303133F	High Frequency Radio Systems	07						U
242	0303140F	Information Systems Security Program	07	10,351				10,351	U

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								Total Enacted S (Base+Emerg+ e OCO)	c
243	0303142F	Global Force Management - Data Initiative	07	2,108	2,210			2,210	U
245	0304115F	Multi Domain Command and Control (MDC2)	07		100,880			100,880	U
246	0304260F	Airborne SIGINT Enterprise	07	109,838	85,157			85,157	U
247	0304310F	Commercial Economic Analysis	07	4,014	3,431			3,431	U
250	0305015F	C2 Air Operations Suite - C2 Info Services	07	8,324	9,313			9,313	U
251	0305020F	CCMD Intelligence Information Technology	07	1,586	1,121			1,121	U
252	0305022F	ISR Modernization & Automation Dvmt (IMAD)	07		19,000			19,000	U
253	0305099F	Global Air Traffic Management (GATM)	07	3,966	4,544			4,544	U
254	0305103F	Cyber Security Initiative	07						U
255	0305111F	Weather Service	07	33,563	35,461			35,461	U
256	0305114F	Air Traffic Control, Approach, and Landing System (ATCALs)	07	12,873	8,651			8,651	U
257	0305116F	Aerial Targets	07	6,527	7,448			7,448	U
260	0305128F	Security and Investigative Activities	07	403	425			425	U
261	0305145F	Arms Control Implementation	07	24,804	41,546			41,546	U
262	0305146F	Defense Joint Counterintelligence Activities	07	3,845	6,858			6,858	U
264	0305179F	Integrated Broadcast Service (IBS)	07		8,728			8,728	U

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243	0303142F	Global Force Management - Data Initiative	07	1,346				1,346	U
245	0304115F	Multi Domain Command and Control (MDC2)	07						U
246	0304260F	Airborne SIGINT Enterprise	07	128,110				128,110	U
247	0304310F	Commercial Economic Analysis	07	4,042				4,042	U
250	0305015F	C2 Air Operations Suite - C2 Info Services	07						U
251	0305020F	CCMD Intelligence Information Technology	07	1,649				1,649	U
252	0305022F	ISR Modernization & Automation Dvmt (IMAD)	07	19,265				19,265	U
253	0305099F	Global Air Traffic Management (GATM)	07	4,645				4,645	U
254	0305103F	Cyber Security Initiative	07	384				384	U
255	0305111F	Weather Service	07	23,640				23,640	U
256	0305114F	Air Traffic Control, Approach, and Landing System (ATCALs)	07	6,553				6,553	U
257	0305116F	Aerial Targets	07	449				449	U
260	0305128F	Security and Investigative Activities	07	432				432	U
261	0305145F	Arms Control Implementation	07						U
262	0305146F	Defense Joint Counterintelligence Activities	07	4,890				4,890	U
264	0305179F	Integrated Broadcast Service (IBS)	07	8,864				8,864	U

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265	0305202F	Dragon U-2	07	87,618	36,389			36,389	U
266	0305205F	Endurance Unmanned Aerial Vehicles	07	15,000	15,000			15,000	U
267	0305206F	Airborne Reconnaissance Systems	07	195,323	137,909			137,909	U
268	0305207F	Manned Reconnaissance Systems	07	14,223	11,787			11,787	U
269	0305208F	Distributed Common Ground/Surface Systems	07	52,421	25,009			25,009	U
270	0305220F	RQ-4 UAV	07	221,675	191,733			191,733	U
271	0305221F	Network-Centric Collaborative Targeting	07	14,256	10,757			10,757	U
272	0305238F	NATO AGS	07	51,527	32,567			32,567	U
273	0305240F	Support to DCGS Enterprise	07	26,579	37,774			37,774	U
274	0305600F	International Intelligence Technology and Architectures	07	11,564	13,515			13,515	U
275	0305881F	Rapid Cyber Acquisition	07	4,146	4,383			4,383	U
276	0305984F	Personnel Recovery Command & Ctrl (PRC2)	07	2,385	2,133			2,133	U
277	0307577F	Intelligence Mission Data (IMD)	07	5,717	8,614			8,614	U
278	0401115F	C-130 Airlift Squadron	07	58,408	101,425			101,425	U
279	0401119F	C-5 Airlift Squadrons (IF)	07	28,245	10,223			10,223	U
280	0401130F	C-17 Aircraft (IF)	07	43,288	21,101			21,101	U
281	0401132F	C-130J Program	07	9,924	8,640			8,640	U
282	0401134F	Large Aircraft IR Countermeasures (LAIRCM)	07	4,182	5,424			5,424	U

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265	0305202F	Dragon U-2	07	18,660				18,660	U
266	0305205F	Endurance Unmanned Aerial Vehicles	07						U
267	0305206F	Airborne Reconnaissance Systems	07	121,512				121,512	U
268	0305207F	Manned Reconnaissance Systems	07	14,711				14,711	U
269	0305208F	Distributed Common Ground/Surface Systems	07	14,152				14,152	U
270	0305220F	RQ-4 UAV	07	134,589				134,589	U
271	0305221F	Network-Centric Collaborative Targeting	07	15,049				15,049	U
272	0305238F	NATO AGS	07	36,731				36,731	U
273	0305240F	Support to DCGS Enterprise	07	33,547				33,547	U
274	0305600F	International Intelligence Technology and Architectures	07	13,635				13,635	U
275	0305881F	Rapid Cyber Acquisition	07	4,262				4,262	U
276	0305984F	Personnel Recovery Command & Ctrl (PRC2)	07	2,207				2,207	U
277	0307577F	Intelligence Mission Data (IMD)	07	6,277				6,277	U
278	0401115F	C-130 Airlift Squadron	07	41,973				41,973	U
279	0401119F	C-5 Airlift Squadrons (IF)	07	32,560				32,560	U
280	0401130F	C-17 Aircraft (IF)	07	9,991				9,991	U
281	0401132F	C-130J Program	07	10,674				10,674	U
282	0401134F	Large Aircraft IR Countermeasures (LAIRCM)	07	5,507				5,507	U

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283	0401218F	KC-135s	07	2,692					U
284	0401219F	KC-10s	07	5,084	20			20	U
285	0401314F	Operational Support Airlift	07	3,059					U
286	0401318F	CV-22	07	15,981	17,906			17,906	U
287	0401840F	AMC Command and Control System	07	1,626					U
288	0408011F	Special Tactics / Combat Control	07	2,322	3,629			3,629	U
289	0702207F	Depot Maintenance (Non-IF)	07	1,880	1,890			1,890	U
290	0708055F	Maintenance, Repair & Overhaul System	07	49,330	10,311			10,311	U
291	0708610F	Logistics Information Technology (LOGIT)	07	13,065	16,065			16,065	U
292	0708611F	Support Systems Development	07	4,406	539			539	U
293	0804743F	Other Flight Training	07	1,948	2,057			2,057	U
294	0808716F	Other Personnel Activities	07	108	10			10	U
295	0901202F	Joint Personnel Recovery Agency	07	1,947	2,060			2,060	U
296	0901218F	Civilian Compensation Program	07	2,849	3,809			3,809	U
297	0901220F	Personnel Administration	07	4,102	6,476			6,476	U
298	0901226F	Air Force Studies and Analysis Agency	07	1,364	1,443			1,443	U
299	0901538F	Financial Management Information Systems Development	07	86,578	9,323			9,323	U
300	0901554F	Defense Enterprise Acntng and Mgt Sys (DEAMS)	07		46,789			46,789	U

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283	0401218F	KC-135s	07	4,591				4,591	U
284	0401219F	KC-10s	07						U
285	0401314F	Operational Support Airlift	07						U
286	0401318F	CV-22	07	18,419				18,419	U
287	0401840F	AMC Command and Control System	07						U
288	0408011F	Special Tactics / Combat Control	07	7,673				7,673	U
289	0702207F	Depot Maintenance (Non-IF)	07						U
290	0708055F	Maintenance, Repair & Overhaul System	07	24,513				24,513	U
291	0708610F	Logistics Information Technology (LOGIT)	07	35,225				35,225	U
292	0708611F	Support Systems Development	07	11,838				11,838	U
293	0804743F	Other Flight Training	07	1,332				1,332	U
294	0808716F	Other Personnel Activities	07						U
295	0901202F	Joint Personnel Recovery Agency	07	2,092				2,092	U
296	0901218F	Civilian Compensation Program	07	3,869				3,869	U
297	0901220F	Personnel Administration	07	1,584				1,584	U
298	0901226F	Air Force Studies and Analysis Agency	07	1,197				1,197	U
299	0901538F	Financial Management Information Systems Development	07	7,006				7,006	U
300	0901554F	Defense Enterprise Acntng and Mgt Sys (DEAMS)	07	45,638				45,638	U

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Line No	Program Element Number	Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted S (Base+Emerg+ e OCO)	c
301	1201017F	Global Sensor Integrated on Network (GSIN)	07		3,647			3,647	U
302	1201921F	Service Support to STRATCOM - Space Activities	07	28,636	988			988	U
303	1202140F	Service Support to SPACECOM Activities	07		11,863			11,863	U
304	1202247F	AF TENCAP	07	31,986					U
305	1203001F	Family of Advanced BLoS Terminals (FAB-T)	07	58,582	195,288			195,288	U
306	1203110F	Satellite Control Network (SPACE)	07	26,374	57,891			57,891	U
308	1203165F	NAVSTAR Global Positioning System (Space and Control Segments)	07	8,610					U
309	1203173F	Space and Missile Test and Evaluation Center	07	69,785	4,566			4,566	U
310	1203174F	Space Innovation, Integration and Rapid Technology Development	07	20,250	33,292			33,292	U
311	1203179F	Integrated Broadcast Service (IBS)	07	9,887					U
312	1203182F	Spacelift Range System (SPACE)	07	20,168	5,837			5,837	U
313	1203265F	GPS III Space Segment	07	136,998	42,440			42,440	U
314	1203400F	Space Superiority Intelligence	07	16,278	14,428			14,428	U
315	1203614F	JSpOC Mission System	07	43,108	85,762			85,762	U
316	1203620F	National Space Defense Center	07	53,305	2,653			2,653	U
317	1203873F	Ballistic Missile Defense Radars	07		15,881			15,881	U
318	1203906F	NCMC - TW/AA System	07						U

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Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	Se
301	1201017F	Global Sensor Integrated on Network (GSIN)	07	1,889				1,889	U
302	1201921F	Service Support to STRATCOM - Space Activities	07	993				993	U
303	1202140F	Service Support to SPACECOM Activities	07	8,999				8,999	U
304	1202247F	AF TENCAP	07						U
305	1203001F	Family of Advanced BLoS Terminals (FAB-T)	07						U
306	1203110F	Satellite Control Network (SPACE)	07						U
308	1203165F	NAVSTAR Global Positioning System (Space and Control Segments)	07						U
309	1203173F	Space and Missile Test and Evaluation Center	07						U
310	1203174F	Space Innovation, Integration and Rapid Technology Development	07						U
311	1203179F	Integrated Broadcast Service (IBS)	07						U
312	1203182F	Spacelift Range System (SPACE)	07						U
313	1203265F	GPS III Space Segment	07						U
314	1203400F	Space Superiority Intelligence	07	16,810				16,810	U
315	1203614F	JSpOC Mission System	07						U
316	1203620F	National Space Defense Center	07	2,687				2,687	U
317	1203873F	Ballistic Missile Defense Radars	07						U
318	1203906F	NCMC - TW/AA System	07	6,990				6,990	U

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Line No	Element Number	Program Item	Act	FY 2019 (Base + OCO)	FY 2020 Base Enacted	FY 2020 Emergency	FY 2020 OCO Enacted	FY 2020 Total Enacted S (Base+Emerg+ e OCO) c
319	1203913F	NUDET Detection System (SPACE)	07	21,578	49,300			49,300 U
320	1203940F	Space Situation Awareness Operations	07	18,920	17,834			17,834 U
321	1206423F	Global Positioning System III - Operational Control Segment	07	491,601	445,302			445,302 U
322	1206770F	Enterprise Ground Services	07		118,870			118,870 U
9999	9999999999	Classified Programs		16,832,438	17,785,996		78,713	17,864,709 U
		Operational Systems Development		22,982,541	24,480,992		83,913	24,564,905
Total Research, Development, Test & Eval, AF				41,419,014	45,566,955		128,248	45,695,203

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Line No	Program Element Number	Item	Act	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)	See
319	1203913F	NUDET Detection System (SPACE)	07						U
320	1203940F	Space Situation Awareness Operations	07						U
321	1206423F	Global Positioning System III - Operational Control Segment	07						U
322	1206770F	Enterprise Ground Services	07						U
9999	9999999999	Classified Programs		15,777,856				15,777,856	U
		Operational Systems Development		21,466,680		5,304	5,304	21,471,984	
		Total Research, Development, Test & Eval, AF		37,391,826		5,304	5,304	37,397,130	

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Summary Recap of Budget Activities -----					
Applied Research					
Advanced Component Development & Prototypes					
System Development & Demonstration					
Management Support					
Operational System Development					
Software & Digital Technology Pilot Programs					
Total Research, Development, Test & Evaluation					
Summary Recap of FYDP Programs -----					
Space					
Classified Programs					
Total Research, Development, Test & Evaluation					

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	FY 2021 Base	FY 2021 OCO for Base Requirements	FY 2021 OCO for Direct War and Enduring Costs	FY 2021 Total OCO	FY 2021 Total (Base + OCO)
Summary Recap of Budget Activities -----					
Applied Research	130,874				130,874
Advanced Component Development & Prototypes	1,311,311				1,311,311
System Development & Demonstration	3,744,016				3,744,016
Management Support	258,510				258,510
Operational System Development	4,733,142				4,733,142
Software & Digital Technology Pilot Programs	149,742				149,742
Total Research, Development, Test & Evaluation	10,327,595				10,327,595
Summary Recap of FYDP Programs -----					
Space	6,694,729				6,694,729
Classified Programs	3,632,866				3,632,866
Total Research, Development, Test & Evaluation	10,327,595				10,327,595

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Fiscal Year (FY) 2021 President's Budget

RDT&E Exhibits in Budget Activity 7

are split into two books:

Vol-III Part 1

Vol-III Part 2

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0301017F I Global Sensor Integrated on Network (GSIN)
--	--

COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	3.468	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
675368: GSIN (Global Integrated Sensor Network)	-	3.468	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
 In FY 2020, PE 0301017F, Global Sensor Integrated on Network (GSIN), Project 675368, GSIN (Global Integrated Sensor Network, efforts were transferred to PE 1201017F, Global Sensor Integrated on Network (GSIN), Project Project 675368, GSIN (Global Integrated Sensor Network, for more accurate classification of work.

A. Mission Description and Budget Item Justification

The mission of USSTRATCOM is to establish and provide full-spectrum, global strike, coordinated space and information operations capabilities to meet both deterrent and decisive national security objectives and to provide operational space support, integrated missile defense, Global Command Control, Communications, and Computers Intelligence Surveillance and Reconnaissance (C4ISR), and specialized planning expertise to the joint warfighter.

The Nation's strategic C2 sensors, and mission planning programs cannot rapidly exchange information across multiple missions creating ambiguity that delays time critical national C2 decision making processes. GSIN developed and established a unified schema that integrates disparate Missile Warning/Missile Defense (MW/MD) data into a single exposed data set providing redundant and unambiguous MW/MD data to national leadership. GSIN also enables existing radars and sensors to provide data in net-centric formats consumable by other authorized systems and mission areas, thus reducing the need to acquire more systems. Activities also include studies and analysis to support current program planning, execution, and future program planning.

GSIN directly supports USSTRATCOM and other COCOMs and MAJCOM mission sets. GSIN meshes together selected systems and sensors (from tactical to strategic), including the Nation's most modern and capable assets, taking advantage of their larger numbers, improved algorithms, mobility, and forward deployment to provide earlier cross-cueing and expanded decision space when every second counts. Repurposing these traditionally stove-piped systems and sensors, GSIN enables the warfighter in several ways. GSIN enables creation of a User Defined Operating Picture (UDOP) to provide a single, unambiguous missile event picture allowing real-time collaboration for nuclear C2 and improved senior leader situational awareness (SA) for effective decision-making. GSIN also improves Space Situational Awareness (SSA) by tapping additional sensor capability and provides this data for the larger space order of battle capabilities. GSIN dramatically improves the ingestion of non-traditional, but readily available, non-US government and commercial data to the Air Force Space Command (AFSPC) catalog managed by the 18SPCC at Vandenberg AFB. GSIN addresses NORTHCOM/STRATCOM's signed Joint Emergent Operational Need (JEON) ST-0010 request for uninterrupted traditional and non-traditional sensor data integration and the Global Threat Characterization Assessment (GTCA) Operational Planning Team report. GSIN provides critical and unique data to the large AFSPC SSA data repositories to facilitate the Space Battle Management Command and Control (BMC2) suite of capabilities/programs. Finally, GSIN provides Machine Learner and Data Analysis functions to optimize and operate situational awareness in the field.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0301017F / <i>Global Sensor Integrated on Network (GSIN)</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver <insert program name> 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 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	3.579	0.000	0.000	0.000	0.000
Current President's Budget	3.468	0.000	0.000	0.000	0.000
Total Adjustments	-0.111	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	-0.111	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Radar, sensor, technical intelligence (TI), and Allied Systems Description: Radar, sensor, technical intelligence and Allied Systems: Designs, develops, exposes and integrates data from radar, sensors and technical intelligence systems in regions of the world where potential GSIN users currently do not have coverage. Provide real time data from systems that previously reported in hours or days after critical events. Conduct studies/ surveys/meetings as necessary to continually identify systems meeting GSIN user data exposure needs. Space Situational Awareness (SSA): Designs, develops, tests, exposes, and integrates SSA data from previously untapped systems into space production systems and the Global Information Grid (GIG). Develop implementation plans to mature data exposure capabilities. FY 2020 Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: N/A	1.907	0.000	-
Title: Data Services, Net Centric Integration and Configuration Control, and program outreach	1.561	0.000	-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0301017F / <i>Global Sensor Integrated on Network (GSIN)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Description: Develop common XML net-enabled data schemas and configuration management processes and procedures for Missile Warning, Missile Defense, Space, MASINT/Technical Intelligence, and Sensor data to manage the XML schema and associated XML messaging and services. Develop technical outreach for potential new GSIN data consumers and providers who require GSIN sensor data. Upgrade GSIN capabilities as DISA Enterprise Services evolve. Continue modifications to data services. Support integration of GSIN sensor data into appropriate registries/catalogs. Continue development of GSIN data services to enable visualization in a common operating picture. Conduct studies and demonstrations of SSA capabilities, data correlation, and assessment services for risk reduction evaluations.</p> <p>FY 2020 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>			
Accomplishments/Planned Programs Subtotals	3.468	0.000	-

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• N/A: N/A	-	-	-	-	-	-	-	-	-	0.000	0.000

Remarks

E. Acquisition Strategy
 GSIN uses existing government contract vehicles (from agencies such as Missile Defense Agency (MDA) or Air Force Life Cycle Management Center (AFLCMC)); to develop and modernize the combined SSA/MW/MD/MASINT/TI data exposure architecture and solution. The contracts are managed by the relevant organizations contracting office. GSIN does not award or manage any contracts.
 The AFLCMC at Hanscom AFB (AFLCMC/HB) and SMC at the Los Angeles AFB provide necessary program management, financial management, and other support as may be applicable for GSIN.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301017F / <i>Global Sensor Integrated on Network (GSIN)</i>	Project (Number/Name) 675368 / <i>GSIN (Global Integrated Sensor Network)</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
GSIN OPSCAP Status Capability	C/CPAF	Northrop Grumman : Omaha, NE	-	-		-		-		-		-	Continuing	Continuing	-
GSIN Non-traditional Space Situational Awareness Data Exposure	C/CPAF	Harris Group : Colorado Springs, CO	-	-		-		-		-		-	Continuing	Continuing	-
GSIN Net-centric Command and Control Data Exposure	C/CPAF	LM : Huntsville, AL	-	-		-		-		-		-	Continuing	Continuing	-
GSIN Space Situational Awareness Data Exposure - Project 2	C/CPAF	Raytheon : Boston, MA	-	-		-		-		-		-	Continuing	Continuing	-
GSIN Space Situational Awareness Data Exposure - Project 3	C/CPAF	Raytheon : Colorado Springs, CO	-	0.800	Jul 2019	-		-		-		-	Continuing	Continuing	-
GSIN Space Situational Awareness Data Exposure - Radar/Sensor/TI Project 4	C/CPAF	Raytheon : Colorado Springs, CO	-	1.649	Dec 2018	-		-		-		-	Continuing	Continuing	-
GSIN Space Situational Awareness Data Exposure - Radar/Sensor/TI Project 5	C/CPAF	Raytheon : Colorado Springs, CO	-	-		-		-		-		-	Continuing	Continuing	-
GSIN Space Situational Awareness Data Exposure - Radar/Sensor/TI Project 6	TBD	Raytheon : Boston, MA	-	-		-		-		-		-	Continuing	Continuing	-
GSIN Space Situational Awareness Data Exposure - Radar/Sensor/TI Project 7	TBD	Raytheon : Colorado Springs, CO	-	-		-		-		-		-	Continuing	Continuing	-
Publisher/Recorder	C/CPAF	Northrop Grumman : Omaha, NE	-	-		-		-		-		-	Continuing	Continuing	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 7				PE 0301017F / Global Sensor Integrated on Network (GSIN)				675368 / GSIN (Global Integrated Sensor Network)							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Strategic Study	C/CPAF	KBR Wyle : Omaha, ND	-	0.500	Nov 2018	-		-		-		-	Continuing	Continuing	-
Subtotal			-	2.949		-		-		-		-	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
GSIN Program Management Administration	C/FFP	Various : Omaha, NE	-	0.519	Oct 2018	-		-		-		-	Continuing	Continuing	-
Subtotal			-	0.519		-		-		-		-	Continuing	Continuing	N/A
Project Cost Totals			-	3.468		0.000		-		-		-	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301017F / <i>Global Sensor Integrated on Network (GSIN)</i>	Project (Number/Name) 675368 / <i>GSIN (Global Integrated Sensor Network)</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
GSIN Data Exposure																												
GSIN Data Exposure (NC2) Operational	■																											
GSIN Data Exposure (MASINT 2) Operational	■																											
GSIN Data Exposure (MASINT 3) Production/Fielding	■																											
GSIN Data Exposure (MASINT 3) Integration and Testing		■																										
GSIN Data Exposure (MASINT 3) Operational			■																									
GSIN Data Exposure (MASINT 4) Concept Design			■	■																								
GSIN Data Exposure (MASINT 4) Design and Development				■																								
GSIN OPSCAP Status Integration and Testing	■																											
GSIN OPSCAP Status Operational		■																										

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301017F / <i>Global Sensor Integrated on Network (GSIN)</i>	Project (Number/Name) 675368 / <i>GSIN (Global Integrated Sensor Network)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
GSIN Data Exposure				
GSIN Data Exposure (NC2) Operational	1	2019	1	2019
GSIN Data Exposure (MASINT 2) Operational	1	2019	1	2019
GSIN Data Exposure (MASINT 3) Production/Fielding	1	2019	1	2019
GSIN Data Exposure (MASINT 3) Integration and Testing	2	2019	2	2019
GSIN Data Exposure (MASINT 3) Operational	3	2019	3	2019
GSIN Data Exposure (MASINT 4) Concept Design	2	2019	4	2019
GSIN Data Exposure (MASINT 4) Design and Development	4	2019	4	2019
GSIN OPSCAP Status Integration and Testing	1	2019	1	2019
GSIN OPSCAP Status Operational	2	2019	2	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0301025F / <i>GeoBase</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	2.723	2.767	0.000	2.767	2.823	2.873	2.924	0.000	Continuing	Continuing
673280: <i>Ceit01</i>	-	0.000	2.723	2.767	0.000	2.767	2.823	2.873	2.924	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funds development of the GeoBase Program. A key initial component of GeoBase is the Common Installation Picture (CIP) which provides the foundation upon which subsequent GeoBase spirals will be built. The CIP will be developed for active, Guard, and Reserve garrison and expeditionary installations to provide a single, interactive map of our installations. Warfighters, commanders, planners, and support personnel alike will be afforded unprecedented situational awareness to accomplish their respective missions. The functional mission sectors will be able to exploit GeoBase to achieve their objectives more effectively, their legacy data will be integrated with the CIP.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	2.723	2.772	0.000	2.772
Current President's Budget	0.000	2.723	2.767	0.000	2.767
Total Adjustments	0.000	0.000	-0.005	0.000	-0.005
• 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	-0.005	0.000	-0.005

Change Summary Explanation

FY20 funding added to budget to begin development of GeoBase.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: GeoBase Development	0.000	2.723	2.767

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0301025F / <i>GeoBase</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Description: Develop Common Installation Picture (CIP)for GeoBase. FY 2020 Plans: Develop CIP for GeoBase. N/A FY 2021 Plans: Continue working CIP for GeoBase FY 2020 to FY 2021 Increase/Decrease Statement: Increase in funding requirement			
Accomplishments/Planned Programs Subtotals	0.000	2.723	2.767
Other Service Funding Adjustment	0.000	0.000	-
Air Force Subtotals	0.000	2.723	2.767

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force Date: February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301025F / <i>GeoBase</i>	Project (Number/Name) 673280 / <i>Ceit01</i>
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Product Development (\$ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
				Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Develop GeoBase	Various	Not specified. : TBD	-	0.000		2.723	Feb 2020	2.767		-		2.767	Continuing	Continuing	-
Subtotal			-	0.000		2.723		2.767		-		2.767	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Subtotals			-	0.000	2.723	2.767	-	2.767	Continuing	Continuing	N/A
Other Service Funding Adjustment			-	0.000	0.000	-	-	-			-
Project Cost Totals			-	0.000	2.723	2.767	-	2.767	0.000	0.000	-

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force Date: February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301025F / <i>GeoBase</i>	Project (Number/Name) 673280 / <i>Ceit01</i>
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>Develop GeoBase</i>																											
Develop CIP																											

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301025F / <i>GeoBase</i>	Project (Number/Name) 673280 / <i>Ceit01</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Develop GeoBase</i>				
Develop CIP	2	2020	4	2024

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	0.000	28.623	44.190	32.759	0.000	32.759	12.940	3.941	3.107	3.095	Continuing	Continuing
673768: <i>Nuclear Planning and Execution System (NPES)</i>	0.000	28.623	35.010	29.655	0.000	29.655	11.882	3.941	3.107	3.095	Continuing	Continuing
674212: <i>NLCC Decision Support System</i>	0.000	0.000	9.180	3.104	0.000	3.104	1.058	0.000	0.000	0.000	0.000	13.342

Note
 This program, BA 7, PE 0301112F, project 674212, DSS Development, is a new start.

A. Mission Description and Budget Item Justification

United States Strategic Command (USSTRATCOM) conducts global operations in partnership with other combatant commands, services and U.S. government agencies to deter and detect strategic attacks against the United States. USSTRATCOM is responsible for command of U.S. nuclear capabilities, space operations, global surveillance and reconnaissance, intelligence, communications, computers, global missile defense and combatting weapons of mass destruction. To enable completion of these missions, it is recapitalizing the Nuclear Planning and Execution System (NPES). NPES is a Chairman, Joint Chiefs of Staff system for nuclear operations and fulfillment of Nuclear Command and Control (NC2) responsibilities. NPES supports national strategic deterrence by providing a host of NC2 execution activities as well as contingency and crisis action planning capabilities to selected joint and combatant command staffs. NPES is operated by USSTRATCOM and other specified users performing missions to deter and dissuade threats, and, when directed, defeat adversaries.

The NPES system has evolved from several single-purpose command and control systems over the past 30 years and has reached a point where it requires recapitalization to meet national and strategic objectives and to comply with future concepts of operation. Additionally, recapitalization is needed to improve cybersecurity, system effectiveness, and supportability. Recapitalization will also seek to lower the total cost of ownership and sustainment. The recapitalization program will use proven/mature software engineering, technologies, and design tenets to provide a modern, secure, interoperable and reliable Nuclear Command and Control (NC2) software capability. NPES will exploit AFLCMC/HBC agile software development economies of scale to enable developers to build and integrate software at the Top Secret level vice paying to build duplicate capabilities at other government or contractor facilities.

Funds agile software development activities and a secure software development environment, located in existing space at Offutt AFB. Software development environment will meet classification/security regulations/criteria, which will promote competition.

This is a Section 804 Alpha Phase rapid software prototyping effort. This effort includes decomposing system, functional and non-functional requirements in order to design, build, and field a new NPES application software baseline via agile, development operations (DevOps), and user-centered design principles. Further, the effort includes developing written artifacts to document system / software engineering elements appropriate for an Agile/DevOps software development effort.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver NPES weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F or 0605833F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	29.620	44.190	35.088	0.000	35.088
Current President's Budget	28.623	44.190	32.759	0.000	32.759
Total Adjustments	-0.997	0.000	-2.329	0.000	-2.329
• 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	-0.997	0.000	-2.329	0.000	-2.329

Change Summary Explanation

\$2,349M removed from the FY2021 budget to support higher Air Force priorities.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>				Project (Number/Name) 673768 / <i>Nuclear Planning and Execution System (NPES)</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
673768: <i>Nuclear Planning and Execution System (NPES)</i>	0.000	28.623	35.010	29.655	0.000	29.655	11.882	3.941	3.107	3.095	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

United States Strategic Command (USSTRATCOM) conducts global operations in partnership with other combatant commands, services and U.S. government agencies to deter and detect strategic attacks against the United States. USSTRATCOM is responsible for command of U.S. nuclear capabilities, space operations, global surveillance and reconnaissance, intelligence, communications, computers, global missile defense and combatting weapons of mass destruction. To enable completion of these missions, it is recapitalizing the Nuclear Planning and Execution System (NPES). NPES is a Chairman, Joint Chiefs of Staff system for nuclear operations and fulfillment of Nuclear Command and Control (NC2) responsibilities. NPES supports national strategic deterrence by providing a host of NC2 execution activities as well as contingency and crisis action planning capabilities to selected joint and combatant command staffs. NPES is operated by USSTRATCOM and other specified users performing missions to deter and dissuade threats, and, when directed, defeat adversaries.

The NPES system has evolved from several single-purpose command and control systems over the past 30 years and has reached a point where it requires recapitalization to meet national and strategic objectives and to comply with future concepts of operation. Additionally, recapitalization is needed to improve cybersecurity, system effectiveness, and supportability. Recapitalization will also seek to lower the total cost of ownership and sustainment. The recapitalization program will use proven/mature software engineering, technologies, and design tenets to provide a modern, secure, interoperable and reliable Nuclear Command and Control (NC2) software capability. NPES will exploit AFLCMC/HBC agile software development economies of scale to enable developers to build and integrate software at the Top Secret level vice paying to build duplicate capabilities at other government or contractor facilities.

Funds agile software development activities and a secure software development environment, located in existing space at Offutt AFB. Software development environment will meet classification/security regulations/criteria, which will promote competition.

This is a Section 804 Alpha Phase rapid software prototyping effort. This effort includes decomposing system, functional and non-functional requirements in order to design, build, and field a new NPES application software baseline via agile, development operations (DevOps), and user-centered design principles. Further, the effort includes developing written artifacts to document system / software engineering elements appropriate for an Agile/DevOps software development effort.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver NPES 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, 0605833F, 0605832F, and 0605898F.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301112F / Nuclear Planning and Execution System (NPES)	Project (Number/Name) 673768 / Nuclear Planning and Execution System (NPES)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: Nuclear Planning and Execution System (NPES) Modernization</p> <p>Description: - The NPES program will use proven and mature software engineering, technologies, and design tenets to provide a modern, secure, interoperable and reliable Nuclear Command and Control (NC2) capability for USSTRATCOM and other users as appropriate.</p> <ul style="list-style-type: none"> - It will update and/or replace existing system software and improve reliability and sustainability. - It will also seek to reduce total ownership cost. <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> -FY20 will be the second year of Development and Fielding. -The NPES recap developer will use Agile Software Development to release operational software code quarterly to user's for evaluation in a production environment. -FY20 the NPES recap developer will produce sufficient new software capability to enable the user representatives to conduct operational testing & evaluation. <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> -FY21 the NPES recap developer will produce sufficient new software capability to enable the user representatives to conduct operational testing & evaluation. -FY21 will be the third year of SW development with plans to reduce the NPES recap SW developer teams. -FY21 NPES Recap will fund AFLCMC/HBC in house software development resources to promote competition, a secure developmental environment, and enable developers to build and integrate software at the Top Secret level as part of the agile software development effort. <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p> <ul style="list-style-type: none"> -FY21 will be the third year of SW development with plans to reduce the NPES recap SW developer teams. 	28.623	35.010	29.655
Accomplishments/Planned Programs Subtotals	28.623	35.010	29.655

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 833140: <i>Strategic Command and Control</i>	2.278	2.266	2.358	-	2.358	2.401	2.443	2.487	-	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>	Project (Number/Name) 673768 / <i>Nuclear Planning and Execution System (NPES)</i>

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

In FY18, PE 0303255F, Service Support to STRATCOM-C4, Project 833140, partial funding was transferred to PE 0301112F, Nuclear Planning and Execution (NPES), for better transparency.

D. Acquisition Strategy

NPES will develop, test, and field a renewed Nuclear Command and Control (NC2) capability for combatant commanders using an evolutionary (Spirals) acquisition approach with development contracts that are negotiated and awarded in a competitive environment. Additionally, select government agencies will be used to conduct relevant analyses and provide other required support. NPES will exploit AFLCMC/HBC agile software development economies of scale to enable developers to build and integrate software at the Top Secret level vice paying to build duplicate capabilities at other government or contractor facilities.

This is a Section 804 Alpha Phase rapid software prototyping effort. This effort includes decomposing system, functional and non-functional requirements in order to design, build, and field a new NPES application software baseline via agile, development operations (DevOps), and user-centered design principles. Further, the effort includes developing written artifacts to document system / software engineering elements appropriate for an Agile/DevOps software development effort.

Funds agile software development activities and a secure software development environment. Software development environment will meet classification/security regulations/criteria, which will promote competition.

The Air Force Life Cycle Management Center at Hanscom AFB, (AFLCMC/HB) and the 55th CONS at Offutt AFB will be the contracting authorities for NPES and provide necessary program management, contracts, legal, and financial management support.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 030112F / Nuclear Planning and Execution System (NPES)	Project (Number/Name) 673768 / Nuclear Planning and Execution System (NPES)
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
Pre Milestone B Risk Reduction	Various	NSWCDD : Offutt AFB, NE	0.000	-		-		-		-		-	Continuing	Continuing	-
Primary Development	Various	NSWCDD : Offutt AFB, NE	0.000	21.961	Nov 2018	29.330	Nov 2019	25.655	Nov 2020	-		25.655	Continuing	Continuing	-
Development Suites & Infrastructure	C/TBD	NSWCDD : Offutt AFB, NE	0.000	1.537	Jun 2019	1.251		-		-		-	Continuing	Continuing	-
Subtotal			0.000	23.498		30.581		25.655		-		25.655	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
Technical Engineering Services	Various	Various : Offutt AFB, NE	0.000	2.062	Nov 2018	1.862	Nov 2019	1.701	Nov 2020	-		1.701	Continuing	Continuing	-
Subtotal			0.000	2.062		1.862		1.701		-		1.701	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
T&E	Various	Various : Offutt AFB, NE	0.000	0.434	Nov 2018	0.503	Feb 2020	0.508	Feb 2021	-		0.508	Continuing	Continuing	-
Subtotal			0.000	0.434		0.503		0.508		-		0.508	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 7				PE 0301112F / Nuclear Planning and Execution System (NPES)				673768 / Nuclear Planning and Execution System (NPES)							
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
Program Management Administration	Various	Various : Offutt AFB, NE	0.000	1.604	Feb 2019	2.064	Feb 2020	1.791	Feb 2021	-		1.791	Continuing	Continuing	-
SBIR and Extramural Cost etc..	Various	Various : Offutt AFB, NE	0.000	1.025	Oct 2018	-		-		-		-	0.000	1.025	-
Subtotal			0.000	2.629		2.064		1.791		-		1.791	Continuing	Continuing	N/A
Project Cost Totals			0.000	28.623		35.010		29.655		-		29.655	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>	Project (Number/Name) 673768 / <i>Nuclear Planning and Execution System (NPES)</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
NPES																												
Alpha Phase - Rapid Prototyping																												
Beta Phase - Rapid Fielding																												
Delta Phase - Continuous Product Improvement																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>	Project (Number/Name) 673768 / <i>Nuclear Planning and Execution System (NPES)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
NPES				
Alpha Phase - Rapid Prototyping	4	2019	2	2021
Beta Phase - Rapid Fielding	2	2021	4	2022
Delta Phase - Continuous Product Improvement	4	2022	4	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>				Project (Number/Name) 674212 / <i>NLCC Decision Support System</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
674212: <i>NLCC Decision Support System</i>	0.000	0.000	9.180	3.104	0.000	3.104	1.058	0.000	0.000	0.000	0.000	13.342
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Note

This program, BA 7, PE 0301112F, project 674212, DSS Development, is a new start.

A. Mission Description and Budget Item Justification

Decision Support Service (DSS) directly supports the senior leader decision making calculus. Numerous studies, reviews, and practical experience identified the need to create a decision making aid. These identified needs culminated in an Initial Capabilities Document (ICD) that have been validated by the Joint Requirements Oversight Council (JROC). DSS will improve situational awareness, aggregate strategic-level information, provide a common visual display, be resilient, and mobile. Several attempts to provide a DSS-like capability have been attempted over the years. These ad hoc attempts failed due to the lack of community buy-in and a structured acquisition methodology. Today, DSS has complete community buy-in and folding it under AFLCMC ensure rigorous acquisition processes will be followed. The program will use the accelerated acquisition process known as Section 804. USSTRATCOM is the logical home for DSS. Additionally, DSS accomplishes agile software development activities and a secure software development environment, located in existing space at Offutt AFB. Software development environment will meet classification/security regulations/criteria, which will promote competition. DSS is supported by WHMO, OSD, NLCC, and CJCS. The Service provider is the United States Air Force and the Functional Manager is Air Force Global Strike Command (AFGSC).

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: DSS Development	0.000	9.180	3.104
Description: Product Development			
FY 2020 Plans:			
- Investigate OSD-sponsored Senior Leader Visualization prototype for lessons learned and possible risk reduction solutions			
- Initial product development			
- Back-end development and data integration			
- Develop IT infrastructure plans to ensure reliability, sustainability and availability			
-- Evaluate Disconnected Intermittent Low-Bandwidth (DIL) prototype for possible IT Infrastructure integration			
- Develop cybersecurity plan			
- Strategic Study			
FY 2021 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>	Project (Number/Name) 674212 / <i>NLCC Decision Support System</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<ul style="list-style-type: none"> - Validate and integrate information from Strategic Study - Deploy Minimal Viable Product (MVP) for user assessment - Provide periodic developmental updates IAW Agile development principles - Continue back-end development and data integration - Build and integrate required IT Infrastructure - Implement cybersecurity requirements IAW cybersecurity plan <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease due to reduction in requirements as program closes out.</p>				
Accomplishments/Planned Programs Subtotals		0.000	9.180	3.104
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				
D. Acquisition Strategy				
<p>DSS will develop, test, and field a decision support system capability for use from the combatant commander and above. DSS will use agile development to rapidly prototype, develop software, and field the solutions. DSS will use existing government contract vehicles when advantageous or create development contracts that are negotiated and awarded in a competitive environment. Funds agile software development activities and a secure software development environment, located in existing space at Offutt AFB. Software development environment will meet classification/security regulations/criteria, which will promote competition. This program will be using the Section 804 acquisitions process to accelerate delivery of a finished product. Section 804 outlines authority granted to DoD in the FY2016 National Defense Acquisitions Act to rapidly prototype/field capabilities distinct from the traditional DoD 5000 acquisition system.</p>				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301112F / Nuclear Planning and Execution System (NPES)	Project (Number/Name) 674212 / NLCC Decision Support System
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Visualization	TBD	TBD : Offutt AFB, NE	0.000	-		2.000	Mar 2020	0.940	Feb 2021	-		0.940	0.000	2.940	-
Backend Development and Integration	TBD	TBD : Offutt AFB, NE	0.000	-		2.000	Mar 2020	0.800	Feb 2021	-		0.800	0.000	2.800	-
IT Infrastructure and Security	TBD	TBD : TBD	0.000	-		3.625	Aug 2020	0.100	Jul 2021	-		0.100	0.000	3.725	-
Strategic Study	TBD	TBD : TBD	0.000	-		0.400	Mar 2020	0.500	Apr 2021	-		0.500	0.000	0.900	-
Subtotal			0.000	-		8.025		2.340		-		2.340	0.000	10.365	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	TBD	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
Engineering Support	SS/TBD	TBD : Offutt AFB, NE	0.000	-		0.290	Nov 2019	0.295	Nov 2020	-		0.295	0.000	0.585	-
Strategic Study	C/TBD	TBD : TBD	0.000	-		0.400	Oct 2019	0.000		-		0.000	0.000	0.400	-
Subtotal			0.000	-		0.690		0.295		-		0.295	0.000	0.985	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
Program Management Administration	C/FFP	A&AS : Offutt AFB, NE	0.000	-		0.450	Feb 2020	0.469		-		0.469	0.000	0.919	-
DoD Travel	TBD	TDY : Offutt AFB, NE	0.000	-		0.015	Oct 2019	0.000		-		0.000	0.000	0.015	-
Subtotal			0.000	-		0.465		0.469		-		0.469	0.000	0.934	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force							Date: February 2020				
Appropriation/Budget Activity 3600 / 7			R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>				Project (Number/Name) 674212 / <i>NLCC Decision Support System</i>				
	Prior Years	FY 2019	FY 2020		FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals	0.000	-	9.180		3.104	-	3.104	0.000	12.284	N/A	

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>	Project (Number/Name) 674212 / <i>NLCC Decision Support System</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
DSS Development																												
DSS Strategic Study																												
Senior Leader Visualization (SLV) Prototype Evaluation																												
Disconnected Intermittent Low-Bandwidth (DIL) prototype evaluation																												
DSS IT Infrastructure and Cybersecurity																												
Data Integration																												
Minimal Viable Product Delivery																												
Application Software Delivery																												
DSS Software Delivery 2																												
DSS Software Delivery 3																												
DSS Software Delivery 4																												
DSS Software Delivery 5																												
DSS Software Delivery 6																												
DSS Software Delivery 7																												
DSS Software Delivery 8																												
FOC																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301112F / <i>Nuclear Planning and Execution System (NPES)</i>	Project (Number/Name) 674212 / <i>NLCC Decision Support System</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>DSS Development</i>				
DSS Strategic Study	2	2020	2	2020
Senior Leader Visualization (SLV) Prototype Evaluation	1	2020	2	2020
Disconnected Intermittent Low-Bandwidth (DIL) prototype evaluation	2	2020	2	2020
DSS IT Infrastructure and Cybersecurity	1	2020	4	2022
Data Integration	2	2020	4	2022
Minimal Viable Product Delivery	1	2021	1	2021
Application Software Delivery	1	2021	1	2021
DSS Software Delivery 2	2	2021	2	2021
DSS Software Delivery 3	2	2021	2	2021
DSS Software Delivery 4	3	2021	3	2021
DSS Software Delivery 5	3	2021	3	2021
DSS Software Delivery 6	4	2021	4	2021
DSS Software Delivery 7	4	2021	4	2021
DSS Software Delivery 8	1	2022	2	2022
FOC	2	2022	2	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0301401F / Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	6.633	3.575	2.904	0.000	2.904	3.180	3.237	3.295	54.666	0.000	77.490
67A051: Space Superiority - Advanced Intelligence Systems	-	6.633	3.575	2.904	0.000	2.904	3.180	3.237	3.295	54.666	0.000	77.490
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program, BA 07 PE 0301401F, project 67A051, Cross Domain Tactical OPIR Processing, is a new start.

Air Force Space and Cyber Non-Traditional Intelligence, Surveillance & Reconnaissance (ISR) for Battlespace Awareness PE 0301401F - P-40A
 Cross Domain Overhead Persistent Infrared (OPIR): Cross Domain Tactical OPIR Processing delivers a mechanism providing reach-back support for battlespace awareness functions and manages the timely transfer of newly developed tools to operational users.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	6.633	3.575	2.908	0.000	2.908
Current President's Budget	6.633	3.575	2.904	0.000	2.904
Total Adjustments	0.000	0.000	-0.004	0.000	-0.004
• 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	-0.004	0.000	-0.004

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Cross Domain OPIR	1.350	-	-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0301401F / <i>Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Description: Develop Cross Domain OPIR that delivers a mechanism to provide reach-back support for battlespace awareness functions and manages the timely transfer of newly developed tools to operational users. specifically by developing tools & tradecraft on a flexible architecture allowing easy integration.			
Title: TAC OPIR Processing	5.283	3.575	2.904
Description: Develop tactical OPIR processing comprised of software development, controlled multi-level security interface that provides data access and processing services for a robust and flexible network architecture.			
FY 2020 Plans: N/A			
FY 2021 Plans: Tactical OPIR processing			
FY 2020 to FY 2021 Increase/Decrease Statement: Increased OPIR Contract obligations			
Accomplishments/Planned Programs Subtotals	6.633	3.575	2.904

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

All contracts funded in this program will be awarded using competitive procedures to the maximum extent possible.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020		
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0301401F / Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness				Project (Number/Name) 67A051 / Space Superiority - Advanced Intelligence Systems					

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Cross Domain OPIR	C/CPFF	NASIC : Dayton, OH	-	1.350	May 2019	3.575	May 2020	2.904	Oct 2021	-		2.904	Continuing	Continuing	-
Tactical OPIR Processing	C/CPFF	NASIC : Dayton, OH	-	5.283	May 2019	-		-		-		-	Continuing	Continuing	-
Subtotal			-	6.633		3.575		2.904		-		2.904	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		-	6.633		3.575		2.904		-	2.904	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301401F / Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness	Project (Number/Name) 67A051 / Space Superiority - Advanced Intelligence Systems

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
<i>Cross Domain OPIR</i>																												
Algorithm Development																												
<i>Tactical OPIR Processing</i>																												
Hardware Purchases, Software Development																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0301401F / Air Force Space and Cyber Non-Traditional ISR for Battlespace Awareness	Project (Number/Name) 67A051 / Space Superiority - Advanced Intelligence Systems

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Cross Domain OPIR</i>				
Algorithm Development	1	2019	3	2023
<i>Tactical OPIR Processing</i>				
Hardware Purchases, Software Development	1	2019	3	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0302015F / <i>E-4B National Airborne Operations Center (NAOC)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	55.707	60.173	3.468	0.000	3.468	0.000	0.000	0.000	0.000	0.000	119.348
674777: <i>E-4B Aircraft Modernization</i>	-	55.707	60.173	3.468	0.000	3.468	0.000	0.000	0.000	0.000	0.000	119.348
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The four (4) aircraft E-4B National Airborne Operations Center (NAOC) fleet satisfies the military need for an airborne operations center with communications capabilities permitting military and civilian leadership to monitor and control military and civil national assets during all phases of conflict (nuclear and non-nuclear) or natural disaster. The E-4B NAOC fleet also satisfies the military requirement to provide a highly survivable node of the National Military Command System (NMCS).

This program's developmental modifications include, but are not limited to, upgrades and enhancements to aircraft structures, propulsion system, fuel system, environmental control system, electrical generation and distribution systems, flight safety and navigation systems (with their associated communications equipment), and Systems Integration Lab. Additionally, modifications may enhance the aircraft's operations center facilities, to include but not limited to those necessary for the Senior Leadership Command, Control and Communications System (SL3CS), National Leadership Command Capability (NLCC), Nuclear Command, Control, and Communications (NC3) and other communications necessary for the E-4B fleet to execute its mission. Funds may also be used to explore and develop modifications, upgrades, and future systems required to meet evolving mission requirements. This budget supports the following developmental modifications and studies/projects currently underway or planned for accomplishment:

- The Advanced Extremely High Frequency (AEHF) Compatible Terminal/ Presidential National Voice Conferencing (PNVC) Program integrates AEHF Compatible Command Post Terminals and PNVC capability onto the E-4B NAOC platform. This integration is necessary to replace the legacy Military Strategic, Tactical and Relay (MILSTAR) terminal, and provide access to protected wideband AEHF satellite networks. PNVC replaces the Survivable Emergency Conferencing Network (SECN), which will not be supported once the AEHF satellite network is in place.

- The Low Frequency Transmit System (LFTS) program replaces the currently installed Very Low Frequency/Low Frequency (VLF/LF) Transmit system, which is no longer sustainable after over 35 years of operation. In order to meet existing Presidential Policy Directive (PPD)-35 requirements and ensure there is assured connectivity between civilian and military leadership and military forces during real world situations, this system must be replaced. The transmit system consists of three primary equipment groups: a Control/Monitor group, a Power Amplifier/Coupler (PA/C) group, and a Trailing Wire Antenna (TWA) group.

- The Mobile User Objective System (MUOS) program upgrades the E-4B's Ultra-High Frequency Radio transmitters to be MUOS capable to meet E-4B Capability Development Document (CDD) and CJCSI 6250.01F requirements. MUOS provides securable data and full duplex voice communications while simultaneously monitoring a second frequency. The MUOS upgrade will provide interoperability with MUOS waveforms for voice and data communications and with other nuclear and national C2 centers and aircraft by replacing the legacy USC-42 UHF SATCOM radios with a MUOS capable radio.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0302015F / <i>E-4B National Airborne Operations Center (NAOC)</i>
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- Survivable SHF will upgrade and replace portions of the E-4B's Jam-Resistant Secure Communications (JRSC) system to meet existing Presidential Policy Directive (PPD)-35 and National Security Presidential Directive (NSPD)-51/Homeland Security Presidential Directive (HSPD)-20 requirements and to ensure continued connectivity and interoperability as satellite and communications infrastructure evolves. Expected modifications include, but are not limited to, component and sub-system upgrades and replacement of portions of the current SHF system that are obsolete or near end of service life. A replacement to the SHF system is required as secure, survivable communications capability transitions from the Defense Satellite Communications System (DSCS). A risk-reduction study was completed in FY19 to help further define the acquisition strategy of the SSHF modernization program. The program will be acquired in 2 phases: Phase 1 will include technical solutions such as upgrading the existing modems, systems integration lab, and Ka-band system. Phase 2 will include new modem technology, new Ku-band system, common workstation, and upgrades to the X-band system.

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 PMA, A&AS, equipment and other government cost.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver E-4B weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F or 0605833F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	57.758	70.173	3.474	0.000	3.474
Current President's Budget	55.707	60.173	3.468	0.000	3.468
Total Adjustments	-2.051	-10.000	-0.006	0.000	-0.006
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-10.000			
• 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	-2.051	0.000			
• Other Adjustments	0.000	0.000	-0.006	0.000	-0.006

Change Summary Explanation

FY19 -\$2.051M SBIR transfer

FY20 -\$10.000M Congressional mark

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0302015F / <i>E-4B National Airborne Operations Center (NAOC)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Title: Advanced Extremely High Frequency (AEHF) Compatible Terminal/Presidential National Voice Capability (PNVC)</p> <p>Description: Integrate AEHF Compatible Terminal/PNVC capability onto the E-4B NAOC platform to replace the existing MILSTAR/SECN system.</p> <p>FY 2020 Plans: Install second prototype kit and conduct flight test, T.O. verification activities leading up to the installation of the first production kit.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased as completion of FY20 completes prototype installs/tests. Solely Procurement-funded in FY21.</p>		24.337	15.087	0.000
<p>Title: E-4B Low Frequency Transmit System (LFTS)</p> <p>Description: Replaces the E-4B's legacy Very Low Frequency/Low Frequency (VLF/LF) Transmit System, which is over 35 years old and is past its useful life. This capability is required to comply with Presidential Policy Directive (PPD)-35 to ensure there is assured connectivity between civilian and military leadership and military forces during all stages of conflict and/or national emergencies.</p> <p>FY 2020 Plans: N/A</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		24.575	0.000	0.000
<p>Title: E-4B Mobile User Objective System (MUOS)</p> <p>Description: The MUOS program upgrades E-4B Ultra-High Frequency (UHF) Radio transmitters to be MUOS capable to meet the E-4B CDD and CJCSI 6250.01F. MUOS provides securable data and full duplex voice communications while simultaneously monitoring a second frequency. The MUOS upgrade will provide interoperability with MUOS waveforms for voice and data communications and with other nuclear and national C2 centers and aircraft by replacing the legacy USC-42 UHF Satellite Communication (SATCOM) radio system.</p> <p>FY 2020 Plans:</p>		4.765	10.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0302015F / <i>E-4B National Airborne Operations Center (NAOC)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Completes the development of the MUOS-capable UHF radio transmitters. FY 2021 Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Title: Survivable SHF Description: SHF Modernization will upgrade and replace portions of the E-4B's Jam-Resistant Secure Communications (JRSC) system to meet existing Presidential Policy Directive (PPD)-35 and National Security Presidential Directive (NSPD)-51/Homeland Security Presidential Directive (HSPD)-20 requirements, and to ensure continued connectivity and interoperability as satellite and communications infrastructure evolves. A risk-reduction study was completed in FY19 to help further define the acquisition strategy of the SSHF modernization program. The program will be acquired in 2 phases: Phase 1 will include technical solutions such as upgrading the existing modems, systems integration lab, and Ka-band system. Phase 2 will include new modem technology, new Ku-band system, common workstation, and upgrades to the X-band system. FY 2020 Plans: Conduct design and prototype development activities for SSHF Phase 1. FY 2021 Plans: Continue prototyping activities and begin integration and test activities of SSHF Phase 1. FY 2020 to FY 2021 Increase/Decrease Statement: RDT&E funding remaining to complete SSHF Phase 1, transitioning to procurement funding (3010).	2.030	35.086	3.468
Accomplishments/Planned Programs Subtotals	55.707	60.173	3.468

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item E00400: <i>E-4B Nat Airborne Ops Center (NAOC)</i>	67.858	58.477	58.803	-	58.803	52.240	38.817	41.160	41.913	Continuing	Continuing
• APAF 06 Line Item 000999: <i>Initial Spares/Repair Parts</i>	2.033	2.365	2.704	-	2.704	3.050	3.402	3.760	3.760	0.000	21.074

Remarks

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0302015F / <i>E-4B National Airborne Operations Center (NAOC)</i>	
E. Acquisition Strategy Acquisition Strategy: The acquisition strategy for each specific modification differs based on the urgency of the requirement, definition of the capability, and technology readiness level of the components. The Acquisition Strategy for Survivable SHF was approved as a Section 804 Middle Tier Acquisition in April 2019. Management Strategy: Program management for all aircraft modifications is executed by the Commercial Derivative Aircraft Division at Tinker AFB. The Program Executive Officer (PEO) for Presidential and Executive Airlift provides management oversight. Contracting Strategy: Contracting strategy differs for each individual modification, but normally includes an initial engineering study contract followed by a development contract. Production installations and sustainment are typically accomplished with the E-4B Contractor Logistics Support (CLS) contract.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0302015F / E-4B National Airborne Operations Center (NAOC)				Project (Number/Name) 674777 / E-4B Aircraft Modernization				

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
AEHF/PNVC Integration	C/CPFF	Raytheon : Largo, FL	-	24.337	Sep 2019	15.087	Apr 2020	-		-		-	0.000	39.424	44.471
LFTS Development	SS/CPIF	Boeing : OKC, OK	-	24.575	Sep 2019	-		-		-		-	0.000	24.575	103.857
MUOS	SS/CPIF	Raytheon : Largo, FL	-	4.765	Nov 2019	10.000	Nov 2019	-		-		-	0.000	14.765	13.000
Survivable SHF	C/CPIF	L-3 : SLC, UT	-	2.030	Apr 2019	35.086	Feb 2020	3.468	Jan 2021	-		3.468	0.000	40.584	120.000
Subtotal			-	55.707		60.173		3.468		-		3.468	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		-	55.707	60.173	3.468	-	3.468	Continuing	Continuing	N/A

Remarks

FY19 & FY20 AEHF funding incrementally funds AEHF EMD and prototype integration efforts under DMEA contract.

FY19 LFTS funding supports integration and test of prototype LFTS system under Boeing's ESS contract.

FY19-20 MUOS funding supports integration and test of prototype MUOS system under Raytheon IDIQ contract.

FY19, FY20 & FY21 SSHF funding supports development, integration, and test of prototype SSHF system under L-3 IDIQ contract.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force			Date: February 2020				
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0302015F / E-4B National Airborne Operations Center (NAOC)			Project (Number/Name) 674777 / E-4B Aircraft Modernization		

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

E-4B Aircraft Modernization	
AEHF Compatible Terminal/PNVC Integration and Testing	[Redacted]
AEHF Compatible Terminal/PNVC Milestone Decision C	[Redacted]
LFTS Modification Integration and Testing	[Redacted]
MUOS Modification Integration and Testing	[Redacted]
MUOS Modification Milestone Decision C	[Redacted]
Survivable SHF Rapid Prototype Decision	[Redacted]
Survivable SHF Risk Reduction Study	[Redacted]
Survivable SHF Phase 1 Integration and Testing	[Redacted]
Survivable SHF Phase 1 Prototype Modification Decision	[Redacted]
Survivable SHF Phase 1 Rapid Fielding Decision	[Redacted]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0302015F / <i>E-4B National Airborne Operations Center (NAOC)</i>	Project (Number/Name) 674777 / <i>E-4B Aircraft Modernization</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>E-4B Aircraft Modernization</i>				
AEHF Compatible Terminal/PNVC Integration and Testing	1	2019	3	2021
AEHF Compatible Terminal/PNVC Milestone Decision C	4	2020	4	2020
LFTS Modification Integration and Testing	1	2019	1	2020
MUOS Modification Integration and Testing	4	2019	1	2021
MUOS Modification Milestone Decision C	2	2021	2	2021
Survivable SHF Rapid Prototype Decision	3	2019	3	2019
Survivable SHF Risk Reduction Study	3	2019	1	2020
Survivable SHF Phase 1 Integration and Testing	2	2020	4	2022
Survivable SHF Phase 1 Prototype Modification Decision	1	2021	1	2021
Survivable SHF Phase 1 Rapid Fielding Decision	1	2022	1	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	62.146	13.543	61.887	0.000	61.887	58.577	14.417	7.010	42.301	Continuing	Continuing
672832: <i>MEECN System Improvements</i>	-	25.059	0.948	0.965	0.000	0.965	0.985	1.003	1.022	1.041	Continuing	Continuing
672835: <i>Common VLF/LF Receiver Inc 2</i>	-	8.559	12.478	25.234	0.000	25.234	57.576	13.404	5.988	41.260	Continuing	Continuing
676029: <i>Global Aircrew Strategic Network Terminal</i>	-	19.181	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
676030: <i>Global ASNT Inc 2</i>	-	9.347	0.117	35.688	0.000	35.688	0.016	0.010	0.000	0.000	Continuing	Continuing

Note
 Nuclear Command, Control, and Communications (NC3) Advanced Concepts will continue to execute FY19 funds from the MEECN System Improvements (MSI) Program 0303131F, Project 672832. NC3 Advanced Concepts efforts will be moved to PE 0604001F in future budgets.

A. Mission Description and Budget Item Justification

Nuclear Deterrence Operations (NDO) is an Air Force Core Function. Within this core function, Nuclear Command and Control (NC2) is the exercise of authority and direction by the President, as Commander in Chief, through established command lines, over nuclear weapon operations of military forces. The President's authority and direction are exercised through the Nuclear Command and Control System (NCCS). The NCCS is the designated combination of flexible and enduring elements including facilities, equipment, communications, procedures, personnel, and the structure in which these elements are integrated, all of which are essential for planning, directing, and controlling nuclear weapon operations.

The MEECN portfolio modernizes the systems necessary to effectively provide assured communications connectivity between the President and the strategic deterrence forces in stressed environments.

MSI is a long-range planning process with users (Air Force Global Strike Command (AFGSC), Air Combat Command (ACC), United States Space Force (USSF), Air Mobility Command (AMC), Air Force Special Operations Command (AFSOC), US Strategic Command (USSTRATCOM), and the Navy) to monitor and assess the performance of existing NC3 systems and develop recommendations for strategic and tactical architecture upgrades, requirements, and issues based on available and emerging technologies. MSI is used to conduct technology testing; analyze technology strategies; conduct requirement trade space analysis, technology maturation and risk reduction efforts, and mission analysis; and build technology Roadmaps as proactive support to the NC3 community. MSI performs analysis, integration, and testing activities for the NC3 Weapon System.

NC3 Advanced Concepts develops and prototypes NC3 unique and dual-use systems in support of Concept for Force Development (CFD), Joint All-Domain Command and Control (JADC2), and Advanced Battle Management Systems (ABMS) initiatives. This program ensures a responsive design and development engineering

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	
<p>infrastructure to address evolving NDO mission requirements, emerging issues and technology insertion/technology application on the NC3 Weapon System, future strategic systems/capability, and other common strategic areas where appropriate, and develop enhanced multi-use capabilities. The NC3 Advanced Concepts Program will provide technology maturation and risk reduction activities to support the NC3 Weapon System (AN/USQ-225). Activity will reduce life cycle costs, inform technology maturation & risk reduction efforts, improve system performance, mitigate evolving threats, and ensure both viability and durability of the NC3 Weapon System.</p> <p>Common Very Low Frequency/Low Frequency (VLF/LF) Receiver (CVR) Increment 2 (CVR Inc 2) will deliver a survivable, beyond-line-of-sight path for Emergency Action Message (EAM) reception. The intent of CVR Inc 2 is to develop and produce a common VLF/LF receiver, capable of implementing an interoperable waveform for future platform integration to include airborne and ground based nodes, improved system performance, and reduced supportability costs through commonality. In parallel, the program will lead development of the Special Mode A waveform specification for the USAF and USN to increase reception range and accuracy while shortening required transmission time. The program will assume responsibility for the sustainment and configuration management of the CVR Inc 1 program's VLF receiver while also providing management support to the B-52 VLF Modernization Program for production and procurement of the AFGSC AF 1067 directed VLF receiver.</p> <p>Global Aircrew Strategic Network Terminal (Global ASNT) replaces inadequate, unsustainable strategic communications equipment at bomber, tanker and reconnaissance Wing Command Posts (WCPs), Nuclear Task Forces and Munitions Support Squadrons (MUNSS) and for Mobile Support Teams (MSTs). Global ASNT is a ground-based system that will provide survivable, secure communication paths to receive Emergency Action Messages (EAMs), Force Management messages, and Force Direction messages and disseminate them to bomber, tanker, and reconnaissance aircrews.</p> <p>Global ASNT is being fielded in separate capability increments. Global ASNT Increment 1 (Inc. 1) includes early system engineering support for the planning and development for the future Global ASNT Increments.</p> <p>Global ASNT Inc. 1 fields required Extremely High Frequency/Advanced Extremely High Frequency (EHF/AEHF) capabilities and replaces inadequate, unsustainable strategic mobile and fixed-site Single Channel Anti-jam Man-Portable (SCAMP) terminals and Secure, Mobile, Anti-Jam, Reliable, Tactical - Terminal (SMART-T) equipment.</p> <p>Global ASNT Increment 2 delivers a replacement Aircrew Alerting System (AAS) consisting of Ultra High Frequency (UHF) as well as High Frequency (HF) personal and general alerting equipment capabilities. Increment 2 replaces aging legacy Electromagnetic Pulse Hardened Dispersal Communication (EHDC) and Aircrew Alerting Communications Electromagnetic Pulse (AACE) systems.</p> <p>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 element 0605831F or 0605833F.</p> <p>This program is in Budget Activity 7, Operational System 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.</p>		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	64.543	13.543	91.814	0.000	91.814
Current President's Budget	62.146	13.543	61.887	0.000	61.887
Total Adjustments	-2.397	0.000	-29.927	0.000	-29.927
• 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	-2.397	0.000			
• Other Adjustments	0.000	0.000	-29.927	0.000	-29.927

Change Summary Explanation

FY21 decreased -\$29.927M due to higher AF priorities

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>					Project (Number/Name) 672832 / <i>MEECN System Improvements</i>		
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672832: <i>MEECN System Improvements</i>	-	25.059	0.948	0.965	0.000	0.965	0.985	1.003	1.022	1.041	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

NC3 Advanced Concepts will continue to execute FY19 funds from the MEECN System Improvements (MSI) Program 0303131F, Project 672832. NC3 Advanced Concepts efforts will be moved to PE 0604001F in future budgets.

A. Mission Description and Budget Item Justification

MSI is a long-range planning process with users (Air Force Global Strike Command (AFGSC), Air Combat Command (ACC), United States Space Force (USSF), Air Mobility Command (AMC), Air Force Special Operations Command (AFSOC), US Strategic Command (USSTRATCOM), and the Navy) to monitor and assess the performance of existing NC3 systems and develop recommendations for strategic and tactical architecture upgrades, requirements, and issues based on available and emerging technologies. MSI is used to conduct technology testing; analyze technology strategies; conduct requirement trade space analysis, technology maturation and risk reduction efforts, and mission analysis; and build technology Roadmaps as proactive support to the NC3 community. MSI performs analysis, integration, and testing activities for the NC3 Weapon System.

NC3 Advanced Concepts develops and prototypes NC3 unique and dual-use systems in support of Concept for Force Development (CFD), Joint All-Domain Command and Control (JADC2), and Advanced Battle Management Systems (ABMS) initiatives. This program ensures a responsive design and development engineering infrastructure to address evolving NDO mission requirements, emerging issues and technology insertion/technology application on the NC3 Weapon System, future strategic systems/capability, and other common strategic areas where appropriate, and develop enhanced multi-use capabilities. The NC3 Advanced Concepts Program will provide technology maturation and risk reduction activities to support the NC3 Weapon System (AN/USQ-225). Activity will reduce life cycle costs, inform technology maturation & risk reduction efforts, improve system performance, mitigate evolving threats, and ensure both viability and durability of the NC3 Weapon System.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: MEECN System Improvements	25.059	0.948	0.965
Description: MSI is used to conduct technology testing, analyze technology strategies, conduct requirement trade space analysis, technology maturation and risk reduction efforts, and mission analysis, and build technology Roadmaps as proactive support to the NC3 community. MSI may also be used to execute test bed activities and exercise participation related to ABMS and JADC2 demonstrations and execute contracts in support of next generation NC3 systems and sub-systems			
FY 2020 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672832 / <i>MEECN System Improvements</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
<ul style="list-style-type: none"> - Refresh NC3 Architecture Roadmap - Plan and initiate integration, analysis, and testing activities for AF NC3 Weapon System - Develop enhanced multiuse capabilities - Evaluate integrated technology, representative modes, and prototype systems - Conduct NC3 Connectivity Performances updates - Develop messaging, waveform, mode, and system standards and documentation - Develop proof-of-concepts and prototypes for prediction-based system functionality, sensor systems, transmission modes and algorithms for traffic routing - Develop weapon system validation test environment including but not limited to the purchase of vendor radios and terminals and test equipment - Conduct studies, analysis, proof-of-concept, and prototyping for the assessment and modernization of the AF NC3 WS (AN/USQ-225) <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue to refresh NC3 Architecture Roadmap - Continue planning and initiate integration, analysis, and testing activities for AF NC3 Weapon System - Complete MSI Summary Report - Conduct design and development engineering - Perform analysis of engineering issues and technology insertion - Develop enhanced multiuse capabilities - Conduct technology maturation and risk reduction activities - Evaluate integrated technology, representative modes, and prototype systems - Conduct technology testing; analyze technology strategies - Build technology roadmaps as proactive support - Perform analysis, integration, and testing activities - Conduct NC3 Connectivity Performances updates - Develop messaging, waveform, mode, and system standards and documentation - Develop proof-of-concepts and prototypes for prediction-based system functionality, sensor systems, transmission modes and algorithms for traffic routing - Develop weapon system validation test environment including but not limited to the purchase of vendor radios and terminals and test equipment 			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672832 / <i>MEECN System Improvements</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
- Conduct studies, analysis, proof-of-concept, and prototyping for the assessment and modernization of the AF NC3 WS (AN/USQ-225)			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> No significant change			
Accomplishments/Planned Programs Subtotals	25.059	0.948	0.965

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

MSI will continue to evaluate the performance of the NC3 Weapon System by assessing performance and technology areas for improvement with the assistance of expert technical support from FFRDCs, UARCs, and may include competitively awarded technical support contracts with industry. MITRE, Massachusetts Institute of Technology (MIT) Lincoln Labs, and Johns Hopkins University/Applied Physics Laboratory (JHU/APL) will continue to support NC3 Weapon System Architecture Roadmap updates.

To conduct NC3 Advanced Concepts essential activities a combination of competitively awarded contracts, as well as sole source contracts, may be used to augment AF organic capabilities with technical skill sets from FFRDCs, UARCs, and industry Advisory and Assistance Services (A&AS) providers. NC3 Advanced Concepts efforts will be moved to PE 0604001F in future budgets.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672832 / <i>MEECN System Improvements</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
MSI NC3 Roadmap / NC3 Connectivity Performances Update	Various	JHU/APL : Laurel, MD	-	0.792	Mar 2019	0.100	Mar 2020	0.300	Jan 2021	-		0.300	Continuing	Continuing	-
Waveform Standards Documentation	Various	MITRE : Bedford, MA	-	-		0.450	Mar 2020	0.240	Dec 2020	-		0.240	Continuing	Continuing	-
Antenna Study	Various	MIT/LL : Lexington, MA	-	-		0.233	Mar 2020	0.250	Mar 2021	-		0.250	Continuing	Continuing	-
NC3 Advanced Concepts	TBD	Various : Various	-	15.092	Feb 2019	-		-		-		-	Continuing	Continuing	-
NC3 Advanced Concepts DMS FFRDC/UARC/A&AS	TBD	Various : Various	-	8.115	Dec 2018	-		-		-		-	Continuing	Continuing	-
Subtotal			-	23.999		0.783		0.790		-		0.790	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
NC3 Advanced Concepts Test	Various	Various : Various	-	0.922	Sep 2019	-		-		-		-	Continuing	Continuing	-
Subtotal			-	0.922		-		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		0.130	Apr 2020	0.138	Apr 2021	-		0.138	Continuing	Continuing	-
MSI PSC (Eng/Acq Spt/ Travel/IMPAC)	Various	Various : Various	-	0.138	Feb 2019	0.035	Nov 2019	0.037	Nov 2020	-		0.037	Continuing	Continuing	-
Subtotal			-	0.138		0.165		0.175		-		0.175	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672832 / <i>MEECN System Improvements</i>
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	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	25.059	0.948	0.965	-	0.965	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672832 / <i>MEECN System Improvements</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

<i>MEECN System Improvement</i>																												
MEECN System Improvement																												
MSI Summary Report - FY19																												
MSI Summary Report - FY20																												
MSI Summary Report - FY21																												
MSI Summary Report - FY22																												
MSI Summary Report - FY23																												
MSI Summary Report - FY24																												
NC3 Advanced Concepts																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672832 / <i>MEECN System Improvements</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>MEECN System Improvement</i>				
MEECN System Improvement	1	2019	4	2025
MSI Summary Report - FY19	1	2020	1	2020
MSI Summary Report - FY20	1	2021	1	2021
MSI Summary Report - FY21	1	2022	1	2022
MSI Summary Report - FY22	1	2023	1	2023
MSI Summary Report - FY23	1	2024	1	2024
MSI Summary Report - FY24	1	2025	1	2025
NC3 Advanced Concepts	1	2019	2	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>					Project (Number/Name) 672835 / <i>Common VLF/LF Receiver Inc 2</i>		
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672835: <i>Common VLF/LF Receiver Inc 2</i>	-	8.559	12.478	25.234	0.000	25.234	57.576	13.404	5.988	41.260	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Common Very Low Frequency/Low Frequency (VLF/LF) Receiver (CVR) Increment 2 (CVR Inc 2) will deliver a survivable, beyond-line-of-sight path for Emergency Action Message (EAM) reception. The intent of CVR Inc 2 is to develop and produce a common VLF/LF receiver, capable of implementing an interoperable waveform for future platform integration to include airborne and ground based nodes, improved system performance, and reduced supportability costs through commonality. In parallel, the program will lead development of the Special Mode A waveform specification for the USAF and USN to increase reception range and accuracy while shortening required transmission time. The program will assume responsibility for the sustainment and configuration management of the CVR Inc 1 program's VLF receiver while also providing management support to the B-52 VLF Modernization Program for production and procurement of the AFGSC AF 1067 directed VLF receiver. The program will continue to invest in VLF Modernization activities directed by the VLF Enterprise Program Office to ensure technology and CONOPS are available for incorporation into current and next generation VLF architectures and aligning with integrating with Joint All Domain Command and Control (JADC2).

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: CVR Inc 2	8.559	12.478	25.234
Description: Post-MDD and preparation for Development RFP Release Decision Point			
FY 2020 Plans:			
<ul style="list-style-type: none"> - Complete Acquisition Strategy and conduct Acquisition Strategy Panel with PEO Continue CVR Inc 2 and VLF/LF Working Groups - Draft statutory acquisition documentation - Finalize System Engineering Plan (SEP) - Complete remaining Call of Broad Agency Announcement (BAA) - Finalize Systems Requirement Document (SRD) - Release Draft EMD RFP - Host Industry Day(s) - Conduct interoperability tests of Special Mode A VLF/LF Waveform with USN counterparts Develop - Special Mode A Waveform Reference Architecture - Develop Modeling and Simulation on Special Mode A VLF/LF Waveform Standard - Coordinate with NC3 Integration Directorate, AFGSC/NC3C, and USSTRATCOM/NEC to establish 			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672835 / <i>Common VLF/LF Receiver Inc 2</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<ul style="list-style-type: none"> - Configuration Control Board for Special Mode A - Coordinate with CVR Inc 1 PM to complete Transition Support Plan (TSP) - Coordinate with Low Frequency Transmitter System (LFTS) PM and NC3 Integration Directorate to explore installation of Special Mode A - Release EMD RFP <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Review industry proposals and conduct Source Selection - Award EMD contract for CVR Inc 2 materiel solution - Conduct CVR Inc 2 System Requirements Review (SRR) / System Functional Review (SFR) to include Special Mode A - Finalize CVR Inc 2 Test and Evaluation Master Plan (TEMP) - Conduct CVR Inc 2 Preliminary Design Review (PDR) - Execute CVR Inc 1 Transition Support Plan and assume role as Chair of Interface Control Working Group (ICWG) - Continue CVR Inc 2 and VLF/LF Working Groups - Participate as USAF lead in USSTRATCOM CCB for Special Mode A <p>FY 2020 to FY 2021 Increase/Decrease Statement: FY21 increase required to execute EMD RFP, source selection activities, achieve Milestone B, and award EMD Contract.</p>			
Accomplishments/Planned Programs Subtotals	8.559	12.478	25.234

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 03 PE 0303131F: <i>CVR Inc 2</i>	0.000	0.000	0.000	0.000	0.000	6.372	49.137	65.917	67.122	Continuing	Continuing
Remarks											

D. Acquisition Strategy
Following a streamlined DODI 5000.02 approach, CVR Inc 2 will use a full and open competitive source selection to award an EMD Contract for new development of an Open System Architecture (OSA) VLF receiver comprising a common core (i.e., receiver, crypto, filter, timing source, ground support equipment, and new waveform).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672835 / <i>Common VLF/LF Receiver Inc 2</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		11.829	Jun 2021	-		11.829	Continuing	Continuing	-
Early Development (TMRR prototype contract FY 2020)	Various	Various : TBD	-	0.729	Aug 2019	-		-		-		-	Continuing	Continuing	-
MITRE (DMS)	Various	Various : Bedford, MA	-	1.721	Jan 2019	1.271	Dec 2019	1.743	Nov 2020	-		1.743	Continuing	Continuing	-
Broad Agency Announcement	Various	Various : TBD	-	0.905	Aug 2019	1.018	Jan 2020	-		-		-	Continuing	Continuing	-
NSA Certification	Various	Various : TBD	-	-		0.468		-		-		-	Continuing	Continuing	-
MIT Lincoln Lab (DMS)	Various	Various : Lexington, MA	-	0.240	Mar 2019	0.264	Feb 2020	0.269	Feb 2021	-		0.269	Continuing	Continuing	-
Direct Cite Civilian Pay	Various	Various : TBD	-	0.550	Sep 2019	1.710	Nov 2019	2.383	Nov 2020	-		2.383	Continuing	Continuing	-
Not specified.	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Subtotal			-	4.145		4.731		16.224		-		16.224	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
General Support (Eng/Acq Spt)	Various	Not specified. : TBD	-	-		3.084		-		-		-	Continuing	Continuing	-
GFE	Various	Various : TBD	-	0.001		0.000		1.292	Mar 2021	-		1.292	Continuing	Continuing	-
Subtotal			-	0.001		3.084		1.292		-		1.292	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	0.344	May 2019	0.356	Mar 2020	-		-		-	Continuing	Continuing	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672835 / <i>Common VLF/LF Receiver Inc 2</i>
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	0.344		0.356		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PSC (Eng/Acq Spt/Travel/IMPAC)	Various	Various : TBD	-	2.197	Nov 2018	3.036	Nov 2019	3.650	Oct 2020	-		3.650	Continuing	Continuing	-
MITRE (PSC)	Various	Various : Bedford, MA	-	1.872	Feb 2019	1.271	Oct 2019	4.068	Nov 2020	-		4.068	Continuing	Continuing	-
Subtotal			-	4.069		4.307		7.718		-		7.718	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	8.559	12.478	25.234	-	25.234	Continuing	Continuing	N/A

Remarks
 In FY20,CVR Inc 2 will expend \$1.710M on manpower positions hired under Direct Cite Authority.
 In FY21,CVR Inc 2 will expend \$2.383M on manpower positions hired under Direct Cite Authority.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672835 / <i>Common VLF/LF Receiver Inc 2</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
CVR Inc. 2																												
Early Systems Engineering																												
Requirements Development																												
Matériel Development Decision (MDD)																												
Acquisition Strategy Panel																												
Draft RFP Release																												
Industry Day(s)																												
EMD RFP Release																												
Source Selection																												
Milestone B Decision																												
EMD Contract Award																												
EMD																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 672835 / <i>Common VLF/LF Receiver Inc 2</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>CVR Inc. 2</i>				
Early Systems Engineering	3	2019	3	2020
Requirements Development	3	2019	3	2020
Material Development Decision (MDD)	4	2019	4	2019
Acquisition Strategy Panel	2	2020	2	2020
Draft RFP Release	3	2020	3	2020
Industry Day(s)	3	2020	3	2020
EMD RFP Release	4	2020	4	2020
Source Selection	1	2021	1	2021
Milestone B Decision	2	2021	2	2021
EMD Contract Award	3	2021	3	2021
EMD	3	2021	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>				Project (Number/Name) 676029 / <i>Global Aircrew Strategic Network Terminal</i>				
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
676029: <i>Global Aircrew Strategic Network Terminal</i>	-	19.181	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

Global ASNT replaces inadequate, unsustainable strategic communications equipment at bomber, tanker and reconnaissance Wing Command Posts (WCPs), Nuclear Task Forces and Munitions Support Squadrons (MUNSS) and for Mobile Support Teams (MSTs). Global ASNT is a ground-based system that will provide survivable, secure communication paths to receive Emergency Action Messages (EAMs), Force Management messages, and Force Direction messages and disseminate them to bomber, tanker, and reconnaissance aircrews.

Global ASNT is being fielded in separate capability increments. Global ASNT Increment 1 (Inc 1) includes early system engineering support for the planning and development for the future Global ASNT Increments.

Global ASNT Inc 1 fields required Extremely High Frequency/Advanced Extremely High Frequency (EHF/AEHF) capabilities and replaces inadequate, unsustainable strategic mobile and fixed-site Single Channel Anti-jam Man-Portable (SCAMP) terminals and Secure, Mobile, Anti-Jam, Reliable, Tactical - Terminal (SMART-T) equipment.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Global ASNT Inc 1	19.181	0.000	0.000
Description: Engineering & Manufacturing Development (EMD)			
FY 2020 Plans: N/A			
FY 2021 Plans: N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	19.181	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 676029 / <i>Global Aircrew Strategic Network Terminal</i>

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>			<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• OPAF 03 PE 0303131F: <i>Global ASNT Inc. 1 (834210)</i>	140.875	132.648	29.664	-	29.664	63.552	40.638	47.557	44.279	Continuing	Continuing
• OPAF 05 PE 0303131F: <i>Global ASNT Inc. 1 (861900)</i>	73.470	68.795	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks

D. Acquisition Strategy

Global ASNT used a full and open competitive approach to award an EMD contract for Increment 1. Global ASNT will continue to use a competitive incremental approach to fulfill the overall requirements for Increments 2 and 3.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020				
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>					Project (Number/Name) 676029 / <i>Global Aircrew Strategic Network Terminal</i>						

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 1 - Engineering & Manufacturing Development	C/FPIF	Raytheon : Marlborough, MA	-	15.547	Oct 2018	-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 1 - Satellite Simulations	SS/FFP	MIT/Lincoln Laboratory : Lexington, MA	-	1.040	Mar 2019	-		-		-		-	Continuing	Continuing	-
Subtotal			-	16.587		-		-		-		-	Continuing	Continuing	N/A

Remarks

- Raytheon Global ASNT Inc 1 EMD contract is an incrementally funded continuing effort on the existing contract.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 1 - MITRE Lab	SS/CPFF	MITRE : Bedford, MA	-	-		-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 1 - Software Support	Various	Various : NV	-	0.371	Mar 2019	-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 1 - GFE	Various	Various : NV	-	-		-		-		-		-	Continuing	Continuing	-
Subtotal			-	0.371		-		-		-		-	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 676029 / <i>Global Aircrew Strategic Network Terminal</i>
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Global ASNT Inc 1 - Government Test and Evaluation	Various	Various : NV	-	0.540	Dec 2018	-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 1 - NSA	MIPR	NSA, Maryland : NV	-	0.007	Apr 2019	-		-		-		-	Continuing	Continuing	-
Subtotal			-	0.547		-		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 1 - PSC (Eng/Acq Support, Travel)	Various	Various : NV	-	1.676	Oct 2018	-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 1 - PSC (MITRE)	SS/CPFF	MITRE : Bedford, MA	-	-		-		-		-		-	Continuing	Continuing	-
Subtotal			-	1.676		-		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
	Project Cost Totals		-	19.181	0.000	-	-	-	Continuing	Continuing

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 676029 / <i>Global Aircrew Strategic Network Terminal</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Global ASNT Inc. 1																												
Global ASNT Inc 1 - Engineering and Manufacturing Development																												
Global ASNT Inc 1 - Test																												
Global ASNT Inc 1 - Milestone C Decision																												
Global ASNT Inc 1 - Production and Deployment																												
Global ASNT Inc 1 - RAA IOC																												
Global ASNT Inc 1 - Interim Contractor Support																												
Global ASNT Inc 1 - RAA FOC																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 676029 / <i>Global Aircrew Strategic Network Terminal</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Global ASNT Inc. 1				
Global ASNT Inc 1 - Engineering and Manufacturing Development	1	2019	4	2019
Global ASNT Inc 1 - Test	1	2019	3	2019
Global ASNT Inc 1 - Milestone C Decision	4	2019	4	2019
Global ASNT Inc 1 - Production and Deployment	4	2019	4	2024
Global ASNT Inc 1 - RAA IOC	4	2021	4	2021
Global ASNT Inc 1 - Interim Contractor Support	1	2020	4	2024
Global ASNT Inc 1 - RAA FOC	4	2024	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>				Project (Number/Name) 676030 / <i>Global ASNT Inc 2</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
676030: <i>Global ASNT Inc 2</i>	-	9.347	0.117	35.688	0.000	35.688	0.016	0.010	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Global ASNT Inc 2 replaces aging legacy strategic communications equipment at bomber, tanker and reconnaissance Wing Command Posts (WCPs), Nuclear Task Forces, Munitions Support Squadrons (MUNSS), and Mobile Support Teams (MSTs). Global ASNT Inc 2 is a ground-based system that will provide survivable, secure communication paths to disseminate Emergency Action Messages (EAMs) to bomber, tanker, and reconnaissance aircrews.

Global ASNT Inc 2 is being fielded in 3 separate capability incremental blocks; all 3 blocks are HEMP and RADHAZ protected.

Global ASNT Inc 2, Block 1 delivers a replacement Aircrew Alerting System (AAS) consisting of Ultra High Frequency (UHF) personal and general alerting equipment replacing EHDC and AACE systems. Global ASNT Inc 2, Blocks 2 and 3 provide High Frequency (HF) capabilities and other enhancements.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Global ASNT Inc 2, Block 1	9.347	0.117	35.688
Description: Pre-Technology Maturation and Risk Reduction (TMRR)			
FY 2020 Plans:			
- Work with STRATCOM/AFGSC to define operational trade space			
- Prepare Source Selection/Technical Evaluation Criteria			
- Release Request for Proposal (RFP)			
FY 2021 Plans:			
- Award Other Transaction Agreement (OTA) [Contract Award]			
- Initiate TMRR activities (Kickoff, etc.)			
- Examine/Analyze COTS implementations of alerting devices			
- Initiate designs and prototypes across range of materiel solutions			
- Examine trade-offs between cost/performance across prototype			
FY 2020 to FY 2021 Increase/Decrease Statement:			
FY21 increase reflects recovery profile after Cong mark in FY20. Ramp-up is required to support TMRR contract award in 1QFY21			
Accomplishments/Planned Programs Subtotals	9.347	0.117	35.688

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 676030 / <i>Global ASNT Inc 2</i>

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

Global ASNT Inc 2 provides 3 separate capability incremental blocks. Global ASNT Inc 2, Block 1 institutes a tailored DoD 5000.02 rapid acquisition strategy. Global ASNT Inc 2, Blocks 2 and 3 will notionally utilize a traditional DoD 5000.02 acquisition strategy.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 676030 / <i>Global ASNT Inc 2</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Various : Bedford, MA	-	-		-		28.429	Nov 2020	-		28.429	Continuing	Continuing	-
MITRE Lab	SS/CPFF	MITRE : Bedford, MA	-	0.235	Jan 2020	-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 2 - Pre-TMRR Activities	Various	Various : Bedford, MA	-	-		-		-		-		-	Continuing	Continuing	-
Risk Reduction	TBD	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Subtotal			-	0.235		-		28.429		-		28.429	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	Various	Not specified. : TBD	-	0.000		-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 2 - Information Assurance	SS/CPAF	Booz Allen Hamilton : Bedford, MA	-	0.145	Nov 2019	-		-		-		-	Continuing	Continuing	-
Subtotal			-	0.145		-		-		-		-	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 2 - Test Planning	PO	96 TW : Eglin AFB, FL	-	0.040	Feb 2019	-		0.484	Oct 2020	-		0.484	Continuing	Continuing	-
Subtotal			-	0.040		-		0.484		-		0.484	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>					Project (Number/Name) 676030 / <i>Global ASNT Inc 2</i>				

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Global ASNT Inc 2 - PSC (Eng/Acq Support, Travel)	Various	Various : Bedford, MA	-	8.927	Nov 2018	0.117	Oct 2019	6.775	Oct 2020	-		6.775	Continuing	Continuing	-
Subtotal			-	8.927		0.117		6.775		-		6.775	Continuing	Continuing	N/A
Project Cost Totals			-	9.347		0.117		35.688		-		35.688	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 676030 / <i>Global ASNT Inc 2</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Global ASNT Inc. 2	
Global ASNT Inc 2 - Pre-TMRR Activities	[Redacted]
Global ASNT Inc 2 - Materiel Development Decision/Acquisition Strategy Review	[Redacted]
Global ASNT Inc 2 - Release Request for Proposal (RFP)	[Redacted]
Global ASNT Inc 2 - OTA (Contract Award)	[Redacted]
Global ASNT Inc 2 - Technology Maturation and Risk Reduction (TMRR)	[Redacted]
Global ASNT Inc 2 - Milestone B/C	[Redacted]
Global ASNT Inc 2 - Initial Operational Capability (IOC)	[Redacted]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303131F / <i>Minimum Essential Emergency Communications Network (MEECN)</i>	Project (Number/Name) 676030 / <i>Global ASNT Inc 2</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Global ASNT Inc. 2				
Global ASNT Inc 2 - Pre-TMRR Activities	1	2019	2	2020
Global ASNT Inc 2 - Materiel Development Decision/Acquisition Strategy Review	2	2020	2	2020
Global ASNT Inc 2 - Release Request for Proposal (RFP)	3	2020	3	2020
Global ASNT Inc 2 - OTA (Contract Award)	1	2021	1	2021
Global ASNT Inc 2 - Technology Maturation and Risk Reduction (TMRR)	1	2021	4	2023
Global ASNT Inc 2 - Milestone B/C	4	2023	4	2023
Global ASNT Inc 2 - Initial Operational Capability (IOC)	1	2025	1	2025

Note

GASNT Inc 2, Block 1 schedule is notional.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303133F / <i>High Frequency Radio Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	49.912	15.881	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.793
675046: <i>Systems Engineering & Integration</i>	-	49.912	15.881	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.793
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

Mission Description and Budget Item Justification: The HF Modernization program is designed to replace existing legacy High Frequency (HF) radios with a modernized HF radio on all Air Force (AF) aircraft that currently are equipped with HF radios (e.g., AN/ARC-190). The current HF radios installed on AF aircraft have reached obsolescence and there is a compelling need to modernize the HF capabilities. The replacement radio will have similar form and fit, but increased capability. The new radio needs to incorporate new technologies such as 3G/4G Automatic Link Establishment (ALE), wide band features that allow the radio to operate from 3 KHz up to 48 KHz channel spacing, and Low Probability of Intercept/Low Probability of Detection (LPI/LPD) features. The new HF radio should be software defined (SDR) to accommodate growth for newer technologies and embedded cryptographic options.

The current AN/ARC-190 radios, that serve a majority of HF airborne needs, will approach end of life ~2025 and do not have current capabilities to be sustainable for future years. Current and future AF aircraft with validated requirements for HF radios will experience a shortage of HF radios starting in FY20. With the increased shortage of spares, as the current HF radios continue to fail, Air Traffic Control (ATC), Air Operation Centers (AOC), and other controlling agencies will lose the ability to communicate with aircraft. HF Modernization provides alternate means of communication when satellite communications are not available due to nature and man-made disruptions. It is essential that these airborne radios keep pace to guarantee interoperability or theater C2 will be degraded.

Program management and administration efforts consist of, but are not limited to, contract services and government costs. This program element may include necessary civilian pay expenses required to manage, execute, and deliver HF Modernization weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

Funding for this exhibit contained in PE 0303133F.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force				Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0303133F / <i>High Frequency Radio Systems</i>				
B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	
Previous President's Budget	51.612	15.881	0.000	0.000	0.000	
Current President's Budget	49.912	15.881	0.000	0.000	0.000	
Total Adjustments	-1.700	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	-1.700	0.000	0.000	0.000	0.000	
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2019	FY 2020	FY 2021
Title: High Frequency Radio System				49.912	15.881	0.000
Description: Development of High Frequency Radio System						
FY 2020 Plans: Development of High Frequency Radio System						
FY 2021 Plans: N/A, there is no FY21 funding for this effort.						
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease from FY20 to FY21 as a result of DoD CIO funding availability.						
Accomplishments/Planned Programs Subtotals				49.912	15.881	0.000
D. Other Program Funding Summary (\$ in Millions) N/A						
Remarks Major Thrust - Funding decrease from FY20 to FY21 as result of DOD CIO funding availability.						
E. Acquisition Strategy Efforts awarded on an annual basis, exercising existing contract options, to support Development of High Frequency Radio System.						

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020				
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0303133F / <i>High Frequency Radio Systems</i>					Project (Number/Name) 675046 / <i>Systems Engineering & Integration</i>				
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
High Frequency Radio System	TBD	Not specified. : TBD	-	49.912		15.881		-		-		-	Continuing	Continuing	-
Subtotal			-	49.912		15.881		-		-		-	Continuing	Continuing	N/A
			Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	49.912		15.881		-		-		-	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303133F / <i>High Frequency Radio Systems</i>	Project (Number/Name) 675046 / <i>Systems Engineering & Integration</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

<i>High Frequency Radio System</i>	
Development	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303133F / <i>High Frequency Radio Systems</i>	Project (Number/Name) 675046 / <i>Systems Engineering & Integration</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>High Frequency Radio System</i>				
Development	2	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	35.775	27.726	10.351	0.000	10.351	13.598	13.405	61.566	62.698	Continuing	Continuing
675100: <i>Cryptographic Modernization</i>	-	34.322	27.726	10.351	0.000	10.351	13.598	13.405	61.566	62.698	Continuing	Continuing
675231: <i>AF Key Management Enterprise (AF KME)</i>	-	1.453	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

Information Systems Security Program (ISSP) - Includes resources, manpower authorizations, necessary facilities and equipment required to perform INFOSEC research and development, to provide INFOSEC services, to procure INFOSEC products required to secure telecommunications and information systems when such products are separately procurable from host systems, and to provide INFOSEC maintenance and support. Also includes costs associated with the protection afforded to telecommunications and information systems which process sensitive data and efforts to ensure confidentiality, integrity, and availability of the information and the system.

The ISSP Element provides cradle-to-grave research, development, acquisitions, supply, sustainment, depot maintenance, and demilitarization of the Air Force (AF) cryptographic and key distribution/management systems (known as the Key Management Enterprise (KME)). ISSP delivers on rising national, DoD, and AF priorities to address cyber security threats and increasing war-fighter dependence on cyberspace. The AF and the DoD require the capability to secure, collect, process, store, and disseminate an uninterrupted flow of information, while denying an adversary the ability to intercept, collect, destroy, interpret, or manipulate our information flows. Secure communication allows the DoD to achieve and maintain decision superiority, the key to successful application of the military instrument of national power in modern, high-tempo, full-spectrum operations. AF Communications Security (COMSEC) equipment protects information such as war-fighter positions, mission planning, target strikes, commanders orders, intelligence, force strength, and force readiness and ensures adversaries cannot interpret, manipulate, or destroy information. When an adversary is capable of interpretation, manipulation, or destruction of the information used by the war-fighter, DoD military forces will suffer significant and/or devastating mission degradation that can result in loss of life and resources and/or exceptionally grave damage to national security.

The overall focus of the Research, Development, Test, and Evaluation (RDT&E) efforts within this program is to transform electronic key delivery and cryptographic devices to meet the next generation war-fighting requirements. These efforts are driven by the National Security Agency's (NSA) mandates to address decertifications, new requirements, and end of life issues. NSA's first tenet calls for an AF KME that permits a totally "man-out-of-the-loop" electronic crypto key distribution system from the generation of the key in the key processor all the way into the using End Crypto Unit (ECU). This eliminates the current key vulnerability of compromise /interruption by individuals transporting or loading the key. NSA's second tenet requires an inventory of cryptographic devices that are more robust, modular, scalable, capable, net-centric, and durable. This enables more effective and efficient performance including reduced inventory, expanded data rates, simplified upgrades, lower life cycle costs, and ensured global information grid-compatibility.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver ISSP weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, Sec 240-D.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	33.979	27.726	11.156	0.000	11.156
Current President's Budget	35.775	27.726	10.351	0.000	10.351
Total Adjustments	1.796	0.000	-0.805	0.000	-0.805
• 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	3.000	0.000			
• SBIR/STTR Transfer	-1.204	0.000			
• Other Adjustments	0.000	0.000	-0.805	0.000	-0.805

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>				Project (Number/Name) 675100 / <i>Cryptographic Modernization</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675100: <i>Cryptographic Modernization</i>	-	34.322	27.726	10.351	0.000	10.351	13.598	13.405	61.566	62.698	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The AF Cryptographic Modernization Effort modernizes cryptographic devices protecting critical national security information across multi-domain operations. In September 2000, the Defense Review Board (DRB) tasked National Security Agency (NSA) to evaluate the security posture of the cryptographic inventory. Systems with aging algorithms, those approaching non-sustainability, and those generally incompatible with modern key management systems were identified and have been replaced or are in the process of being replaced. Priority systems that required immediate replacement were also identified. In addition, NSA documented the need to modernize the cryptographic inventory with capabilities designed to enable network-centric operations. Replacements/Modernization of the near term vulnerable systems must occur within the timeframe specified by device and algorithm in Chairman Joint Chiefs of Staff Notice (CJCSN) 6510. The DoD Cryptographic Modernization Program was established to develop a modern cryptographic base that provides this assured security robustness, interoperability, advanced algorithms, releasability, programmability, and compatibility with the future Key Management Enterprise (KME-See PE 0303140F, Project 67523, AF KME for a full description). This AF effort supports an integrated effort across the cyber domain to transform to next-generation cryptographic capabilities. It provides U.S. forces and multinational and interagency partners the multi-domain security needed to protect the flow and exchange of strategic, operational, and tactical information in accordance with national and international policy/standards, and the validated requirements of decision makers, warfighters, and the intelligence community.

The AF Cryptographic Modernization Effort is a collection of projects accomplished in three phases: replacement, modernization, and transformation. The replacement phase of the program focused on updating and/or replacing out-of-date algorithms along with unsustainable cryptographic products. The modernization phase provides crypto devices with common solutions that are more robust, modular, scalable, and provide the durability to existing cryptographic end items, as well as updating mid-term aging/unsupportable crypto equipment. Manpower and logistics requirements will be reduced and manpower efficiencies gained, while incremental capability enhancements and footprint reduction are provided. The third phase of the Cryptographic Modernization Program, transformation, provides common joint solutions which enable secure, transparent, multi-domain, network-centric capabilities. Activities also include studies and analysis to support both current program planning/execution and future program planning.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver ISSP weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Technology Development (TD)	8.372	7.275	3.469
Description: Technical Development (TD) conducts concept development, early systems engineering, and development/modernization activities to analyze and mitigate evolving crypto threats and Communications Security (COMSEC) capability			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675100 / <i>Cryptographic Modernization</i>

B. Accomplishments/Planned Programs (\$ in Millions)

gaps across AF and DoD mission areas. Develops, plans and executes Technology Maturation and Risk Reduction (TMRR) and Engineering and Manufacturing Development (EMD) activities for future cryptographic initiatives. Mitigates risk for thousands of AF and DoD users affected by algorithm security issues and ensures required security upgrades can be integrated into the AF and DoD enterprise. Works closely with NSA and other services to develop standards that increase security of communication and information products and facilitate efficient crypto and COMSEC enterprise management. Initiatives include but are not limited to: Advanced Cryptographic Capabilities Increment One (ACC Inc. 1) and Cryptographic Modernization 2 (CM2).

FY 2020 Plans:

- Coordinate the AF Limited User Testing (LUT) for the Advanced Cryptographic Capabilities Increment One (ACC Inc.1) initiative
- Continue TMRR activities to support cryptographic equipment modifications and new cryptographic equipment developments within the scope of the CM2 initiative
- Identify materiel solutions requiring modification or acquisition under the joint CM2 Initial Capabilities Document (ICD) and provide information to AF Lead Command to support AF1067 modifications or JCIDS documentation for follow-on acquisition
- Continue development of the Common Cryptologic Management Information Base (CC MIB) standard that will enable accurate tracking and management of crypto assets in support of COMSEC Enterprise Management (EM) and to verify CM2 algorithm transition compliance
- Begin the modification of CM2 impacted cryptographic devices to mitigate CM2 associated threats
- Continue to develop system security documentation (Operational Security (OPSEC) Plans, Cybersecurity Plans, Security Classification Guidance (SCG), Integrated Threat Assessments (ITAs), Anti-Tamper Planning and Program Protection Planning)
- Continue to develop the necessary Trusted System Network (TSN) processes to deliver a trusted system (integrating all source supply chain information, threat to risk methodologies, mapping of both SCRM Key Practices and Risk Management Framework (RMF) mitigations, risk strategies, and technical mitigations for both H/W and S/W)
- Continue to provide both counterfeit detection (H/W analysis) and Malware Analysis (S/W analysis)
- Continue to provide TSN contract language and clauses to effectively acquire trusted systems

FY 2021 Plans:

- Will continue to coordinate AF Limited User Testing (LUT) for the Advanced Cryptographic Capabilities Increment One (ACC Inc.1) initiative
- Will continue to identify materiel solutions requiring modification or acquisition under the joint Cryptographic Modernization 2 (CM2) Initial Capabilities Document (ICD) and provide information to AF Lead Command to support AF1067 modifications or JCIDS documentation for follow-on acquisition
- Will conduct Technology Maturation and Risk Reduction (TMRR) activities, execute AF 1067 cryptographic equipment modifications, and begin new cryptographic equipment developments within the scope of the CM2 program
- Will continue the modification of CM2 impacted cryptographic devices to mitigate CM2 associated threats

FY 2019	FY 2020	FY 2021

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675100 / <i>Cryptographic Modernization</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>-Will continue development of the Common Cryptologic Management Information Base (CC MIB) standard that will enable accurate tracking and management of crypto assets across the AF in support of the CM2 developments</p> <p>-Will develop system security documentation (OPSEC Plans, Cybersecurity Plans, Security Classification Guidance (SCG), Integrated Threat Assessments (ITAs), Anti-Tamper Planning and Program Protection Planning)</p> <p>-Will develop the necessary TSN processes to deliver a trusted system (integrating all source supply chain information, threat to risk methodologies, mapping of both SCRM Key Practices and Risk Management Framework (RMF) mitigations, risk strategies, and technical mitigations for both H/W and S/W)</p> <p>-Will provide both counterfeit detection (H/W analysis) and Malware Analysis (S/W analysis)</p> <p>-Will provide TSN contract language and clauses to effectively acquire trusted systems</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to higher AF priorities</p>				
<p>Title: IFF Mode 5</p> <p>Description: Identification Friend or Foe (IFF) Mode 5 devices provide authentication and encryption/decryption services to IFF Mode 5 host equipment. These encryption devices operate within military aircraft, fixed, and transportable ground stations when connected to an interrogator and/or transponder. The Identification Friend or Foe (IFF) Mode 5 crypto models KIV-77 and KIV-78 require permanent modification. The modification of these devices are required to address produce-ability and algorithm re-programmability mandated by the National Security Agency (NSA) and the 2019 Chairman of the Joint Chiefs of Staff Notice (CJCSN) 6510.</p> <p>FY 2020 Plans:</p> <p>-Executing funding from the Technology Development (TD) thrust for the modification of the KIV-78 IFF Mode 5 device in support of the Cryptographic Modernization 2 (CM2) effort as stated in TD description</p> <p>-Establish the CM2 Modification: IFF Mode 5 Program Management Office (PMO) to oversee the development contract</p> <p>FY 2021 Plans:</p> <p>-Reallocate funding from the Technology Development thrust to execute the permanent modification of the IFF Mode 5 in support of the Cryptographic Modernization 2 (CM2) effort</p> <p>-Execute the modification development effort for the IFF Mode 5 in support of the CM2 effort</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p> <p>-Funding decreased to execute a permanent modification of the IFF devices to incorporate cryptographic resilience through algorithm re-programmability mandated by the National Security Agency (NSA) and the 2019 Chairman of the Joint Chiefs of Staff</p>		-	4.779	3.274

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675100 / <i>Cryptographic Modernization</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
Notice (CJCSN) 6510. Funding was decreased from TD in order to continue development of the CM2 modification effort under the IFF thrust.				
<p>Title: Space Modular Common Crypto (SMCC)</p> <p>Description: Space Modular Common Crypto (SMCC) provides Information Assurance (IA) services for new satellite architectures via a family of common crypto solutions that integrate Tracking, Telemetry, & Commanding (TT&C), Mission Data (MD), and/or Transmission Security (TRANSEC) key stream functions for the Air Force and Intelligence Community space systems.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Ramp down SMCC development contract activities <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p> <ul style="list-style-type: none"> - Will complete SMCC EMD Phase 		22.306	12.124	-
<p>Title: Algorithm Transition Compliance and Support</p> <p>Description: Supports Air Combat Command (AF lead for Cyber Superiority) in Algorithm Transition Compliance and provides Information Assurance (IA) support by conducting analysis on all utilized cryptographic algorithms and hundreds of cryptographic equipment types to support transition efforts. This includes the development and planning of technology demonstrations to ensure new algorithms can be integrated into the multitude of devices across the AF crypto enterprise, determining and monitoring mitigation strategies to address vulnerabilities, and tracking and reporting algorithm/device integration. Assesses current state of AF cryptography across the enterprise and develops the Cryptographic Roadmap. Develops and maintains a classified Crypto Modernization (CM) database system that tracks status of AF crypto device types that is accessible by the CM community via SIPRNET. Efforts support NC3, ISR, all AF platforms, and most ground networks.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> -Continue to analyze the AF crypto enterprise and provide situational awareness of significant risks related to aging inventory and cryptographic vulnerabilities -Continue to provide analysis of adequacy of COMSEC products in support of NSA requirements, sustainment issues, and the state of technology -Provide Crypto Mod analysis database to AF community to assist in annual assessments and long term efforts to develop enterprise capabilities based assessment (CBA) and to identify technical capability gaps -Conduct annual assessment of the state of the AF cryptographic enterprise and update the Cryptographic Roadmap <p>FY 2021 Plans:</p>		3.385	3.448	3.508

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675100 / <i>Cryptographic Modernization</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<ul style="list-style-type: none"> - Will continue to analyze the AF crypto enterprise and provide situational awareness of significant risks related to aging inventory and cryptographic vulnerabilities - Will continue to provide analysis of adequacy of COMSEC products in support of NSA requirements, sustainment issues, and the state of technology - Will provide Crypto-Mod analysis database to AF community to assist in annual assessments and long term efforts to develop enterprise capabilities based assessment (CBA) and to identify technical capability gaps - Will conduct annual assessment of the state of the AF cryptographic enterprise and update the Cryptographic Roadmap <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to Cryptographic Modernization 2 (CM2) requirements</p>				
<p>Title: Missile Electronic Encryption Device (MEED) Modification</p> <p>Description: The MEED Modification upgraded the legacy Missile Entry Control System (MECS) devices used to securely authenticate personnel attempting access to this Nation's ground-based Intercontinental Ballistic Missile (ICBM) facilities. This effort will bring the MEED equipment into compliance with current NSA information assurance (IA) security design guidance.</p> <p>FY 2020 Plans: N/A</p> <p>FY 2021 Plans: N/A</p>		0.159	0.000	0.000
<p>Title: Classified Data At Rest (CDAR)</p> <p>Description: CDAR plans to develop and procure an NSA approved modernized cryptographic solution(s) for use in ISR, C2, and EW platforms exposed to hostile/uncontrolled environments. The enterprise cryptographic solution will encrypt/decrypt Top Secret and Below (TSAB) data at rest residing in a variety of data storage environments.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Conduct Risk Reduction and Technology Maturation (TMRR) prototyping of key enabling technologies - Continue market research and preparation for Milestone B and entry into EMD <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Will complete TMRR prototyping - Will continue market research and preparation for Milestone B and entry into EMD 		0.100	0.100	0.100
Accomplishments/Planned Programs Subtotals		34.322	27.726	10.351

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675100 / <i>Cryptographic Modernization</i>

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 831010: <i>COMSEC Equipment</i>	53.171	49.979	48.736	-	48.736	49.573	50.438	51.343	52.284	Continuing	Continuing

Remarks

Remarks: Other Program Funding reflects Crypto Modernization (CM) portion of Information Systems Security Program (ISSP) OPAF total.

D. Acquisition Strategy

Implement AF portion of the DoD's Cryptographic Modernization (CM) Initiative through modernization/modification efforts, in varying stages of the acquisition cycle, with focus on minimizing life cycle costs. The CM portfolio of component acquisition projects is executing using a variety of approaches that vary from an evolutionary acquisition strategy using spiral development (for new component development) to incremental improvement leveraging leading-edge, certified non-developmental items (for modernization). Contract type is selected for each of the individual projects based upon its acquisition approach and its unique technology risks. A mixture of fixed-price and cost-reimbursement contracts have been selected which maximize the best value for the Government.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675100 / <i>Cryptographic Modernization</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Tech Development	Various	MULTIPLE : MULTIPLE	-	2.393	Jan 2019	14.152	Jan 2020	6.743	Dec 2021	-		6.743	Continuing	Continuing	-
Space Modular Common Crypto (SMCC)	C/CPIF	MULTIPLE : MULTIPLE	-	23.664	Dec 2018	9.383	Feb 2020	-		-		-	0.000	33.047	-
Subtotal			-	26.057		23.535		6.743		-		6.743	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Space Modular Common Crypto (SMCC)	Various	MULTIPLE : MULTIPLE	-	1.811	Dec 2018	0.743	Dec 2019	-		-		-	0.000	2.554	-
Subtotal			-	1.811		0.743		-		-		-	0.000	2.554	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Administration (PMA)	Various	Various : Various	-	6.454	Dec 2018	3.448	Dec 2019	3.608	Dec 2020	-		3.608	Continuing	Continuing	-
Subtotal			-	6.454		3.448		3.608		-		3.608	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	34.322	27.726	10.351	-	10.351	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675100 / <i>Cryptographic Modernization</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>Cryptographic Modernization APPN 3600, BA07, PE 0303140F, BPAC 675100</i>	
Technology Development	
IFF Mode 5	
Space Modular Common Crypto (SMCC)	
MEED	
CDAR	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675100 / <i>Cryptographic Modernization</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Cryptographic Modernization APPN 3600, BA07, PE 0303140F, BPAC 675100</i>				
Technology Development	1	2019	4	2025
IFF Mode 5	1	2020	4	2022
Space Modular Common Crypto (SMCC)	1	2019	4	2020
MEED	1	2019	4	2020
CDAR	1	2019	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>				Project (Number/Name) 675231 / <i>AF Key Management Enterprise (AF KME)</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675231: <i>AF Key Management Enterprise (AF KME)</i>	-	1.453	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

The Air Force Key Management Enterprise (AF KME) Program consists of multiple developments supporting the AF requirements/portion of the DoD Key Management Infrastructure (KMI) at the Tier 3 level. The National Security Agency (NSA) acts as the Executive Agent for the DoD KMI Program. AF KMI, in concert with this overarching DoD KMI Program, will provide a secure and flexible capability for the electronic generation, distribution, accounting, and management of key material and other communications security (COMSEC) materials for all DoD Command, Control, Communications, Computers, and Intelligence (C4I) systems and for the Services' weapon systems. KMI represents a broad-scale replacement of the current Electronic Key Management System (EKMS). KMI will provide capabilities that will allow networked operation in consonance with the AF Information Network and other DoD, fellow Service, and AF enterprise objectives. It thereby will assure a viable support infrastructure for future weapons and C4I programs to incorporate key management into their system designs.

The DoD KMI will greatly improve protection of national security-related information by substantially enhancing confidentiality, integrity, and non-repudiation characteristics over the legacy EKMS. KMI will greatly accelerate the availability of crypto key materials through electronic transmission versus shipping of materials, will enhance mission responsiveness and flexibility, and will eventually take the man "out-of-the-loop" in the distribution of crypto key materials.

The AF KMI Program in concert with the DoD KMI Program is transitioning the Air Force from the legacy EKMS to modern DoD KMI and building the AF KME Tier 3 architecture. This Research and Development effort includes system engineering, development and testing to successfully implement the AF KMI Last Mile architecture as part of the AF Key Management Enterprise (KME) Tier 3. The AF KME Tier 3 is a holistic solution integrating the legacy and new and evolving cryptographic programs, materials, products, sources and consumers. The AF KME Tier 3 capabilities include as part of the AF KME distribution, management, and loading of cryptographic materials from the KMI (COMSEC account) to the end cryptographic unit (ECU). It builds the linkage interfaces that will allow KMI systems to communicate and integrate other related developments to meet operational needs. AF KME Tier 3 is currently in the Development Phase. Activities also include studies and analysis to support both current program planning and execution and future program planning.

In parallel with AF KMI, DoD and the Services are addressing the need for a new generation of future KMI-aware ECUs that will be capable of direct interaction with the DoD KMI Enterprise, under the Joint Crypto Modernization Initiative (PE0303140F, BPAC 675100, Cryptographic Modernization, supports this initiative). In some cases these new ECUs, although needing to be supported by KMI, will not be KMI network-connected. "Last mile" transport of black (aka benign, or encrypted) and red (unencrypted) keying material from a KMI client to a new generation ECU or current legacy ECU will need to be handled in the early years by one of two data transfer devices. Development of these two data transfer devices is supported by the Air Force Key Management Enterprise Tier 3 Program.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver ISSP weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675231 / <i>AF Key Management Enterprise (AF KME)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Air Force KME Tier 3 Network Information Warfare Center (NIWC) Support (Tier 3) Description: Support includes architectural planning, systems engineering, testing and studies and analyses for Tier 3 Key Management activities (includes acquisition planning, systems integration, engineering support and System Program Office (SPO) support). Transitioned existing key management capabilities to AF KME Tier 3. FY 2020 Plans: N/A FY 2021 Plans: N/A	1.453	0.000	0.000
Accomplishments/Planned Programs Subtotals	1.453	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 831010: <i>COMSEC Equipment</i>	2.654	2.623	1.955	-	1.955	2.909	2.960	3.012	3.067	Continuing	Continuing

Remarks
Remarks: Other Program Funding reflects AF Key Management Infrastructure (KMI) portion of Information Systems Security Program (ISSP) OPAF total.

D. Acquisition Strategy
Implement AF portion of the DoD's Cryptographic Modernization (CM) Initiative through modernization/modification efforts, in varying stages of the acquisition cycle, with focus on minimizing life cycle costs. All major contracts within this project are open to full and open competition with technology knowledge, expertise, and prior experience on similar projects weighted heavily in the evaluation process.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675231 / <i>AF Key Management Enterprise (AF KME)</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>KME</i>	
AF KMI Tier 3 Last Mile	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303140F / <i>Information Systems Security Program</i>	Project (Number/Name) 675231 / <i>AF Key Management Enterprise (AF KME)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>KME</i>				
AF KMI Tier 3 Last Mile	1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0303142F I Global Force Management - Data Initiative
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	2.108	2.210	1.346	0.000	1.346	0.458	0.000	0.000	0.000	0.000	6.122
676027: Global Force Mgt Initiative	-	2.108	2.210	1.346	0.000	1.346	0.458	0.000	0.000	0.000	0.000	6.122
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The Global Force Management Data Initiative (GFM DI) is a Joint Staff and the Office of the Secretary of Defense (OSD) initiative to standardize force structure data, making it visible, accessible, and understandable across the Department of Defense (DoD). This initiative is accomplished through each service's Organizational Server. The Air Force Organizational Server (AFOS) consumes data from various Air Force Authoritative Data Sources (ADSs), validates it, formats it in a consistent force structure data standard, and publishes it for consumption by programs of record that use force structure data. The AFOS is the ADS for Air Force Authorized Force Structure and provides critical unit, billet, crew platform, vehicle, and command relationship data within the Air Force to the Joint Staff (J8) for war and contingency planning, by providing visibility of the entire force structure as a function of time: past, present and future.

The AFOS produces consistent force structure data in the Global Force Management Information Exchange Model format that is well defined, centrally managed, and inter-operable as a standardized representation of the organization's hierarchy in all other programs of record that use force structure data. The end goal of the GFM-DI AFOS is to integrate the four force management processes (Assignment, Manpower & Personnel, Readiness, and Allocation), and ensure the data is available to meet the needs of all users, systems and functions.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the GFM-DI system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

Funds will be used to perform studies and innovative integration efforts for common technology capabilities such as cloud migration, technology development and mobile application.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303142F / <i>Global Force Management - Data Initiative</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	2.170	2.210	1.348	0.000	1.348
Current President's Budget	2.108	2.210	1.346	0.000	1.346
Total Adjustments	-0.062	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	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.002	0.000			
• SBIR/STTR Transfer	-0.060	0.000			
• Other Adjustments	0.000	0.000	-0.002	0.000	-0.002

Change Summary Explanation

FY19 change due to an approved Below Threshold Reprogramming of \$0.002M

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Global Force Management - Data Initiative	2.108	2.210	1.346
Description: The GFM-DI is a combination of net-centric services designed to provide access to information on the operational availability of USAF forces and equipment. GFM-DI is part of a Joint GFM, (each service has a GFM-DI), directed by OSD and the JCS.			
FY 2020 Plans: - Receive Joint Staff J8 validation - Implement major Joint Staff directed database changes			
No OCO			
FY 2021 Plans: - Will continue to implement major Joint Staff J8 directed database changes - Will refactor database - Will implement GFM-DI XSD 4.0 Database Changes			
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to anticipated program requirement reduction.			
Accomplishments/Planned Programs Subtotals	2.108	2.210	1.346

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0303142F / <i>Global Force Management - Data Initiative</i>	
D. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
E. Acquisition Strategy The program will utilize an evolutionary acquisition strategy resulting in the migration to a Joint Information Environment (JIE)-compliant platform, replacement of system Commercial-Off-the-Shelf (COTS) components with newer, more capable elements, and additional software releases to implement additional requirements. The anticipated contract structure will be Firm-Fixed Price contract. The Air Force Organizational Server (AFOS) PMO will utilize a mix of Service Level Agreements (SLA) and Interface Requirement Agreements with AFOS stakeholders and support agencies as part of its management strategy. SLAs will be developed with the Lead Developmental Test Organization and the Capabilities Integration Environment at Maxwell AFB-Gunter Annex. The AFOS PMO also maintains Memorandum of Agreements (MOAs) with several AFOS input and output systems, including Manpower Programming & Execution Systems, Air Force Directory Services, Air Force Equipment Management System, and Force Structure Data Management.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 7				PE 0303142F / Global Force Management - Data Initiative				676027 / Global Force Mgt Initiative							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
GFM-DI AFOS / Development Contract	C/FFP	Various : Various	-	1.521	Mar 2019	1.376	Mar 2020	0.579	Mar 2021	-		0.579	Continuing	Continuing	-
Subtotal			-	1.521		1.376		0.579		-		0.579	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
CIE Support - NIPR/SIPR Dev Environment	C/FFP	AFLCMC/HNIZ : Montgomery, AL	-	0.030	May 2019	0.031	May 2020	0.031	May 2021	-		0.031	Continuing	Continuing	-
EPASS - A&AS	C/CPFF	Oasis : Bedford, MA	-	0.070	Apr 2019	0.131	Apr 2020	0.150	Apr 2021	-		0.150	Continuing	Continuing	-
Enclave System Admin Services	MIPR	DISA: DECC-OKC : Montgomery, AL	-	0.335	Aug 2019	0.396	Aug 2020	0.396	Aug 2021	-		0.396	Continuing	Continuing	-
Subtotal			-	0.435		0.558		0.577		-		0.577	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Lead Developmental Test Organization Independent Test & Evalaution	C/FFP	AFLCMC/HNIZ : MONTGOMERY, AL	-	0.047	Apr 2019	0.055	Apr 2020	0.055	Apr 2021	-		0.055	Continuing	Continuing	-
Subtotal			-	0.047		0.055		0.055		-		0.055	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Office Support	Various	AFLCMC/HIB : MONTGOMERY, AL	-	0.105	Oct 2018	0.221	Oct 2019	0.135	Oct 2020	-		0.135	Continuing	Continuing	-
Subtotal			-	0.105		0.221		0.135		-		0.135	Continuing	Continuing	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303142F / <i>Global Force Management - Data Initiative</i>	Project (Number/Name) 676027 / <i>Global Force Mgt Initiative</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
GFM-DI Inc 2																												
- JIE Integration and Migration																												
- Readiness/Authorization Linkage																												
- Functional/Data Validation																												
- Joint Staff J8 Validation																												
- Refactor Database																												
- GFM-DI XSD 4.0 Database Changes																												
- Future Joint Staff Requirements																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0303142F / <i>Global Force Management - Data Initiative</i>	Project (Number/Name) 676027 / <i>Global Force Mgt Initiative</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>GFM-DI Inc 2</i>				
- JIE Integration and Migration	1	2019	2	2019
- Readiness/Authorization Linkage	2	2019	4	2019
- Functional/Data Validation	3	2019	3	2021
- Joint Staff J8 Validation	1	2020	1	2022
- Refactor Database	4	2021	1	2022
- GFM-DI XSD 4.0 Database Changes	4	2021	1	2022
- Future Joint Staff Requirements	4	2021	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0304115F / <i>Multi Domain Command and Control (MDC2)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	100.880	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
673380: <i>Multi Domain Command and Control (MDC2)</i>	-	0.000	100.880	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
 In FY21, PE 0304115, Multi Domain Command and Control RDT&E funds were transferred to PE 0604003F BA 04, (BPAC 640141) Advanced Battle Management System in order to provide consolidation of multi domain efforts and to provide greater clarity and transparency.

A. Mission Description and Budget Item Justification

The Advanced Battle Management System (ABMS) portfolio develops the digital infrastructure and tools required for the joint force to provide operationally relevant and fieldable capabilities in support of the National Defense Strategy (NDS). ABMS addresses gaps in interoperability and information sharing for air, land, sea, space, and cyberspace domains. The ABMS lines of effort accelerate the development, integration, transition, and fielding of technologies that enable Joint All-Domain Command and Control.

ABMS investments are divided into seven categories of activities.

Digital Architectures, Standards, and Concept Development: This includes digital engineering and analysis, model-based systems engineering, and related analyses and exploration in support of potential investments in the other six categories.

Sensor Integration: This includes the development, test, and integration of open architecture sensor system. These systems will be based on government-owned standards and provide open and reusable capabilities, initially focused on air and ground moving target indication (AMTI, GMTI).

Multi-Domain Data Management: This includes cloud-based data libraries, data feeds, data wrappers, and data management to improve data discoverability and information sharing across the joint force.

Multi-Domain Secure Processing: This includes hardware and software for multi-level security as well as edge hardware to enable a full range of military operations.

Multi-Domain Connectivity: This includes maturation and integration of open software-defined radios and networks, government-owned waveform libraries, and wideband multi-function RF systems. This category also includes the integration and standards required to leverage advances in commercial technology such as 5G networks and proliferated low-earth orbit satellite communications.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0304115F / <i>Multi Domain Command and Control (MDC2)</i>
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Multi-Domain Applications: This includes cloud-based applications to process sensor data, fuse sensor data from multiple platforms across different domains, combine data into a common multi-domain operating picture, and provide battle management, command, and control (BMC2) functionality.

Effects Integration: This includes development and integration of open smart munitions that enable dynamic kill webs, attritable aircraft that generate combat mass and distributed effects, and real-time updates to mission data files to improve electronic warfare system performance.

The ABMS approach is not a traditional systems acquisition. Instead of acquisition of platforms, ABMS is moving to acquisition of capabilities that are open, available, deployable, and reconfigurable for installation on or use by multiple systems across multiple domains. These capabilities increase the effectiveness and survivability of Air Force, joint, and coalition partners across permissive and contested environments, in all warfighting domains, and at multiple classification levels. ABMS will leverage existing and emerging technology with emphasis on commercial technology and those at technology readiness levels that will enable rapid transition. The innovations from ABMS will augment new and ongoing initiatives aligned with service multi-domain operational priorities.

ABMS funding provides for operational concept development and demonstration, hardware development and integration, and software development and integration. The funding will also enable the limited transition of mature and ready capabilities to appropriate programs of record in synchronization with planned modernization activities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver JADC2 capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This is not a new start.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	0.000	150.880	106.400	0.000	106.400
Current President's Budget	0.000	100.880	0.000	0.000	0.000
Total Adjustments	0.000	-50.000	-106.400	0.000	-106.400
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-50.000			
• 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	-106.400	0.000	-106.400

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0304115F / <i>Multi Domain Command and Control (MDC2)</i>
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Change Summary Explanation

Effort continues execution under PE 0604003F BA 04 BPAC 640141 beginning in FY21.

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
<p>Title: Advanced Battle Management System</p> <p>Description: ABMS leverages and complements ongoing efforts and emerging technologies across services, agencies, laboratories, and industry partners. The hardware development approach is based on continuous integration and delivery of incremental capability improvement over time, with emphasis on open and modular systems that can be rapidly transitioned and widely deployed. Software will be deployed using a development/security/operations (DevSecOps) approach with multiple partners. Key points of emphasis include open and reusable software, cloud deployments for scaling and data management, and cyber resiliency. The DevSecOps approach directed by DoD facilitates integration efforts by traditional and non-traditional software providers, with or without prime contractor involvement.</p> <p>ABMS executes onramp events with a COCOM sponsor every four months. These events show proposed technical solutions across the ABMS product lines, demonstrate capabilities being developed in an operationally-relevant scenario, and have the potential to generate leave-behind capabilities if requested. The participating platforms and COCOMs will vary from event to event. Capabilities developed in the ABMS portfolio will be presented at onramp events as they become ready for demonstration, with multiple capabilities being demonstrated at each event. Each event informs the next development sprint as well as future events while also reducing technology risk. This approach also facilitates rapid integration by making the technology visible and performing initial operationally-relevant testing for a broad COCOM audience. Specific event costs are contained in the JADC2 PE 3040115F (BPAC 673380), formerly known as MDC2, while development costs are contained in the ABMS PE.</p> <p>FY 2020 Plans: Develop airborne gateway technology for rapid connection and information sharing between existing platforms. The first successful demonstration of communications between F-22 and F-35 using gateways was in December 2019. Test new sensor mesh networks including connection to proliferated low-earth orbit (LEO) commercial satellite communications. The first successful demonstration of this multi-domain mesh network was in December 2019. Additional hardware-related activities in FY 2020 include design of a radar testbed, continued capability improvements to gateways, test of a multi-level secure tablet, continued capability improvements to sensor mesh networks, and initial development of advanced radios and apertures.</p> <p>Develop cloud-based tools for processing of sensor data, fusion of data across platforms and domains, combining data into a multi-domain common operating pictures, and battle management, command, and control (BMC2). The first successful demonstration of this software suite was in December 2019. Additional software-related activities in FY 2020 include creation of</p>	0.000	100.880	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0304115F I Multi Domain Command and Control (MDC2)
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
a radar mode library, waveform upgrades to gateways, and initial tests of software tools and cloud access on a multi-level secure tablet. The first on ramp event was held in December 2019 at Eglin AFB and was led by NORAD and USNORTHCOM. This ABMS onramp included Air Force, Army, and Navy system with key first in the areas of connectivity between platforms, mesh networking, and cloud-based battle management. The next FY2020 events will be held in April 2020 and August 2020. FY 2021 Plans: See PE 0604003F BA 04 BPAC 640141 for FY21 changes. FY 2020 to FY 2021 Increase/Decrease Statement: See PE 0604003F BA 04 BPAC 640141 for FY21 changes.			
Accomplishments/Planned Programs Subtotals	0.000	100.880	0.000

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE 04 0604003F: <i>Advanced Battle Management System (ABMS)</i>	0.000	8.000	302.323	0.000	302.323	449.290	590.878	1,087.601	832.229	Continuing	Continuing
• RDTE 07 0604003F: <i>Advanced Battle Management System (ABMS)</i>	30.000	35.600	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.600

Remarks

E. Acquisition Strategy
 ABMS will provide capability through existing program office, program executive officers, service labs, services or agencies, programs of record, and their respective contracts and agreements. ABMS is not a single program of record. Many lines of effort will be horizontally integrated by the USAF Chief Architect and partner organizations. Program execution (cost, schedule, and performance) will be managed by the Chief Architect Integration Office and the appropriate program office.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304115F / <i>Multi Domain Command and Control (MDC2)</i>	Project (Number/Name) 673380 / <i>Multi Domain Command and Control (MDC2)</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

ABMS	
ABMS HW, SW, On Ramps	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304115F / <i>Multi Domain Command and Control (MDC2)</i>	Project (Number/Name) 673380 / <i>Multi Domain Command and Control (MDC2)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
ABMS				
ABMS HW, SW, On Ramps	1	2020	1	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0304260F / <i>Airborne SIGINT Enterprise</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	109.838	85.157	128.110	0.000	128.110	135.043	134.278	100.872	94.686	Continuing	Continuing
675180: <i>RC-135 (Airborne SIGINT Development - RC-135 Rivet Joint)</i>	-	50.577	33.396	45.066	0.000	45.066	45.954	46.725	47.507	48.327	Continuing	Continuing
675183: <i>Common Development (Airborne SIGINT Development - Common Development)</i>	-	51.349	21.103	55.075	0.000	55.075	66.684	64.746	36.174	28.851	Continuing	Continuing
675185: <i>COMPASS BRIGHT</i>	-	0.000	23.289	20.484	0.000	20.484	14.763	15.028	9.274	9.445	Continuing	Continuing
675186: <i>Special Programs (Airborne SIGINT Development - Special Platforms)</i>	-	7.912	7.369	7.485	0.000	7.485	7.642	7.779	7.917	8.063	Continuing	Continuing

Note

Project 675185, (COMPASS BRIGHT), changed from (Non-Traditional SIGINT (NTS))
 FY19: COMPASS BRIGHT projects zeroed out to support higher Air Force priorities with payback in FY20 & FY21

A. Mission Description and Budget Item Justification

This program funds multi-domain, multi-Intelligence, Surveillance and Reconnaissance (ISR) research, development, test and evaluation (RDT&E) efforts in support of the National Defense Strategy (NDS), as applied by the Air Force in the Next Generation ISR Dominance Flight Plan. Specifically, Program Element (PE) 0304260F provides authorized and appropriated funding to Signals Intelligence (SIGINT) RDT&E efforts for utilization on airborne platforms.

According to the 2018 NDS, we are facing an increasingly complex security environment with adversaries in every operating domain and we need to ensure operations while under persistent multi-domain attack. The future ISR portfolio will consist of multi-domain, multi-intelligence systems and remain confident across the entire conflict spectrum. The Airborne SIGINT Enterprise (ASE) PE is integral to developing the SIGINT component of the multi-domain, multi-ISR system capable of maintaining the warfighter's decisive advantage through all ranges of military operations, to include the highly contested environments (HCE).

ASE Program funds are distributed to projects based on the development priorities established by the USAF SIGINT Capabilities Working Group (SCWG). The SCWG is chartered to guide the ASE capability investment. When required, the USAF may move funds between ASE projects, developing the highest priority projects in response to urgent (e.g., JUON) and emerging (e.g., JEON) warfighter needs.

The ASE Program participates in the development, integration, testing, and implementation of International and Air Force standards (e.g., North Atlantic Treaty Organization (NATO) standardization) to ensure Joint, Allied, and Coalition interoperability with ASE fielded systems. ASE funds lead the modernization efforts including

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0304260F / <i>Airborne SIGINT Enterprise</i>
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existing airborne platform sensors, and where appropriate, their interfaces with the Air Force Distributed Common Ground System (AF DCGS). Summarizing, the ASE Program approach is a synergistic development effort providing Air Force-wide ISR capabilities consistent with the NDS.

ASE will use the Air Force SIGINT Architecture (AFSA) for planning and decision-making. AFSA is focused on employing open architecture standards whenever possible, to allow maximum effectiveness, efficiency and flexibility of development upgrades with multi-domain interoperability. That is, the ASE primary goal is to produce an open system architecture-based, capability-focused SIGINT investment strategy for the USAF.

Funds in any project may be utilized to cover activities to include studies and analysis activities, supporting 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 capabilities. The use of such program funds would be in addition to civilian pay expenses budgeted in program elements 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	109.873	102.667	125.782	0.000	125.782
Current President's Budget	109.838	85.157	128.110	0.000	128.110
Total Adjustments	-0.035	-17.510	2.328	0.000	2.328
• Congressional General Reductions	0.000	-9.000			
• Congressional Directed Reductions	0.000	-8.500			
• 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	-0.035	-0.010	2.328	0.000	2.328

Change Summary Explanation

FY19: 0.035M reduction in Common Development BPAC due to current for canceled bill paid to contractor.

FY20: 17.510M reduction due to congressional marks against ASE PE.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise				Project (Number/Name) 675180 / RC-135 (Airborne SIGINT Development - RC-135 Rivet Joint)			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675180: RC-135 (Airborne SIGINT Development - RC-135 Rivet Joint)	-	50.577	33.396	45.066	0.000	45.066	45.954	46.725	47.507	48.327	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports design studies, engineering analysis, non-recurring engineering, and other efforts associated with the integration and modification of the RC-135 SIGINT sensors and their associated air and ground components. Through extensive utilization of commercial-off-the-shelf (COTS) based solutions to field needed capabilities, it also incurs a need for continuous identification of suitable replacements for components affected by Diminishing Manufacturing Sources and integration efforts consistent with the COTS technology cycle. These efforts provide required engineering for preliminary assessments of technical feasibility, operability, or military utility as well as specific engineering implementations integrated into the various baseline modifications. These funds will be disbursed among the RC-135V/W RIVET JOINT, the RC-135U COMBAT SENT, and the RC-135S COBRA BALL programs. Funding reflects the SCWG priorities and the accomplishment of other Airborne SIGINT Enterprise initiatives.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: RC-135 SIGINT Development	50.577	33.396	45.066
Description: Non-Recurring Engineering for the RC-135 signals intelligence systems. See Classified Budget Exhibits (PE 0305207F)			
FY 2020 Plans: - Continue SIGINT development efforts for the RC-135 fleet to include new signal sets and upgrades to current capabilities.			
FY 2021 Plans: - Will continue SIGINT development efforts for the RC-135 fleet to include new signal sets and upgrades to current capabilities. See PE 0305207F for classified details. Classified requirements POC is HAF AF/A200 (704) 614-7317.			
FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased because of a requirement increase for new signal sets and increased number of upgrades to the RC-135 fleet for SIGINT development. These improvements will increase RC-135 fleet effectiveness, efficiency, and flexibility through sensor integration and fusion.			
Accomplishments/Planned Programs Subtotals			
	50.577	33.396	45.066

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675180 / RC-135 (Airborne SIGINT Development - RC-135 Rivet Joint)

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>			<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item DARPO1: RC-135	394.532	227.673	191.332	-	191.332	211.736	210.502	85.720	232.123	Continuing	Continuing

Remarks

The funds within Program 0305207F procure all necessary aircraft modifications for the RC-135 program and include those funds necessary to field SIGINT capabilities developed under Project 675180 of the ASE. Not all procurement funds in #DARPO1: RC-135 are for ASE SIGINT projects.

D. Acquisition Strategy

Aircraft, aircraft sensor systems, and associated ground support system modifications planned include the procurement, fielding and logistical support for future RC-135V/W RIVET JOINT, RC-135U COMBAT SENT and RC-135S COBRA BALL baseline configurations. Development and integration is managed by the Big Safari Systems Group. They employ evolutionary acquisition approaches to field incremental capability improvements.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675180 / RC-135 (Airborne SIGINT Development - RC-135 Rivet Joint)
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
RC-135 SIGINT Development	SS/ Various	L3COM : Greenville, TX	-	50.577	Jan 2019	33.396	Jan 2020	45.066	Jan 2021	-		45.066	Continuing	Continuing	-
Subtotal			-	50.577		33.396		45.066		-		45.066	Continuing	Continuing	N/A

Remarks
Above contract method/type will be CPFF and FFP

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	50.577	33.396	45.066	-	45.066	Continuing	Continuing	N/A

Remarks
FY20: RC-135 projects decreased to support higher Air Force priorities

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675180 / RC-135 (Airborne SIGINT Development - RC-135 Rivet Joint)

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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 of RC-135 mission sensors	
Development of RIVET JOINT mission sensors (see 0305207F for classified details)	
Development of COMBAT SENT mission sensors (see 0305207F for classified details)	
Development of COBRA BALL mission sensors (see 0305207F for classified details)	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675180 / RC-135 (Airborne SIGINT Development - RC-135 Rivet Joint)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Development of RC-135 mission sensors				
Development of RIVET JOINT mission sensors (see 0305207F for classified details)	1	2019	4	2025
Development of COMBAT SENT mission sensors (see 0305207F for classified details)	1	2019	4	2025
Development of COBRA BALL mission sensors (see 0305207F for classified details)	1	2019	4	2025

Note

Requirements documentation is classified. Classified requirements POC is HAF AF/A200 (703) 614-7317

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise				Project (Number/Name) 675183 / Common Development (Airborne SIGINT Development - Common Development)			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675183: Common Development (Airborne SIGINT Development - Common Development)	-	51.349	21.103	55.075	0.000	55.075	66.684	64.746	36.174	28.851	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Common Development project supports airborne SIGINT design studies, engineering analysis, non-recurring engineering (NRE), program management, and other efforts associated with support to the fielded Airborne Signals Intelligence Payload (ASIP) and the development of follow-on SIGINT sensors and their associated air and ground components. The Common Development project also supports the development and integration of new sensor capabilities, quick reaction capabilities, and replacement components affected by Diminishing Manufacturing Sources and Material Shortages (DMSMS).

Development supports the ASIP system and follow-on SIGINT sensors to include Global High-altitude Open-system Sensor Technology (GHOST). The ASIP sensor provides a common SIGINT system, allowing for maximum coverage of the electromagnetic spectrum through the use of an integrated high and low band system. The GHOST sensor is being developed as a platform agnostic SIGINT sensor to replace ASIP through the use of rapid acquisition strategies, implementation of open architecture concepts, and rapid integration of new signals of interests. GHOST will be designed to address the NDS and Next Generation ISR Dominance Flight Plan identified needs for multi-ISR systems in order to sustain SIGINT operations in a highly contested environment.

This project also supports overarching Airborne SIGINT Enterprise Program common development to include, but not limited to, the Air Force SIGINT Architecture maintenance, SIGINT modeling and simulation efforts, and technology development and risk reduction through the Air Force Research Lab managed Open Architecture Technology Lab (OATL). Capability improvements needed to exploit service identified signals of interest will be identified as priorities by the Air Force SCWG. This project provides the warfighter increased SIGINT combat capability via rapid acquisition. Capability enhancements are implemented as soon as the ASE technology achieves satisfactory risk levels. ASE developed Sensors will be integrated and tested on available platforms, funding permitting.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Common SIGINT Development	51.349	21.103	55.075
Description: Develop and test common open architecture compliant SIGINT system for multiple SIGINT platforms, to include ASIP support and follow-on SIGINT sensors using an open system architecture to the maximum extent possible. Additionally, will advance testing capabilities through the Open Architecture Technology Lab for current and future SIGINT sensors.			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675183 / Common Development (Airborne SIGINT Development - Common Development)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Conclude ASIP Increment 2 Build A development. - Conclude ASIP Systems Integration Lab (SIL) and Cybersecurity support efforts. - Develop new signals capabilities and enhancements. Details are classified. - Support development of replacement components affected by DMSMS. - Demonstrate SIGINT capability insertion through OATL Phase III project. <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Develop new signals capabilities and enhancements. Details are classified. - Enhance OATL infrastructure to support future SIGINT sensor development and testing. - Leverage sensor development activities to support GHOST prototype efforts by multiple vendors. - Evaluate open architecture compliance of GHOST prototypes in the OATL. <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to support in ramp up in GHOST prototyping and development among multiple vendors, and open architecture efforts/events within the OATL.</p>			
Accomplishments/Planned Programs Subtotals	51.349	21.103	55.075

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item HAWK00: RQ-4 Mods	23.715	4.851	126.340	-	126.340	117.382	106.166	-	-	167.265	545.719
• RDTE 07 0305202F: Dragon U-2	0.520	0.550	1.840	-	1.840	3.920	0.000	-	-	0.000	6.830

Remarks
Not all Other Program Funding is associated with SIGINT.

D. Acquisition Strategy
SIGINT capabilities will be developed and integrated onto various platforms using an evolutionary acquisition approach to field incremental capability improvements, leveraging the OATL to incorporate platform agnostic, open system architecture. Requirements as validated and prioritized by the SCWG, will be executed through acquisition strategies employing maximum use of Middle Tier Acquisition (MTA) authorities to include Section 804 rapid prototyping. The GHOST System will evolve rapidly starting with demonstrations of open architecture compliance on representative prototype hardware in the OATL before successively progressing to a testing

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / <i>Airborne SIGINT Enterprise</i>	Project (Number/Name) 675183 / <i>Common Development (Airborne SIGINT Development - Common Development)</i>

program of a flyable prototype system and eventually production system. Such capabilities will be acquired and delivered by contracting with the appropriate vendor(s) while encouraging competition where possible and leveraging any existing USG capabilities that have already been developed.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675183 / Common Development (Airborne SIGINT Development - Common Development)
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ASIP Global Hawk Increment 1	SS/CPFF	Northrop Grumman : San Jose, CA	-	3.133	Jan 2019	-		-		-		-	Continuing	Continuing	-
ASIP Upgrades Increment 2 - Build A; SIL / Cyber Support	SS/CPFF	Northrop Grumman : San Jose, CA	-	15.812	Jan 2020	6.094	Aug 2020	-		-		-	Continuing	Continuing	-
Open Architecture Technology Lab (OATL)	Various	Various : Various	-	6.762	May 2019	3.316	Feb 2020	7.628	Mar 2021	-		7.628	Continuing	Continuing	-
Global High-Altitude Open-system Sensor Technology (GHOST)	TBD	Various : Various	-	10.153	Mar 2020	7.148	Jul 2020	39.795	Dec 2020	-		39.795	Continuing	Continuing	-
Air Force SIGINT Architecture (AFSA)	Various	AECOM : Annapolis Junction, MD	-	6.402	Dec 2019	2.370	Mar 2020	4.000	Dec 2020	-		4.000	Continuing	Continuing	-
Subtotal			-	42.262		18.928		51.423		-		51.423	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Various integration efforts and flight test	Various	Various : Various	-	0.297	Dec 2018	-		-		-		-	Continuing	Continuing	-
Subtotal			-	0.297		-		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMA	Various	Various : Dayton, OH	-	8.790	May 2019	2.175	Mar 2020	3.652	Feb 2021	-		3.652	Continuing	Continuing	-
Subtotal			-	8.790		2.175		3.652		-		3.652	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675183 / Common Development (Airborne SIGINT Development - Common Development)
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	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	51.349	21.103	55.075	-	55.075	Continuing	Continuing	N/A

Remarks

- Funding decrease from FY19 to FY20 of \$14.772M for higher Air Force priorities.
- Funding increase from FY20 to FY21 due to returning to normal funding levels and supports GHOST follow-on SIGINT sensor prototyping efforts ramping up in FY21.
- ASIP Global Hawk Increment 1 completed development efforts in FY19.
- ASIP Increment 2 Build A development efforts and support efforts to maintain the ASIP Systems Integration Lab (SIL) and cybersecurity authority to operate were ended in FY20, and will transition to the airborne platforms.
- Open Architecture Technology Lab (OATL) technology development and risk reduction efforts will continue in FY21 to demonstrate rapid technology insertion and support GHOST prototyping efforts.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675183 / Common Development (Airborne SIGINT Development - Common Development)

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
<i>SIGINT Common Development</i>																												
ASIP Global Hawk Increment 1 Upgrades																												
ASIP Upgrades Increment 2 - Build A; SIL / Cyber Support																												
Open Architecture Technology Lab (OATL)																												
Global High-Altitude Open-System Sensor Technology (GHOST)																												
Air Force SIGINT Architecture (AFSA)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675183 / Common Development (Airborne SIGINT Development - Common Development)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
SIGINT Common Development				
ASIP Global Hawk Increment 1 Upgrades	1	2019	2	2020
ASIP Upgrades Increment 2 - Build A; SIL / Cyber Support	1	2019	4	2020
Open Architecture Technology Lab (OATL)	1	2019	4	2025
Global High-Altitude Open-System Sensor Technology (GHOST)	1	2019	4	2025
Air Force SIGINT Architecture (AFSA)	1	2019	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise				Project (Number/Name) 675185 / COMPASS BRIGHT			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675185: COMPASS BRIGHT	-	0.000	23.289	20.484	0.000	20.484	14.763	15.028	9.274	9.445	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The COMPASS BRIGHT program develops, demonstrates, and rapidly transitions advanced Air Force specific SIGINT capabilities against emerging and future target signals of interest. This program pursues SIGINT technologies for program transition, to include Communications Intelligence (COMINT), Electronic Intelligence (ELINT), Audio, Analytics, Special Signals of Interest, and Radio Frequency Measurement and Signature Intelligence (MASINT). The COMPASS BRIGHT program objective is to mature technologies for application in SIGINT and MASINT systems or subsystems. Production and integration of these developed technologies will be conducted by the appropriate programs. COMPASS BRIGHT projects are selected through a data call process, whereby the USAF evaluates proposals from the laboratories, platforms, and other government agencies, to select those projects that are most promising.

Operational Reconnaissance (Ops Recce) is part of the initiative to improve overall USAF intelligence, surveillance, and reconnaissance (ISR) capability through development and use of sensor data from non-traditional ISR platforms and innovative use of sensors. This program pursues Ops Recce capabilities for transition through development, testing, demonstration and implementation efforts across all platforms. The Ops Recce program objective is to provide increased battlespace awareness through the use of sensors/platforms to achieve effects beyond what those sensor/platforms were originally designed.

The program office authority extends to accomplishment of out-of-cycle COMPASS BRIGHT efforts. These tasks may be filtered through the SIGINT Capability Working Group (SCWG) outside the normal vetting process to expedite acquisition of high-end capabilities for the warfighter.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: COMPASS BRIGHT Tech Development	0.000	23.289	20.484
Description: Develops projects in the SIGINT and MASINT areas for transition to the RC-135 fleet, other intelligence, surveillance, and reconnaissance platforms and Ops Recce.			
FY 2020 Plans: Initiate various SIGINT projects to include but not limited to: - 5x ELINT projects - 1x audio project - 2x COMINT projects - 2x special signal projects, and analytic projects.			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675185 / COMPASS BRIGHT
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
(details of projects are classified)			
- FY21 Project selection process initiated.			
FY 2021 Plans:			
- Will initiate, continue, and complete various SIGINT projects to include enhanced ELINT exploitation, COMINT, Audio exploitation, Ops Recce, signals of interest prosecution, and NTS.			
- FY22 Project selection process initiated.			
FY 2020 to FY 2021 Increase/Decrease Statement:			
Funding decreased because of transition to traditional funding levels.			
Accomplishments/Planned Programs Subtotals	0.000	23.289	20.484

C. Other Program Funding Summary (\$ in Millions)										
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u> <u>Total Cost</u>
• APAF 05 DARP01: RC-135	444.052	278.121	256.792	-	256.792	256.022	258.850	-	-	Continuing Continuing

Remarks
Not all funds are associated with SIGINT.

D. Acquisition Strategy
Air Force Life Cycle Management Center/Intelligence, Surveillance, and Reconnaissance and Special Operations Forces Directorate (AFLCMC/WI) will execute COMPASS BRIGHT and Operational Reconnaissance efforts through technology development and demonstration contracts which leverage existing laboratory relationships and other existing contractual vehicles, with future development projects emphasizing full and open competition.

On an annual basis, the SIGINT Capabilities Working Group (SCWG) reviews developmental technologies against warfighter capabilities and requirements based on strategic roadmaps. 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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675185 / COMPASS BRIGHT
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
COMPASS BRIGHT	Various	Multiple : Various	-	-		17.789	Nov 2019	15.021	Jan 2021	0.000		15.021	Continuing	Continuing	-
Ops Recce	Various	Multiple : Various	-	-		3.500	Dec 2019	3.500	Jan 2021	0.000		3.500	Continuing	Continuing	-
Subtotal			-	-		21.289		18.521		0.000		18.521	Continuing	Continuing	N/A

Remarks
On an annual basis, the SIGINT Capabilities Working Group (SCWG) reviews developmental technologies against warfighter capabilities and requirements based on strategic roadmaps. 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.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Compass Bright PMA	Various	Various : Various, OH	-	-		1.500	Nov 2019	1.463	Nov 2020	-		1.463	Continuing	Continuing	-
OPS Recce PMA	C/CPAF	Not specified. : TBD	-	-		0.500	Apr 2020	0.500	Apr 2021	-		0.500	Continuing	Continuing	-
Subtotal			-	-		2.000		1.963		-		1.963	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	-	23.289	20.484	0.000	20.484	Continuing	Continuing	N/A

Remarks
FY20 COMPASS BRIGHT increased to restore program support levels following previous reductions.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675185 / COMPASS BRIGHT
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Non-Traditional SIGINT (NTS)																												
SIGINT Technologies																												
- ELINT Programs																												
- COMINT Programs																												
- Special Signals Programs																												
- Audio Programs																												
- Analytics Programs																												
Ops Recce Efforts																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675185 / COMPASS BRIGHT
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Non-Traditional SIGINT (NTS)</i>				
SIGINT Technologies	1	2019	4	2025
- ELINT Programs	1	2019	4	2025
- COMINT Programs	1	2019	4	2025
- Special Signals Programs	1	2019	4	2025
- Audio Programs	1	2019	4	2025
- Analytics Programs	1	2019	4	2025
Ops Recce Efforts	1	2019	4	2025

Note

On an annual basis, the SCWG reviews developmental technologies against warfighter capabilities and requirements based on strategic roadmaps. 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. As a result, the USAF will move funds between projects periodically to develop the highest priority projects in response to urgent and emerging warfighter needs.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise				Project (Number/Name) 675186 / Special Programs (Airborne SIGINT Development - Special Platforms)			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675186: <i>Special Programs (Airborne SIGINT Development - Special Platforms)</i>	-	7.912	7.369	7.485	0.000	7.485	7.642	7.779	7.917	8.063	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports special SIGINT studies as well as the development and integration of advanced SIGINT capabilities for special programs including, but not limited to: quick reaction capability sensors, the processing, exploitation, and dissemination associated with these systems, and other efforts approved by the USAF SCWG. Development efforts will include, but are not limited to: new signal sets, antenna improvements, sensitivity upgrades, and data distribution upgrades, and new/advanced deployment capabilities. This project provides the war fighter with near term combat capabilities with increased capability improvements accomplished as technologies and risks achieve satisfactory levels. Sensors will be integrated and tested on various platforms including the MQ-9A remotely piloted aircraft as funding permits.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: SIGINT Development	7.912	7.369	7.485
Description: Develop, update, and test SIGINT capabilities for QRC and normalized special programs SIGINT projects.			
FY 2020 Plans: - Continue to modernize SIGINT systems used by the MQ-9A.			
FY 2021 Plans: - Will continue to modernize SIGINT systems used by the MQ-9A.			
FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to slightly increased quick reaction capability upgrade requirements, which is consistent with future funding requests.			
Accomplishments/Planned Programs Subtotals	7.912	7.369	7.485

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / <i>Airborne SIGINT Enterprise</i>	Project (Number/Name) 675186 / <i>Special Programs (Airborne SIGINT Development - Special Platforms)</i>

D. Acquisition Strategy

SIGINT capabilities will be integrated to various classified platforms using an evolutionary acquisition approach. Capabilities and prototypes will be developed by Other Government Agencies and transitioned to select vendors as production needs develop.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675186 / Special Programs (Airborne SIGINT Development - Special Platforms)
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Upgrades to SIGINT systems used by the MQ-9 Remotely piloted aircraft	Various	Various : Various	-	7.000	Jan 2019	7.369	Jan 2020	7.265	Jan 2021	-		7.265	Continuing	Continuing	-
Subtotal			-	7.000		7.369		7.265		-		7.265	Continuing	Continuing	N/A

Remarks
Upgrades the quick reaction capability sensors already on the MQ-1/9 fleet

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Flight Test	Various	Various : Various	-	0.912	May 2019	-		0.220	May 2021	-		0.220	Continuing	Continuing	-
Subtotal			-	0.912		-		0.220		-		0.220	Continuing	Continuing	N/A

Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
-	7.912	7.369	7.485	-	7.485	Continuing	Continuing	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304260F / Airborne SIGINT Enterprise	Project (Number/Name) 675186 / Special Programs (Airborne SIGINT Development - Special Platforms)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
SIGINT Development				
MQ-9 Sensor 1 Modernization	1	2019	4	2025
MQ-9 Sensor 2 Modernization	1	2019	4	2025
MQ-9 Sensor Upgrades	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0304310F / <i>Commercial Economic Analysis</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	4.014	3.431	4.042	0.000	4.042	4.377	4.456	4.536	4.102	Continuing	Continuing
675896: <i>Commercial Economic Analysis</i>	-	4.014	3.431	4.042	0.000	4.042	4.377	4.456	4.536	4.102	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

To preserve Air Force and DoD military advantage from commercial and economic risk, the Office of Commercial Economic Analysis (OCEA) produces in-depth analytical assessments and advanced risk mitigation strategies based on commercially available industry, market, and economic information. These assessments and strategies support the decision making efforts of Service, Department of Defense, and Whole of Government to protect National Security Innovation Base equities and sustain the U.S. competitive advantage.

The funding request provides for an enterprise analytic platform providing a technical prototype which will aggregate risk data and produce mitigation strategies and impact analytic products, i.e. mature big data architecture, higher domain connectivity, continuous assessment capability and integrate external applications. The funding also supports continuous assessment of the commercially available information to ensure it is accurate, current, and relevant.

Additional classified details can be found in OSD Comptroller's classified Justification Book Volume 6.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	3.472	3.431	4.049	0.000	4.049
Current President's Budget	4.014	3.431	4.042	0.000	4.042
Total Adjustments	0.542	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	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.542	0.000	-0.007	0.000	-0.007

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0304310F / <i>Commercial Economic Analysis</i>
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Change Summary Explanation

FY19 to FY20 funding decreased to account for the availability of prior year execution balances.

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Commercial Economic Analysis	4.014	3.431	4.042
Description: Develop solutions to protect the National Security Innovation Base from adversary information attacks and protect the U.S. technological advantage. Research, develop, test and evaluate Commercial Economic Analysis capabilities, systems, tools, data, products, and services through a disciplined, yet agile, process that ensures commercial economic modeling pilots, risk management constructs, decision support tools, and continuous monitoring capabilities are available for Air Force sectors and segments of the National Security Innovation Base.			
Additional classified details can be found in OSD Comptroller's classified Justification Book Volume 6.			
FY 2020 Plans: Utilize existing contracts for continuation of modular components and data architecture framework supporting risk management, risk mitigation and nontraditional support capabilities.			
Additional classified details can be found in OSD Comptroller's classified Justification Book Volume 6.			
FY 2021 Plans: Utilize existing contracts and new IDIQ contract task orders for continuation of modular components and data architecture framework supporting risk management, risk mitigation and nontraditional support capabilities.			
Additional classified details can be found in OSD Comptroller's classified Justification Book Volume 6.			
FY 2020 to FY 2021 Increase/Decrease Statement: The FY 2020 funding reduction accounts for the availability of prior year execution balances.			
Accomplishments/Planned Programs Subtotals	4.014	3.431	4.042

D. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost	
• O&M 030431F: <i>Commercial Economic Analysis</i>	20.804	18.168	18.207	-	18.207	22.225	22.219	21.998	23.520	Continuing	Continuing	

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0304310F / <i>Commercial Economic Analysis</i>
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D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
Remarks N/A											

E. Acquisition Strategy

Pursue competitively awarded contracts for follow-on to existing contract and task orders, with emphasis on system integration and corresponding data architectures. IDIQ task orders and specific system integration, cloud connectivity, and data contracts are the cornerstone of OCEA RDT&E activities.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304310F / Commercial Economic Analysis	Project (Number/Name) 675896 / Commercial Economic Analysis
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Enterprise Architecture and Data Integration	SS/CPPIF	Novetta : McLean, VA	-	4.014	Oct 2018	1.750		-		-		-	Continuing	Continuing	-
Analytic and Technical Services follow-on	C/TBD	TBD : TBD	-	-		1.177	Apr 2020	3.000	Apr 2021	-		3.000	Continuing	Continuing	-
Subtotal			-	4.014		2.927		3.000		-		3.000	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FFRDC	SS/FFP	MITRE : McLean, VA	-	0.000		0.104	Oct 2019	0.602	Oct 2020	-		0.602	Continuing	Continuing	-
Hosting Services	SS/FFP	AWS (C2S) : Seattle, WA	-	-		0.400	Nov 2019	0.440	Nov 2020	-		0.440	Continuing	Continuing	-
Subtotal			-	0.000		0.504		1.042		-		1.042	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	4.014	3.431	4.042	-	4.042	Continuing	Continuing	N/A

Remarks
 Product Development: Follow-on Analytic and Technical Services IDIQ contract will replace existing Enterprise Architecture and Data Integration contract in FY20.
 Support: Contract award is scheduled for 1Q/FY21 for these continuing efforts.

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0304310F / <i>Commercial Economic Analysis</i>	Project (Number/Name) 675896 / <i>Commercial Economic Analysis</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CEA				
Mature Big Data Architecture	1	2019	2	2025
Higher Domain Connectivity	1	2019	2	2025
Continuous Assessment Capability	1	2019	2	2025
Integrate External Applications	1	2019	2	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	8.324	9.313	0.000	0.000	0.000	0.000	6.170	6.315	6.469	0.000	36.591
675218: <i>Applications Development</i>	-	0.470	6.780	0.000	0.000	0.000	0.000	6.170	6.315	6.469	0.000	26.204
675220: <i>Unit Level</i>	-	7.854	2.533	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.387

Note
In FY 2021, PE 0305015F, C2 Air Operations Suite - C2 Information Services (C2AOS-C2IS), Project 675218, Applications Development, was transferred to PE 0207438F, Theater Battle Management (TBM) C4I, Project 675218, Applications Development, in order to improve transparency of development program.

In FY 2021, Project 675220, Unit Level, initial capability development efforts for Command and Control Incident Management and Emergency Response Application (C2IMERA; formerly Unit Command and Control [UC2]) is completed; new user requirements are being scoped and may result in future project restart.

A. Mission Description and Budget Item Justification

Command and Control (C2) Air Operations Suite - C2 Information Services (C2AOS-C2IS) funds operational development necessary to acquire and modify segments of Air Force's (AF) C2 capabilities and services. Applications Development provides worldwide operational capabilities for AF C2 in support of DoD, Coalition Partners, and other government agencies. These efforts focus on support of the Joint Forces Air Component Commander (JFACC) that provides air, space and cyber support as presented to the AOC and to other AF and Joint Services C2 systems. Applications Development efforts deliver capabilities identified in the Joint Command and Control (JC2) Capability Development Document (CDD) (2013). These activities include C2AOS-C2IS needs identified in the Capability Definition Package (CDP) (2012).

Applications Development: C2AOS-C2IS creates web-enabled information services to expose air operations data using standardized schemas, such as those developed by the Air Operations Community of Interest. C2AOS-C2IS also develops and matures net-centric C2 applications for air battle planning, execution, and management functions. These applications include Network Enabled Weapons (NEW); the remainder of the CDP and Theater Battle Management Core Systems - Force Level (TBMCS FL) functionality; services to support air mission and Friendly Order of Battle execution, Alerting, Publish and Subscribe, Content Management and Reporting; and integration with a JC2 Reference Architecture (RA) host infrastructure environment.

Unit Level: Command and Control Incident Management and Emergency Response Application (C2IMERA; formerly Unit Command and Control [UC2]) funds develop and integrate C2IMERA as an evolving sequence of increasing software capabilities that support a wing commander's ability to track base level resources, incident management, and provide a real time Common Operating Picture, enabling a commander to have total situational awareness during peace and wartime operations. C2IMERA operations software systems addresses needs identified in the TBMCS Operational Requirements Document (ORD) (2001), the UC2 Baseline System Requirements Document (SRD), and AF Form 1067, Modification Proposal, requirements documents. C2IMERA is utilizing Agile Software Development and Operations (DevOps) methodology by directly soliciting user feedback for improvements to the software. C2IMERA is fielded to Wing Operations Centers (WOC), the Maintenance Operations Centers (MOC), the Emergency Operations Centers (EOC), Crisis Action Teams (CAT), and many other work-centers across multiple MAJCOMs with plans to expand for use as an AF wide application.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver Applications Development and Unit Level weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	8.608	9.313	7.873	0.000	7.873
Current President's Budget	8.324	9.313	0.000	0.000	0.000
Total Adjustments	-0.284	0.000	-7.873	0.000	-7.873
• 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	-0.284	0.000			
• Other Adjustments	0.000	0.000	-7.873	0.000	-7.873

Change Summary Explanation

FY 2021 funding decreased \$7.873M due to transfer to PE 0207438F, TBM C4I; based on OSD direction to keep TBMCS FL development supporting joint service AOC applications separate for increased Congressional and Headquarters Air Force oversight.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services				Project (Number/Name) 675218 / Applications Development			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675218: Applications Development	-	0.470	6.780	0.000	0.000	0.000	0.000	6.170	6.315	6.469	0.000	26.204
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2021, PE 0305015F, C2 Air Operations Suite - C2 Information Services (C2AOS-C2IS), Project 675218, Applications Development, was transferred to PE 0207438F, Theater Battle Management (TBM) C4I, Project 675218, Applications Development, in order to improve transparency of development program.

A. Mission Description and Budget Item Justification

This project funds operational development necessary to acquire and modify segments of Air Force's (AF) Command and Control (C2) capabilities and services. Applications Development provides worldwide operational capabilities for AF C2 in support of DoD, Coalition Partners, and other government agencies. These efforts focus on support of the Joint Forces Air Component Commander (JFACC) that provides air, space and cyber support as presented to the AOC and to other AF and Joint Services C2 systems. Applications Development efforts deliver capabilities identified in the Joint Command and Control (JC2) Capability Development Document (CDD) (2013). These activities include C2 Air Operations Suite - C2 Information Services (C2AOS-C2IS) needs identified in the Capability Definition Package (CDP) (2012). C2AOS-C2IS creates web-enabled information services to expose air operations data using standardized schemas, such as those developed by the Air Operations Community of Interest. C2AOS-C2IS also develops and matures net-centric C2 applications for air battle planning, execution, and management functions. These applications include Network Enabled Weapons (NEW); the remainder of the CDP and Theater Battle Management Core Systems - Force Level (TBMCS FL) functionality; services to support air mission and Friendly Order of Battle execution, Alerting, Publish and Subscribe, Content Management and Reporting; and integration with a JC2 Reference Architecture (RA) host infrastructure environment.

No FY 2021 funding requested; FY 2021 project efforts are detailed in PE 0207438F, Theater Battle Management (TBM) C4I.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Applications Development weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: C2AOS-C2IS Development	0.470	6.130	0.000	0.000	0.000
Description: Conduct C2AOS-C2IS development and integration using FY16 NDAA, Sec 804 rapid prototyping authority. Develop a solution to address joint partner and non-AOC usage of C2AOS-C2IS in the Agile DevOps framework.					
FY 2020 Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services	Project (Number/Name) 675218 / Applications Development

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Deliver software to AOC WS Modifications to fully retire TBMCS FL and the Master Air Attack Plan Tool Kit - Develop and deploy C2AOS-C2IS to joint partner and non-AOC entities FY 2021 Base Plans: See PE 0207438F, Theater Battle Management (TBM) C4I, Project Number 675218, Applications Development. FY 2021 OCO Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to transfer to PE 0207438F, Theater Battle Management (TBM) C4I, Project Number 675218, Applications Development.					
Title: C2AOS-C2IS Test and Evaluation Description: Agile Test and Evaluation FY 2020 Plans: - Continue to conduct continuous product and cyber testing (e.g., unit, integration and performance) on Agile DevOps framework FY 2021 Base Plans: See PE 0207438F, Theater Battle Management (TBM) C4I, Project Number 675218, Applications Development. FY 2021 OCO Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to transfer to PE 0207438F, Theater Battle Management (TBM) C4I, Project Number 675218, Applications Development.	0.000	0.650	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	0.470	6.780	0.000	0.000	0.000

C. Other Program Funding Summary (\$ in Millions) N/A Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services	Project (Number/Name) 675218 / Applications Development

D. Acquisition Strategy

The acquisition strategy builds on agile development and modification of existing capabilities using evolutionary acquisition to standardize and modernize C2AOS-C2IS. C2AOS-C2IS modifications will operate under FY16 NDAA, Section 804, Middle Tier of Acquisition for Rapid Prototyping and Rapid Fielding, leveraging commercial best practices to fully retire TBMCS FL.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services	Project (Number/Name) 675218 / Applications Development
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C2AOS-C2IS Development	C/CPFF	Raytheon : Waltham, MA	-	0.470	Mar 2019	3.002	Mar 2020	0.000		0.000		0.000	0.000	3.472	-
C2AOS-C2IS Other Transaction (OT)	Various	Pivotal : Multiple	-	-		1.930	Mar 2020	0.000		0.000		0.000	0.000	1.930	-
Subtotal			-	0.470		4.932		0.000		0.000		0.000	0.000	5.402	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C2AOS-C2IS Lead Development Test and Evaluation Organization	PO	96th Test Wing : Eglin AFB, FL	-	-		0.650	Feb 2020	0.000		0.000		0.000	0.000	0.650	-
Subtotal			-	-		0.650		0.000		0.000		0.000	0.000	0.650	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C2AOS-C2IS Systems Engineering	SS/ Various	MITRE : Bedford, MA	-	-		0.714	Feb 2020	0.000		0.000		0.000	0.000	0.714	-
C2AOS-C2IS Program Support	C/Various	Various : Hanscom AFB, MA	-	-		0.484	Feb 2020	0.000		0.000		0.000	0.000	0.484	-
Subtotal			-	-		1.198		0.000		0.000		0.000	0.000	1.198	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	0.470	6.780	0.000	0.000	0.000	0.000	7.250	N/A

Remarks
C2AOS-C2IS funding transferred to PE 0207438F, Theater Battle Management (TBM) C4I, Project Number 675218, Applications Development.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force			Date: February 2020		
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services		Project (Number/Name) 675218 / Applications Development	

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Applications Development	
C2AOS-C2IS Development	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services	Project (Number/Name) 675218 / Applications Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Applications Development				
C2AOS-C2IS Development	1	2019	4	2020

Note

See PE 0207438F, Theater Battle Management (TBM) C4I, Project Number 675218, Applications Development for continued development events.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services	Project (Number/Name) 675220 / Unit Level
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675220: Unit Level	-	7.854	2.533	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.387
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Command and Control Incident Management and Emergency Response Application (C2IMERA; formerly Unit Command and Control [UC2]) funds are used to develop and integrate C2IMERA as an evolving sequence of increasing software capabilities that support a wing commander's ability to track base level resources, incident management, and a real time Common Operating Picture, enabling a commander to have total situational awareness during peace and wartime operations. C2IMERA operations software systems addresses needs identified in the TBMCS Operational Requirements Document (ORD) (2001), the UC2 Baseline System Requirements Document (SRD), and AF Form 1067, Modification Proposal, requirements documents. C2IMERA is utilizing Agile DevOps methodology by directly soliciting user feedback for improvements to the software. C2IMERA is fielded to Wing Operations Centers (WOC), the Maintenance Operations Centers (MOC), the Emergency Operations Centers (EOC), Crisis Action Teams (CAT), and many other work-centers across multiple MAJCOMs with plans to expand for use as an AF wide application.

In FY 2021, no funding is requested for Unit Level as initial capability development efforts for C2IMERA development is completed; new user requirements are being scoped and may result in future project restart.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Unit Level weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: UC2/C2IMERA Software Development	7.754	2.433	0.000	0.000	0.000
Description: C2IMERA software development and integration.					
FY 2020 Plans:					
- Transition C2IMERA from cloud friendly to cloud native platform					
- Continue to enhance the software to improve the user experience					
- Continue to field C2IMERA via the cloud					
FY 2021 Base Plans:					
N/A					
FY 2021 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services	Project (Number/Name) 675220 / Unit Level
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to no funding requested starting in FY 2021 as development was completed.					
Title: UC2/C2IMERA Testing and Test Support	0.100	0.100	0.000	0.000	0.000
Description: C2IMERA testing and test support activities.					
FY 2020 Plans: - Continue to verify the continuous delivery pipeline - Continue to test C2IMERA modifications					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to no funding requested starting in FY 2021 as development was completed.					
Accomplishments/Planned Programs Subtotals	7.854	2.533	0.000	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 834520: Theater Battle Mgt C2 System	0.967	0.500	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	1.467

Remarks

D. Acquisition Strategy
Projects will be awarded via a sole-source contract for Agile DevOps development, fielding and support activities. The acquisition and contracting strategies were approved by the Senior Materiel Leader on 20 June 2018.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services	Project (Number/Name) 675220 / Unit Level
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UC2/C2IMERA Development	C/CPFF	Leidos Inc. : Reston, VA	-	7.307	Jan 2019	1.986	Jan 2020	0.000		0.000		0.000	0.000	9.293	-
Subtotal			-	7.307		1.986		0.000		0.000		0.000	0.000	9.293	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UC2/C2IMERA Testing and Test Support	PO	96th Test Wing : Eglin, FL	-	0.100	Mar 2019	0.100	Mar 2020	0.000		0.000		0.000	0.000	0.200	-
Subtotal			-	0.100		0.100		0.000		0.000		0.000	0.000	0.200	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
UC2/C2IMERA Systems Engineering	SS/ Various	MITRE : Bedford, MA	-	0.327	Oct 2018	0.327	Oct 2019	0.000		0.000		0.000	0.000	0.654	-
UC2/C2IMERA Program Support	C/Various	Various : Hanscom AFB, MA	-	0.100	Oct 2018	0.100	Oct 2019	0.000		0.000		0.000	0.000	0.200	-
UC2/C2IMERA Cyber Support	MIPR	Various : Hanscom AFB, MA	-	0.020	Dec 2018	0.020	Dec 2019	0.000		0.000		0.000	0.000	0.040	-
Subtotal			-	0.447		0.447		0.000		0.000		0.000	0.000	0.894	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	7.854	2.533	0.000	0.000	0.000	0.000	10.387	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services	Project (Number/Name) 675220 / Unit Level

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Unit Level																												
UC2/C2IMERA Development																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305015F / C2 Air Operations Suite - C2 Info Services	Project (Number/Name) 675220 / Unit Level

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Unit Level</i>				
UC2/C2IMERA Development	2	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305020F / <i>CCMD Intelligence Information Technology</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	1.586	1.121	1.649	0.000	1.649	1.688	1.718	1.749	1.782	Continuing	Continuing
674901: <i>Ccmd Intelligence Information Technology</i>	-	1.586	1.121	1.649	0.000	1.649	1.688	1.718	1.749	1.782	Continuing	Continuing

A. Mission Description and Budget Item Justification

Combatant Commands (CCMDs) require a cohesive, flexible Information Technology (IT) enterprise to ensure intelligence content informs analysis, planning, warfighter operations, and strategic decision making. The Combatant Command Intelligence Enterprise Management Support Office (CCI EMSO) is at the nexus of multiple service providers, networks, systems, applications, classification levels, and funding. The vast majority of these IT services are tailored to Intelligence Community (IC) users vice CCMD-specific missions or needs.

OUSD(I) and Joint Staff sponsored a capabilities based assessment resulting in an Intelligence System Initial Capability Document (IS-ICD - JROCM 094-16) and a Doctrine, Organization, Training, Material, Logistics, Policy, Facility (DOTMLPF) Change Request (DCR - JROCM 088-17). In response OUSD(I) coordinated with the Air Force to create the CCI EMSO, formerly Combatant Command Intelligence Information Technology Provisional Program Activity Office (CCIIT PPAO). CCI EMSO is tasked to address these gap areas for the CCMDs. Budget line enables long term research and evaluation of systems and processes capable of supporting the CCI Enterprise.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	1.586	1.121	1.652	0.000	1.652
Current President's Budget	1.586	1.121	1.649	0.000	1.649
Total Adjustments	0.000	0.000	-0.003	0.000	-0.003
• 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	-0.003	0.000	-0.003

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity
3600: *Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development*

R-1 Program Element (Number/Name)
PE 0305020F / *CCMD Intelligence Information Technology*

Change Summary Explanation

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305020F / CCMD Intelligence Information Technology				Project (Number/Name) 674901 / Ccmd Intelligence Information Technology			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
674901: Ccmd Intelligence Information Technology	-	1.586	1.121	1.649	0.000	1.649	1.688	1.718	1.749	1.782	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

N/A

A. Mission Description and Budget Item Justification

Combatant Commands (CCMDs) require a cohesive, flexible Information Technology (IT) enterprise to ensure intelligence content informs analysis, planning, warfighter operations, and strategic decision making. Currently, the Combatant Command Intelligence Enterprise Management Support Office (CCI EMSO) is at the nexus of multiple service providers, networks, systems, applications, classification levels, and funding. The vast majority of these IT services are tailored to Intelligence Community (IC) users vice CCMD-specific missions or needs.

OUSD(I) and Joint Staff sponsored a Capabilities Based Assessment resulting in an Intelligence System Initial Capability Document (IS-ICD - JROCM 094-16). In response OUSD(I) coordinated with the Air Force to create the CCI EMSO, formerly Combatant Command Intelligence Information Technology Provisional Program Activity Office (CCIIT PPAO). CCI EMSO is tasked to address these gap areas for the CCMDs. Budget line enables long term research and evaluation of systems and processes capable of supporting the CCI Enterprise.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Combatant Command Intelligence Information Technology (CCMD Intel IT)	1.586	1.121	1.649
Description: Development, modification, and integration of new functionality to support improved end-to-end service delivery against one or more of six validated requirements areas within the CCIIT Enterprise operational mission set.			
FY 2020 Plans: Continuation of efforts: The RDT&E funds are being used to research, test and evaluate multiple software tools and workflows impacting the CCI Enterprise. Complex research and evaluation of emerging data structures, visualization tools, and cross domain services directly address multiple Joint Requirements Oversight Council(JROC) requirements and CCMD Integrated Priority Lists (IPLs).			
FY 2021 Plans: Continuation of efforts: The RDT&E funds will be used to continue research, test and evaluate multiple software tools and workflows impacting the CCI Enterprise. Complex research and evaluation of emerging data structures, visualization tools,			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305020F / <i>CCMD Intelligence Information Technology</i>	Project (Number/Name) 674901 / <i>Ccmd Intelligence Information Technology</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
and cross domain services directly address multiple Joint Requirements Oversight Council (JROC) requirements and CCMD Integrated Priority Lists (IPLs).			
FY 2020 to FY 2021 Increase/Decrease Statement: Funding increase to meet user requirements to develop evolving mission sets.			
Accomplishments/Planned Programs Subtotals	1.586	1.121	1.649

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• O&M PE 0305020F: <i>CCMD Intelligence Information Technology</i>	11.455	12.703	13.575	-	13.575	13.569	13.793	14.025	14.265	Continuing	Continuing

Remarks
N/A

D. Acquisition Strategy
RDT&E funds will be applied as a modification to an existing contract vehicle to address identified requirements, and align and integrate capabilities across the enterprise critical to the warfighter.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305020F / CCMD Intelligence Information Technology	Project (Number/Name) 674901 / Ccmd Intelligence Information Technology
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Software work flow research and evaluation	C/CPAF	Other Contracting : Fairfax, VA	-	1.586	Mar 2019	1.121	Mar 2020	1.649	Mar 2021	-		1.649	Continuing	Continuing	-
Subtotal			-	1.586		1.121		1.649		-		1.649	Continuing	Continuing	N/A
Project Cost Totals			-	1.586		1.121		1.649		-		1.649	Continuing	Continuing	N/A

Remarks
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305020F / CCMD Intelligence Information Technology	Project (Number/Name) 674901 / Ccmd Intelligence Information Technology

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>Solution Analysis</i>	
Research intelligence capabilities / gaps / software and develop work-flows and requirements. Program will evaluate existing and potential software.	[REDACTED]
<i>Requirements Development Solution</i>	
Refinement of requirements to match user input for added capability	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305020F / <i>CCMD Intelligence Information Technology</i>	Project (Number/Name) 674901 / <i>Ccmd Intelligence Information Technology</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Solution Analysis</i>				
Research intelligence capabilities / gaps / software and develop work-flows and requirements. Program will evaluate existing and potential software.	1	2019	4	2024
<i>Requirements Development Solution</i>				
Refinement of requirements to match user input for added capability	1	2020	4	2025

Note

PB 2020 R-DOC Exhibit R-4 describes 4 lines. Capability Drop 1 and Capability Drop 2 lines of effort were moved into sustainment. Solution Analysis and Requirements Development are continuation of previous efforts.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	19.000	19.265	0.000	19.265	19.171	19.265	19.362	19.719	Continuing	Continuing
675197: <i>Core Technology</i>	-	0.000	16.000	15.971	0.000	15.971	15.976	15.971	15.969	16.263	Continuing	Continuing
675306: <i>Analysis Enterprise</i>	-	0.000	3.000	3.294	0.000	3.294	3.195	3.294	3.393	3.456	Continuing	Continuing

A. Mission Description and Budget Item Justification

(U) AF ISR must adapt large data sets and condition it into mission sets, allowing personnel to discover, manage, and analyze data and transform it into living intelligence. Kill Chain Automation applies new methodologies; advances automation and machine learning; ensures data is accessible, agreeable, and interoperable; and delivers decision advantage.

(U//FOUO) Algorithmic Warfare encompasses efforts to develop, employ, or field artificial intelligence, automation, machine learning, deep learning, and computer vision algorithms. This critical shift to the digital age will transition ISR analysis from the "what" to the "why" of analysis via human-machine teaming. Algorithmic Warfare can provide world-class ISR support to Joint Operations at the scale and speed required in modern warfare against our adversaries.

(U//FOUO) Algorithmic Warfare reshapes current sense, identify, attribute, share (SIAS, previously known as PED - processing, exploitation, and dissemination) models because the current models will be unsustainable and ineffective in developing ISR digital solutions to find efficiencies and thrive in a complex operating environment. This funding is a first step to address ISR analysts' struggles with data overload; they currently spend 80 percent of their time searching for data and 20 percent of their time making sense of the information.

(U) Supports National Defense Strategy priority of operating at the "speed of relevance."

(U) Supports Next Generation ISR Dominance Flight Plan.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	19.000	19.300	0.000	19.300
Current President's Budget	0.000	19.000	19.265	0.000	19.265
Total Adjustments	0.000	0.000	-0.035	0.000	-0.035
• 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	-0.035	0.000	-0.035

Change Summary Explanation

New start in FY20.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>				Project (Number/Name) 675197 / <i>Core Technology</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675197: <i>Core Technology</i>	-	0.000	16.000	15.971	0.000	15.971	15.976	15.971	15.969	16.263	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

(U//FOUO) Algorithmic Warfare encompasses efforts to develop, employ, or field artificial intelligence, automation, machine learning, deep learning, and computer vision algorithms. This critical shift to the digital age will transition ISR analysis from the "what" to the "why" of analysis via human-machine teaming. Algorithmic Warfare can provide world-class ISR support to Joint Operations at the scale and speed required in modern warfare against our adversaries.

(U//FOUO) Algorithmic Warfare reshapes current sense, identify, attribute, share (SIAS, previously known as PED - processing, exploitation, and dissemination) models because the current models will be unsustainable and ineffective in developing ISR digital solutions to find efficiencies and thrive in a complex operating environment. This funding is a first step to address ISR analysts' struggles with data overload; they currently spend 80 percent of their time searching for data and 20 percent of their time making sense of the information.

(U) Supports National Defense Strategy priority of operating at the "speed of relevance."

(U) Supports Next Generation ISR Dominance Flight Plan.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Algorithmic Warfare	0.000	16.000	15.971
Description: SECAF directed the AF to invest in a more automated environment to relieve strain on manpower in the out years. Algorithmic Warfare can provide world-class ISR support to Joint Operations at the scale and speed required in modern warfare against our adversaries. This effort supports National Defense Strategy of operating at the "speed of relevance."			
FY 2020 Plans: Provides RDT&E funding to develop ISR Algorithmic Warfare - artificial intelligence, automation, machine learning, deep learning, and computer vision algorithms.			
FY 2021 Plans: Continuing to develop ISR Algorithmic Warfare - artificial intelligence, automation, machine learning, deep learning, and computer vision algorithms			
FY 2020 to FY 2021 Increase/Decrease Statement:			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>	Project (Number/Name) 675197 / <i>Core Technology</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Decrease due to other higher Air Force priorities			
Accomplishments/Planned Programs Subtotals	0.000	16.000	15.971

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>	Project (Number/Name) 675197 / <i>Core Technology</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Algorithmic Warfare	
Begin Algorithm Development	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>	Project (Number/Name) 675197 / <i>Core Technology</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Algorithmic Warfare				
Begin Algorithm Development	1	2020	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>	Project (Number/Name) 675306 / <i>Analysis Enterprise</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675306: <i>Analysis Enterprise</i>	-	0.000	3.000	3.294	0.000	3.294	3.195	3.294	3.393	3.456	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

(U) AF ISR must adapt large data sets and condition it into mission sets, allowing personnel to discover, manage, and analyze data and transform it into living intelligence. Kill Chain Automation applies new methodologies; advances automation and machine learning; ensures data is accessible, agreeable, and interoperable; and delivers decision advantage.

(U) Supports National Defense Strategy priority of operating at the "speed of relevance."

(U) Supports Next Generation ISR Dominance Flight Plan.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Kill Chain Automation	0.000	3.000	3.294
Description: AF's first ISR investment to work large data sets, automation, COTS IT tolls, and data aggregation.			
FY 2020 Plans: Funds software development to automate ISR analyst workflows; analysts currently spend 80 percent of their time searching for data and 20 percent of their time making sense of information. Human-machine teaming allows humans and machines to focus on activities they each do best.			
FY 2021 Plans: Continuing to fund software development to automate ISR analyst workflows; analysts currently spend 80 percent of their time searching for data and 20 percent of their time making sense of information. Human-machine teaming allows humans and machines to focus on activities they each do best.			
FY 2020 to FY 2021 Increase/Decrease Statement: increase in required funding			
Accomplishments/Planned Programs Subtotals	0.000	3.000	3.294

C. Other Program Funding Summary (\$ in Millions)

N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>	Project (Number/Name) 675306 / <i>Analysis Enterprise</i>

C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>	Project (Number/Name) 675306 / <i>Analysis Enterprise</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025							
	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				
<i>Kill Chain Automation</i>																																
Begin automation development																																

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305022F / <i>ISR Modernization & Automation Dvmt (IMAD)</i>	Project (Number/Name) 675306 / <i>Analysis Enterprise</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Kill Chain Automation</i>				
Begin automation development	1	2020	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305099F / <i>Global Air Traffic Management (GATM)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	3.966	4.544	4.645	0.000	4.645	4.743	4.828	4.914	5.004	Continuing	Continuing
674689: <i>Global Access Architecture</i>	-	3.966	4.544	4.645	0.000	4.645	4.743	4.828	4.914	5.004	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element funds the Air Force Life Cycle Management Center (AFLCMC) Aerospace Management Systems Division (AMSD), the designated Air Force (AF) Communications, Navigation, Surveillance/Air Traffic Management (CNS/ATM) and Navigation Safety Center of Excellence (COE). The COE conducts highly specialized analysis, assessment and performance monitoring of military and civil CNS/ATM capabilities and ensures manned and unmanned aircraft system conformance to national and international civil aviation standards allowing safe and efficient access to global airspace. COE expertise is provided to Headquarters Air Force, AF Major Commands (MAJCOM), and weapon system program offices. This centralized capability supplements the MAJCOMs and over 30 AF weapon system program offices with resident CNS/ATM technical expertise.

This funding enables the COE to monitor and participate in government and industry technical forums and U.S. and International civil aviation standards bodies such as the Federal Aviation Administration (FAA), International Civil Aviation Organization (ICAO), Radio Technical Commission for Aeronautics (RTCA), Airlines Electronic Engineering Committee (AEEC) and others. These organizations are responsible for the development and assessment of international civil aviation standards for safe and efficient flight operations in worldwide airspace. COE personnel analyze civil aviation standards as they are being developed and work to influence them to support Department of Defense (DoD) interests.

Specific technical and engineering criteria established by U.S. and International civil aviation standards are documented in generic performance matrices (GPMs). The COE works with MAJCOM and program office personnel and develops strategies to implement CNS/ATM capability requirements on AF weapon systems and tailor the GPMs to each platform's unique avionics architecture and operational mission. After completion of CNS/ATM component integration and testing, COE personnel validate platform performance against the aviation standards necessary for the platform to operate safely and efficiently in worldwide airspace. This performance assessment is submitted to the aircraft program office and becomes part of their Airworthiness certification package.

The COE provides technical analysis and assessments of CNS/ATM and navigation safety avionics equipment throughout the lifecycle of manned and unmanned aircraft platforms. Efforts include and are not limited to performance assessment, test support, performance monitoring, interoperability testing, cybersecurity assessments, and the development and assessment of CNS/ATM capabilities for unmanned platforms. Unmanned platform support includes, and is not limited to location-specific Ground Based Detect and Avoid (GBDAA) radar and airspace characterization, and evaluation of emerging unmanned aircraft system technologies.

The COE administers and manages multiple contracts including the electronic Global Air Traffic Management (iGATM) catalog to enable centralized procurement of CNS/ATM and navigation safety avionics equipment, navigation data, and technical engineering services for aircraft platform program offices and other mission partners.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305099F / <i>Global Air Traffic Management (GATM)</i>
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Technical engineering services may include and are not limited to performance monitoring, interoperability testing, cybersecurity assessments, and the development and assessment of CNS/ATM capabilities for emerging unmanned platform technologies such as location-specific GBDAA characterization. The iGATM catalog may also offer hardware, software, risk kits, operations and training materials, and the installation and check-out of GBDAA and other emerging unmanned see and avoid technologies and systems. These contracts are used by aircraft program offices across the DoD, among other federal agencies, and in support of foreign military sales.

The Digital Aeronautical Flight Information File (DAFIF) electronic navigation database is developed and maintained by the National Geospatial Intelligence Agency (NGA) and contains critical safety of flight information used by all DoD flight crews to fly Instrument Flight Rules (IFR) procedures, safely navigate airways and fly Instrument Approach Procedures (IAPs) to civil and military airfields worldwide. The COE performs periodic and event driven audits of NGA and alternate industry navigation source data providers and navigation data software tools required by civil aviation authorities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CNS/ATM weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	4.106	4.544	4.654	0.000	4.654
Current President's Budget	3.966	4.544	4.645	0.000	4.645
Total Adjustments	-0.140	0.000	-0.009	0.000	-0.009
• 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	-0.140	0.000			
• Other Adjustments	0.000	0.000	-0.009	0.000	-0.009

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: CNS/ATM COE Administration of DoD Avionics Equipment Catalog	0.796	0.798	0.800
Description: Multiple contract vehicles with multiple avionics vendors that enable centralized procurement of CNS/ATM and navigation safety avionics equipment/components, navigation data, and technical engineering services. Supports numerous DoD, US Federal Agency, and Foreign Military Sales program offices. Provide preferred customer pricing and extended warranty.			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0305099F / <i>Global Air Traffic Management (GATM)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>FY 2020 Plans: Continue administration of the DoD electronic avionics equipment catalog and monitor industry for new CNS/ATM products and technical services which could be added to catalog. Follow-on catalog ID/IQ contract planned 4QFY20.</p> <p>FY 2021 Plans: Continue administration of the CNS/ATM electronic storefront and enhanced DoD electronic avionics equipment catalog. Monitor industry for new CNS/ATM products and technical services which could be added to catalog.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increase due to inflation.</p>				
<p>Title: CNS/ATM COE Digital Aeronautical Flight Information File (DAFIF) Management</p> <p>Description: Perform periodic audits of the processes and procedures utilized by organizations involved in the development and distribution of critical safety of flight electronic databases used by aircrews to fly instrument flight rules procedures worldwide. Ensures the validity of multiple sources of information critical to implementation of international performance based navigation (PBN) standards.</p> <p>FY 2020 Plans: Continue efforts with DoD agencies and the FAA to audit/certify electronic navigational databases and sources, and develop performance based procedures required to operate without restriction in the National Airspace System (NAS) and in international civil aviation environments. Continue to publish procedures and databases with the required degree of accuracy/performance necessary to operate manned and remotely piloted aircraft in NAS.</p> <p>FY 2021 Plans: Continue efforts with DoD agencies and the FAA to audit/certify electronic navigational databases and sources, and develop performance based procedures required to operate without restriction in the NAS and in international civil aviation environments. Continue to publish procedures and databases with sufficient accuracy/performance necessary to operate manned and remotely piloted aircraft in NAS.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease due to economic adjustments.</p>		1.738	1.883	1.881
<p>Title: CNS/ATM COE Standards Bodies Engagement and Generic Performance Matrix (GPM) Development</p> <p>Description: Participate in technical forums to understand and influence civil aviation standards and incorporate DoD interests to ensure safe and efficient access of AF manned and unmanned aircraft to the global airspace. Create new and/or revise GPMs used by AF platform program offices to ensure aircraft comply with civil aviation requirements. Tailor GPMs for program offices</p>		1.432	1.863	1.964

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305099F / <i>Global Air Traffic Management (GATM)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>to apply standards to unique aircraft avionics architectures. Assist 30 aircraft program offices with the development of CNS/ATM related test and evaluation plans, the analysis of test/performance data, and the assessment of aircraft CNS/ATM performance through preparation of a Performance Assessment Report (PAR).</p> <p>FY 2020 Plans: Continue development of generic and tailored performance matrices to ensure AF manned and remotely piloted aircraft are capable and certified to operate safely and efficiently in worldwide civil airspace in accordance with emerging performance based CNS/ATM requirements. Anticipated support to aircraft platforms in FY20 includes and is not limited to: A-10, B-1, B-52, C-5, C-17, C-130, C-130, E-8, E-3, F-16, F-22, F-35, UH-1N, KC-135, KC-46A, RQ-4, MQ-9, HH-60W and VC-25A/B.</p> <p>FY 2021 Plans: Prioritize participation in technical forums and civil aviation standards bodies based on funding and operational requirements of AF platforms. Continue development of generic and tailored performance matrices to ensure AF manned and remotely piloted aircraft are capable and certified to operate safely and efficiently in worldwide civil airspace in accordance with emerging performance based CNS/ATM requirements. Continue to support AF aircraft platform program office test and design reviews, analysis of test/performance data, and performance assessment reports. Prioritize manpower support to provide deliverable products such as the TPM or PAR to ACAT 1 and Reportable modification programs, to include but limited to: T-X, VC-25B, F-35, HH-60W, and UH-1 Replacement program. Support will be provided to AF platform program offices based on manpower availability and operational requirements of AF platforms. FY21 platforms support requests are anticipated by at least the following program offices: A-10, B-1, B-2, B-52, C-5, C-17, C-130, CV-22, E-3, E-4, E-8, E-11, F-15, F-16, F-22, UH-1N, KC-135, KC-46A, RQ-4, MQ-9, HH-60W and VC-25A/B.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increase due to increase in platform support requests and inflation.</p>			
Accomplishments/Planned Programs Subtotals	3.966	4.544	4.645

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

This program primarily supports the acquisition of contractor advisory and assistance service (A&AS) and other technical support personnel to support the efforts described in Section C. This program also provides for the acquisition of contractor services in support of various program management activities within the COE. All of these services are acquired via the issuance of task/delivery orders against existing contractor support contract vehicles available to the CNS/ATM COE.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305099F / <i>Global Air Traffic Management (GATM)</i>	Project (Number/Name) 674689 / <i>Global Access Architecture</i>
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Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
CNS/ATM Center of Excellence: Technical support for CNS/ATM requirement assessments, GPM development, DAFIF navigation data chain audits/certification, and CNS/ATM ID/IQ contract management.	C/T&M	MITRE : Bedford, MA	-	2.064	Oct 2018	2.614	Oct 2019	2.733	Oct 2020	-		2.733	Continuing	Continuing	-
CNS/ATM Center of Excellence: Technical support for operational requirement assessments, GPM development, DAFIF navigation data chain audits/certification, and CNS/ATM ID/IQ contract management.	C/CPFF	Oasis Systems : Lexington, MA	-	1.069	Jul 2019	1.090	Jul 2020	1.100	Jul 2021	-		1.100	Continuing	Continuing	-
Subtotal			-	3.133		3.704		3.833		-		3.833	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Program office support - PMA (Contract Services)	C/T&M	Oasis Systems : Lexington, MA	-	0.540	Jul 2019	0.549	Jul 2020	0.550	Jul 2021	-		0.550	Continuing	Continuing	-
Program office support - PMA (Contract Svcs)	C/T&M	Tecolote/Quantech : Bedford, MA	-	0.055	Oct 2018	0.073	Oct 2019	0.091	Oct 2020	-		0.091	Continuing	Continuing	-
Program office support - PMA (Other Govt Costs)	Various	Various : Bedford, MA	-	0.238	Oct 2018	0.218	Oct 2019	0.171	Oct 2020	-		0.171	Continuing	Continuing	-
Subtotal			-	0.833		0.840		0.812		-		0.812	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force							Date: February 2020				
Appropriation/Budget Activity 3600 / 7			R-1 Program Element (Number/Name) PE 0305099F / <i>Global Air Traffic Management (GATM)</i>				Project (Number/Name) 674689 / <i>Global Access Architecture</i>				
	Prior Years	FY 2019	FY 2020		FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals	-	3.966	4.544		4.645	-	4.645	Continuing	Continuing	N/A	

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305099F / <i>Global Air Traffic Management (GATM)</i>	Project (Number/Name) 674689 / <i>Global Access Architecture</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
CNS/ATM COE																												
Generic Performance Matrix Development																												
DAFIF Management																												
CNS/ATM iGATM II Contract Proposal Evaluations																												
CNS/ATM iGATM II Contract Administration																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305099F / <i>Global Air Traffic Management (GATM)</i>	Project (Number/Name) 674689 / <i>Global Access Architecture</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CNS/ATM COE				
Generic Performance Matrix Development	1	2020	4	2025
DAFIF Management	1	2020	4	2025
CNS/ATM iGATM II Contract Proposal Evaluations	1	2020	2	2021
CNS/ATM iGATM II Contract Administration	1	2020	2	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305103F / <i>Cyber Security Initiative</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	0.384	0.000	0.384	0.294	0.294	0.294	0.294	Continuing	Continuing
671931: <i>TECH SURVEIL COUNTER MEAS EQPT</i>	-	0.000	0.000	0.384	0.000	0.384	0.294	0.294	0.294	0.294	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 0305103F, project 671931, Tech Surveill Counter Mess Equipment, is a new start.

A. Mission Description and Budget Item Justification

Integrate MDCO network sensor collections and analytical capabilities to enable data sharing.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	0.384	0.000	0.384
Total Adjustments	0.000	0.000	0.384	0.000	0.384
• 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	0.384	0.000	0.384

C. Accomplishments/Planned Programs (\$ in Millions)

	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>
Title: Tech Surveill Counter Mess Equipment	-	0.000	0.384
Description: CI PED			
FY 2020 Plans:			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305103F / <i>Cyber Security Initiative</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Effort not started			
<i>FY 2021 Plans:</i> New Effort for FY21			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> New start to integrate current MDCO network sensor collection and analytics.			
Accomplishments/Planned Programs Subtotals	-	0.000	0.384

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

Integrate MDCO sensor collection and analysis.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305103F / <i>Cyber Security Initiative</i>	Project (Number/Name) 671931 / <i>TECH SURVEIL COUNTER MEAS EQPT</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

CI Process Exploit Dissemination (PED) System Development	
Analysis of MDCO sensor integration	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305103F / <i>Cyber Security Initiative</i>	Project (Number/Name) 671931 / <i>TECH SURVEIL COUNTER MEAS EQPT</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>CI Process Exploit Dissemination (PED) System Development</i>				
Analysis of MDCO sensor integration	1	2021	1	2025

Note

Integrate MDCO sensor collection and analysis.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	33.563	35.461	23.640	0.000	23.640	27.507	28.722	28.707	29.234	Continuing	Continuing
672738: <i>Weather Service</i>	-	33.563	35.461	23.640	0.000	23.640	27.507	28.722	28.707	29.234	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This budget activity funds operational development necessary to acquire, sustain, and modernize Air Force Weather Service (AFWS) capabilities in support of the 2018 National Defense Strategy (NDS) lines of effort. To improve readiness for a more lethal force, AFWS provides timely, accurate, resilient, and relevant environmental information, to include space environment and terrestrial weather, for global battlespace situational awareness for Air Force (AF), Army, Special Operations Forces (SOF), combatant commands, the intelligence community, and other government agencies. AFWS capabilities at home station and deployed provide critical support to the full spectrum of air and space combat operations. AFWS decreases the risk to mission and risk to force by increasing the lethality, effectiveness, and survivability of DoD weapon systems. The AF Weather Enterprise Cloud migration effort modernizes key capabilities providing the military advantage to accurately predict environmental impacts optimizing mission planning, targeting, weaponing, mission execution, battle damage assessment, and space systems operations. To strengthen alliances and partnerships, AFWS development efforts integrate DoD, government agency, commercial, and international partner environmental data with AFWS information system equipment for processing, storing, exploiting, and disseminating multi-domain weather information for analysis, forecasting, mission integration, and greater interoperability. Funding for AFWS development ensures greater performance and affordability through improvements to architecture and system efficiency, cybersecurity, joint all-domain command and control (JADC2)/advanced battle management system (ABMS)/sensing grid integration, migration to cloud computing, artificial intelligence and machine learning (AI/ML) initiatives, and expanding agile software development, delivery, and integration practices.

AFWS aligns activities under four capability areas: Weather Data Collection, Weather Data Analysis and Dissemination, Weather Forecasting, and Product Tailoring/Warfighter Applications (PTWA). This alignment ensures an integrated and systems-oriented approach to program management decisions. Of these four capability areas, two (Weather Data Analysis and Dissemination and Weather Forecasting) are addressed by APPN 3600, BA 07, PE 0305111F, Project 672738 - Weather Service. In FY2021, a portion of the APPN 3600 funding and activities from Weather Data Analysis and Dissemination and Weather Forecasting will begin to migrate to the PTWA capability area to better address development of applications, software, C2 systems, and web interfaces that directly impact the warfighter.

1. Weather Data Analysis and Dissemination provides cloud-computing-based Continuous Delivery/Continuous Integration (CD/CI) for software development and deployment; command and control and mission planning integration; centralized, cybersecure weather web service capability; large-scale data ingest, processing, and warfighter product generation and visualization; global, regional, and mission execution forecasts; specific, mission-tailored weather data on demand; and weapon system interoperability which shortens the Combatant Commander kill chain through machine to machine interfaces. The Weather Data Analysis and Dissemination capability area includes activities for Weather Data Analysis Increment 4 (WDA Inc-4) and its follow-on increment, Weather Data Analysis Increment 5 (WDA Inc-5). WDA Inc-4 was previously referred to as WDA.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>
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2. Weather Forecasting provides advanced scientific numerical weather prediction capabilities for automated, high-resolution forecast products for mission planning, rehearsal, and execution with an emphasis on clouds, theater scale weather, aerosol/chemical constituents, and space environment characterization. Weather Forecasting includes activities for Numerical Weather Modeling (NWM); Weather Services - Live, Virtual, Constructive (WS-LVC), and Space Weather Analysis and Forecast System (SWAFS).

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Weather Service weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

Activities include research and analysis to support current program planning. Management Service costs include Federally Funded Research and Development Centers (FFRDC) and Advisory and Assistance Service (A&AS).

This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, SEC 240-D.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	34.615	25.461	27.105	0.000	27.105
Current President's Budget	33.563	35.461	23.640	0.000	23.640
Total Adjustments	-1.052	10.000	-3.465	0.000	-3.465
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	10.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-1.052	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-3.465	0.000	-3.465

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 672738: *Weather Service*

Congressional Add: *Commercial Weather Data Pilot (CWDP) Program*

Congressional Add: *Research on Atmospheric Rivers*

Congressional Add: *Enhanced Weather Prediction*

	FY 2019	FY 2020
	5.000	5.000
	0.000	2.000
	0.000	3.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>
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Congressional Add Details (\$ in Millions, and Includes General Reductions)	FY 2019	FY 2020
Congressional Add Subtotals for Project: 672738	5.000	10.000
Congressional Add Totals for all Projects	5.000	10.000

Change Summary Explanation

FY19: \$1.052M reprogrammed at end of FY19 to account for actuals
 FY20: Conf:[+\$10.0M] +\$3.0M program increase: enhanced weather prediction; +\$2.0M program increase: research on atmospheric rivers; +\$5.0M program increase: commercial weather data pilot

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: Weather Data Analysis Increment 4 (WDA Inc-4)</p> <p>Description: WDA Inc-4 provides a net-centric infrastructure that assimilates worldwide sources of atmospheric and space environment data and produces decision-quality information for warfighters.</p> <p>FY 2020 Plans: - Finalize WDA Inc-4 development activities and transition to WDA Inc-5 cloud computing activities and capital equipment replacement (CER) functions for hardware components of the data center as the AF Weather Enterprise cloud migration occurs. - Continue to expand the Open Geospatial Consortium services and upgrade for the large-scale data processing to accommodate new environmental satellite and numerical weather modeling data as well as begin efforts to implement an AFWWS Single Services Baseline.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease due to program transitioning to WDA Inc-5.</p>	14.080	4.871	0.000
<p>Title: Weather Data Analysis Increment 5 (WDA Inc-5)</p> <p>Description: WDA Inc-5 will institute a cloud computing-based platform enabling a transition from agile development to a CD/CI pipeline for software development and deployment efforts which will enable rapid updates to functionality and security measures. The WDA Inc-5 cloud computing platform will also provide an enterprise big data analytics capability and ML platform, as well as supporting and funding development and deployment of WDA Inc-5 web service and customer-facing applications. Finally, the program will provide both classified and unclassified production cloud computing platforms that communicate directly with C2 customers</p>			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p><i>FY 2020 Plans:</i></p> <ul style="list-style-type: none"> - Institute a cloud computing platform; migrate applications from agile to a CD/CI pipeline. - Implement and develop WDA Inc-5, Build A, Release 20A/B/C/D to enhance the capability to ingest, process, store access, and disseminate meteorological/oceanographic data via upgrades to the web services architecture. - Continue to expand the Open Geospatial Consortium series and upgrade for the large-scale data process to accommodate new weather satellite and NWM data. - Implement a cloud computing-based AFWWS Single Services Baseline by developing a cloud-native AFW-WEBS as the single web interface for accessing authoritative AF meteorological information and services in geospatially-enabled formats for direct integration into warfighter systems and decision cycles. - Develop and release a cloud-native Impact Services for increased risk management and agile decision support. <p><i>FY 2021 Plans:</i></p> <ul style="list-style-type: none"> -Funding for applications, software, C2 systems, and web interfaces previously aligned under WDA Inc-5 will begin to transition to a different Program of Record under the PTWA capability area; remaining RDT&E funding in WDA Inc-5 will support AI/ML integration and development improvements to the AF Weather Virtual Private Cloud platform. <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding increase due to completion of WDA Inc-4 activities.</p>			
<p><i>Title:</i> Numerical Weather Modeling (NWM)</p> <p><i>Description:</i> NWM provides advanced scientific numerical weather prediction capabilities for automated, high-resolution forecast products for mission planning, rehearsal, and execution. NWM includes AI/ML initiatives such as Global Synthetic Weather Radar (GSWR) that will be used to mitigate gaps in weather radar coverage in NDS highlighted AORs.</p> <p><i>FY 2020 Plans:</i></p> <ul style="list-style-type: none"> - Complete software development to exploit dynamic aerosols and transition to operations. - Continue software development for exploitation of new satellite data sources while continuing develop explicit NWP-based cloud forecasting capability. - Initiate new 3-year Land Information System (LIS) improvement and integration project. - Finish GSWR simulated radar mosaic capability development, begin transition to operations. - Migrate software development and deployment to CD/CI methods. <p><i>FY 2021 Plans:</i></p> <ul style="list-style-type: none"> - Complete integration and transition of hydrology streamflow model into operations. - Continue LIS enhancement and integration, field annual update. 	9.218	13.172	9.657

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<ul style="list-style-type: none"> - Continue meteorological satellite (METSAT) integration and exploitation efforts for cloud forecasting applications through the Cloud Analysis and Forecast contract. - Continue explicit cloud data assimilation (DA) and modeling collaboration and development activities. <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: Space Weather Analysis and Forecast System (SWAFS)</p> <p>Description: SWAFS is a software suite of 47 models/applications to ingest, process, and store space environmental data, run space environmental models to specify and forecast the near-Earth environment, and run space effects characterization applications. SWAFS products support various operations including 1. Spacecraft tracking and health 2. Early Warning & Theater Warning Radar support 3. GPS & SATCOM user support 4. Intel Community support and 5. High Altitude & Space Flight support. SWAFS's current main thrusts include modernizing SWAFS software code and transitioning SWAFS code to the cloud which will enable construction of a service-based architecture and enhance cycle times and the overall user experience. Furthermore, the program is working to deliver the Magnetospheric Energetic Charged Particle Hazard Assessment System (ECP HAS) that is designed to inform satellite operators of hazards and the impacts to their spacecraft and will provide the warfighter with the environmental awareness to safely sustain their respective orbits and missions.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continue prototyping SWAFS code to modernize and migrate to a cloud infrastructure. - Continue to perform and exploit new data ingest of space weather observations. - 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. <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue prototyping SWAFS code to modernize and transition to a cloud infrastructure which is essential in providing a modern, stable, and sustainable platform on which all SWAFS software will run to achieve a service-based architecture. - Transition the first of five components of the hazard assessment system to a cloud infrastructure. This phase of the ECP HAS will provide the warfighter with a modern user interface to determine the hazards to space vehicles. - 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. <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease is due to requirements reprioritization at ACC.</p>		3.621	2.357	2.185
<p>Title: Weather Services-Live, Virtual Constructive (WS-LVC)</p>		0.644	0.604	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Description: WS-LVC provides DoD Modeling and Simulation users a correlated and realistic natural environment. Tailorable scenarios are used to create specific effects for the warfighter. This effort was formerly called Environmental Data Cube System Support (EDCSS).</p> <p>FY 2020 Plans: -Provide software enhancements through CD/CI methods to current meteorological capabilities in order to provide consistent weather behaviors and environmental impacts across large scale exercises. -Continue to optimize performance in the cloud computing environment to reduce its sustainment footprint.</p> <p>FY 2021 Plans: -FY2021, WS-LVC will begin to transition to a different Program of Record under the PTWA capability area</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease due to no development efforts scheduled.</p>			
Accomplishments/Planned Programs Subtotals	28.563	25.461	23.640

	FY 2019	FY 2020
<p>Congressional Add: Commercial Weather Data Pilot (CWDP) Program</p> <p>FY 2019 Accomplishments: - Purchase commercial satellite and other space-based sensor data to fill sensing gaps. - Accelerate space-based sensor prototypes into orbit. - Integrate data into numerical weather models and perform model performance verification.</p> <p>FY 2020 Plans: - Verify military utility and operational use cases for commercial satellite and space-based sensor data. Validate and incorporate ML into nowcasting and forecasting capabilities using commercial data sources. - Explore and enhance new satellite technologies to mature technical readiness levels (TRL) to be launched into orbit for data collection. - Integrate commercial data into NWM and perform comparative analysis with DoD satellite data.</p>	5.000	5.000
<p>Congressional Add: Research on Atmospheric Rivers</p> <p>FY 2019 Accomplishments: N/A</p> <p>FY 2020 Plans: - Fund man-days and dropsondes in support of AF Reserve, Hurricane Hunters' research on atmospheric rivers.</p>	0.000	2.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>
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	FY 2019	FY 2020
- Conduct research and development to improve modeling capability of atmospheric rivers.		
Congressional Add: Enhanced Weather Prediction	0.000	3.000
FY 2019 Accomplishments: N/A		
FY 2020 Plans: - Fund collaborative research with community partners to enhance weather prediction capabilities such as modeling, DA, validation, verification, AI/ML, product development, and post-processing.		
Congressional Adds Subtotals	5.000	10.000

D. Other Program Funding Summary (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPAF 03 Line Item 833070: <i>Weather Observation Forecast</i>	52.113	31.447	33.021	-	33.021	32.730	35.270	33.902	34.522	Continuing	Continuing
• RDTE 04 0604002F: <i>Air Force Weather Services Research</i>	0.000	0.772	0.869	-	0.869	1.000	0.803	0.831	0.846	Continuing	Continuing

Remarks

E. Acquisition Strategy

AF Weather is adopting a CD/CI approach to delivering capabilities rapidly and routinely using multiple contracts to support a family of ACAT III Programs of Record through development fielding and sustainment.

Cost Plus contracts are utilized for software development and sustainment and Fixed Firm Price contracts for COTS systems and Contract Logistics Support (CLS) efforts. Pre-competed GSA and Defense MicroElectronics Activity (DMEA) contract vehicles are leveraged when appropriate, and competitive and small-business awards are favored.

The Air Force Program Executive Officer for Digital (AFPEO Digital) and the Air Force Program Executive Officer for Space (AFPEO SP) are the PEOs for the AFWS. AFPEO Digital manages the ground-based atmospheric sensing and data analysis, atmospheric forecast systems, and PTWA. AFPEO SP manages the ground-based segments of space environment collection platforms as well as SWAFS. Both the AFPEO Digital and AFPEO SP are their respective program's Milestone Decision Authority (MDA), unless delegated.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>	Project (Number/Name) 672738 / <i>Weather Service</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
WDA 1, Develop centralized web service capability (WDA 4D)	C/CPIF	Northrop Grumman : Bellevue, NE	-	3.995	Jul 2019	1.959	Dec 2019	-		-		-	Continuing	Continuing	-
WDA 1, Develop centralized web service capability (WDA-Inc 5)	C/CPAF	TBD : TBD	-	1.000	Sep 2019	4.612	Nov 2019	12.844	Nov 2020	-		12.844	Continuing	Continuing	-
WDA 2, Development and integration of weather analysis software (AFW-WEBS)	C/CPFF	Raytheon : Long Beach, CA	-	-		1.923	Mar 2020	0.000		-		0.000	Continuing	Continuing	-
Commercial Weather Pilot Program	C/FFP	Various : Various	-	5.000	Feb 2020	5.000		-		-		-	Continuing	Continuing	-
Research on Atmospheric Rivers	Various	Various : Various	-	-		2.000		-		-		-	Continuing	Continuing	-
Enhanced Weather Prediction	Various	Various : Various	-	-		3.000		-		-		-	Continuing	Continuing	-
NWM 1 - Perform software enhancements to the mesoscale production model	MIPR	NCAR : Boulder, CO	-	0.649	Feb 2019	0.668	Feb 2020	0.701	Mar 2021	-		0.701	Continuing	Continuing	-
NWM 2 - Improve land information system (LIS) application, providing earth surface boundary characterization for numerical modeling	MIPR	NASA : Greenbelt, MD	-	1.766	Feb 2019	1.819	Feb 2020	2.462	Jan 2021	-		2.462	Continuing	Continuing	-
NWM 3 - Develop model data assimilation application ensemble forecast procedures and convective scale resolution model capability.	C/CPIF	Northrop Grumman : Bellevue, NE	-	11.031	Jun 2019	9.153	Jan 2020	2.787	May 2021	-		2.787	Continuing	Continuing	-
NWM 4 - Deliver a Synthetic Weather Radar Capability mitigating gaps	MIPR	MIT Lincoln Labs : TBD, MA	-	3.000	Jan 2020	-		-		-		-	Continuing	Continuing	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>	Project (Number/Name) 672738 / <i>Weather Service</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
in the Central Command and other AORs.															
WS-LVC	C/CPIF	Northrop Grumman : Bellevue, NE	-	0.495	Apr 2019	0.366	Apr 2020	-		-		-	Continuing	Continuing	-
SWAFS Magnetic Field Measuring AoA	PO	AFRL : Annapolis, MD	-	0.482	Oct 2018	-		-		-		-	Continuing	Continuing	-
SWAFS Magnetospheric Energized Charged Particle (ECP) Hazard Assessment System (HAS) Model Integration	PO	AFRL : Annapolis, MD	-	-		1.857	Oct 2019	1.067	Jan 2021	-		1.067	Continuing	Continuing	-
SWAFS RadEx Analysis of Alternatives	PO	AFRL : Annapolis, MD	-	0.486	May 2019	-		-		-		-	Continuing	Continuing	-
SWAFS Magnetospheric ECP HAS Analysis of Alternatives	PO	AFRL : Annapolis, MD	-	0.486	May 2019	-		-		-		-	Continuing	Continuing	-
SWAFS Cloud Transition Prep	C/FFP	Perspecta : Herndon, VA	-	1.573	May 2019	-		0.418	Oct 2020	-		0.418	Continuing	Continuing	-
Subtotal				-	29.963	-	32.357	20.279		-		20.279	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
46th TS/JITC AFLCMC	WR	46 TS : Offutt AFB, NE	-	0.347	Nov 2018	0.529	Jan 2020	0.581	Nov 2020	-		0.581	Continuing	Continuing	-
Subtotal				-	0.347	-	0.529	0.581		-		0.581	Continuing	Continuing	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>	Project (Number/Name) 672738 / <i>Weather Service</i>
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>Weather Service</i>																												
Weather Data Analysis Inc 4 Build D Deliveries																												
Weather Data Analysis Inc 5 Build A Deliveries																												
Numerical Weather Modeling Deliveries																												
Live, Virtual, and Constructive Deliveries																												
Weather Data Analysis Inc 5 Build B Deliveries																												
SWAFS- Energetic Charged Particle Hazard Assessment model (ECP HAS) Integration																												
SWAFS Cloud Transition Prep																												
SWAFS Energetic Charged Particle Hazard (ECP HAS) AoA																												
SWAFS Radiation Exposure Model (RadEx) AoA																												
SWAFS Magnetic Field Measuring System (Magnetometer) AoA																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305111F / <i>Weather Service</i>	Project (Number/Name) 672738 / <i>Weather Service</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Weather Service</i>				
Weather Data Analysis Inc 4 Build D Deliveries	1	2019	1	2021
Weather Data Analysis Inc 5 Build A Deliveries	3	2019	1	2024
Numerical Weather Modeling Deliveries	1	2019	4	2024
Live, Virtual, and Constructive Deliveries	1	2019	4	2020
Weather Data Analysis Inc 5 Build B Deliveries	3	2023	4	2025
SWAFS- Energetic Charged Particle Hazard Assessment model (ECP HAS) Integration	1	2020	4	2024
SWAFS Cloud Transition Prep	1	2019	4	2021
SWAFS Energetic Charged Particle Hazard (ECP HAS) AoA	1	2019	4	2019
SWAFS Radiation Exposure Model (RadEx) AoA	1	2019	4	2019
SWAFS Magnetic Field Measuring System (Magnetometer) AoA	1	2019	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305114F / <i>Air Traffic Control, Approach, and Landing System (ATCALs)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	12.873	8.651	6.553	0.000	6.553	6.691	6.810	6.931	7.072	0.000	55.581
673587: <i>Air Traffic Control Systems</i>	-	12.873	8.651	6.553	0.000	6.553	6.691	6.810	6.931	7.072	0.000	55.581
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

To support the Air Force worldwide flying mission, this program element funds research, development, and management of new air traffic control communications, surveillance, automation, positioning, and precision approach and landing systems. When applicable, this includes joint efforts with the Federal Aviation Administration (FAA) and coordination with the International Civil Aviation Organization and the North Atlantic Treaty Organization. ATCALs development funding currently focuses on Air Traffic Control (ATC) Future Technology (formerly referred to as the Federal Aviation Administration (FAA) Next Generation Air Transportation System {NextGen ATS}). The program name was changed to more accurately reflect the scope of the effort which includes military and civil capabilities/requirements. In order to enable safe and efficient military flight operations in a changing global airspace, the ATC Future technology effort is designed to identify the warfighter's emerging airspace needs, analyze technologies, formulate requirements and positions, and advise DoD aviation and air traffic communities.

ATCALs ATC Future Technology supports the 2018 National Defense strategic approach to "generate decisive and sustained U.S. military advantages" by enabling "forward force maneuver and posture resilience" through the research and development of technology and strategies that support adaptive, agile basing concepts of operations while providing ATCALs capabilities necessary to ensure enduring, resilient, efficient and safe air operations. ATC Future Technology will "evolve innovative operational concepts" by modernizing airfield operations and providing adaptive ATC services and systems appropriate for the current environment, which will bolster "Dynamic Force Employment" through scalable employment operations and globally deployable forces for the four layers of the "Global Operating Model: "contact, blunt, surge, and homeland".

FY21 efforts will continue to research and develop new technologies in the areas of aircraft launch and recovery for both fixed and expeditionary operations; military and civil airspace interoperability; optimization of flight operations; Unmanned Aircraft System (UAS) access to civil airspace; ATC training study; DoD/AF or civil US and international mandates (e.g., Mode-5); improved Notice to Airmen (NOTAMs) software capabilities; conduct of service operational test and evaluations as required; mitigation of windfarm interference (e.g., with Infill Radars); technology and evaluation of new civil air traffic control and landing system technologies that may have military utility to include an Early Operational Assessment (EOA) of Remote Virtual ATC Tower System technology, mobile TACAN antenna technology, and expeditionary technology development and prototyping. As these technologies and architectures mature, fixed base and deployable ground system upgrades will be coordinated and fielded concurrently with related aircraft avionics capabilities that may be required (manned and unmanned). ATC Future Technology analysis and recommendations will be captured in program charters and incorporated into the ATC Future Technology Strategic Roadmap. When implemented, these efforts will enable DoD aircraft to take advantage of new technologies and operational capabilities, to enhance safety, security, efficiency, affordability, and flight operations.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305114F / <i>Air Traffic Control, Approach, and Landing System (ATCALs)</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver the ATCALs weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	13.271	5.651	6.565	0.000	6.565
Current President's Budget	12.873	8.651	6.553	0.000	6.553
Total Adjustments	-0.398	3.000	-0.012	0.000	-0.012
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	3.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.398	0.000			
• Other Adjustments	0.000	0.000	-0.012	0.000	-0.012

Change Summary Explanation

FY20 Congressional add for Infill Radars continues development of procedures to ensure unmanned systems and manned aircraft can operate within close proximity safely in the National Airspace System. Funding obligation is planned in Mar 20

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: ATC Future Technologies	12.873	8.651	6.553	0.000	6.553
Description: Includes efforts to implement ATC Future Technologies efficiencies and capabilities. Focus is on aircraft launch and recovery, airspace interoperability, expeditionary technology development and prototyping, optimization of flight capability, adherence to mandates, technology research and analysis, Notice to Airmen software upgrades, ATC training and technology study, Early Operational Assessment of Remote Virtual Air Traffic Control Tower technology, development of standards for certification of Infill radars for civil implementation, and development of procedures and tools to support ATC Management of Unmanned Aircraft Systems (UASs) in close proximity with manned aircraft.					
FY 2020 Plans:					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

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C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>- Continue ATC Future Technology analysis and research which will include the following tasks:</p> <ul style="list-style-type: none"> -- Continue development and maturation of technology to support Aircraft Launch and Recovery for both expeditionary and fixed operations. -- Continue supporting advancement in airspace interoperability between civilian and military fleets in both national and international airspace. -- Continue analyzing current and emerging aviation technology to help optimize the efficiency, effectiveness, and safety of flight capabilities. -- Continue to monitor emerging DoD/USAF and civil US and International mandates to ensure compliance of USAF fleets. -- Continue development of Notice to Airmen (NOTAMs) software upgrades to enhance NOTAM creation and query applications. -- Begin Expeditionary Technology Development and Prototyping. -- Continue ATC Training and Technology Study. -- Continue Early Operational Assessment of a Remote Virtual Air Traffic Control Tower capability to assess ability to meet AF flying/ATC missions in lieu of brick and mortar control towers. -- Continue development of Infill radar requirements and threshold parameters to enable operational validation for use in the National Airspace System. -- Continue effort with FAA and Air Force Research Laboratory to develop air traffic control management technology and procedures/tools to ensure unmanned and manned aircraft can safely operate in civil airspace. <p><i>FY 2021 Base Plans:</i></p> <ul style="list-style-type: none"> - Will continue ATC Future Technology Analysis and Research which will include the following tasks: -- Will continue development and maturation of technology to support Aircraft Launch and Recovery for both expeditionary and fixed operations. -- Will continue supporting advancement in airspace interoperability between civilian and military fleets in both national and international airspace. -- Will continue to monitor emerging DoD/USAF and civil US and International mandates to ensure compliance of USAF fleets. -- Will continue development of NOTAMs software upgrades to enhance NOTAM creation and query applications. -- Will continue Expeditionary Technology Development and Prototyping. -- Will continue ATC Training and Technology Study. 					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305114F <i>I Air Traffic Control, Approach, and Landing System (ATCALs)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
-- Will continue Early Operational Assessment of a Remote Virtual Air Traffic Control Tower capability to assess ability to meet AF flying/ATC missions in lieu of brick and mortar control towers. -- Will continue development of Infill radar requirements and threshold parameters to enable operational validation for use in the National Airspace System. -- Will continue effort with FAA and Air Force Research Laboratory to develop air traffic control management technology and procedures/tools to ensure unmanned and manned aircraft can safely operate in civil airspace. FY 2021 OCO Plans: None FY 2020 to FY 2021 Increase/Decrease Statement: FY20 funds reduced due to prior year under execution of funds allocated to D-RAPCON Mode 5 integration studies.					
Accomplishments/Planned Programs Subtotals	12.873	8.651	6.553	0.000	6.553

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
 ATCALs is a basket program element with multiple programs in various stages of acquisition which provide the air traffic control infrastructure to support peacetime and wartime missions. The overall strategy for ATC Future Technology is focused on developing a long-term strategy for and executing the development of lightweight, scalable, readily deployable ATC equipment in order to support the National Defense Strategy.

Current contracting efforts include Early Operational Assessment (EOA) of Remote Virtual ATC Control Tower technology, Expeditionary Technology Development and Prototyping and NOTAMs software upgrades. Multiple ATC Future Technology Enterprise Architecture Implementation Tasks, Infill radar certification, and ATC Management of UASs are being executed via Military Inter-Departmental Purchase Requests, and Project Orders with various organizations (FAA, MITRE, Army, Air Force Research Laboratory, and Air Force Flight Standards Agency). The Remote Virtual ATC Control Tower EOA contract award was a full and open competition using Other Transaction Authority (OTA) procedures. The Expeditionary Technology Development and Prototyping effort is planned to use full and open competition using Other Transaction Authority (OTA) procedures.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305114F / <i>Air Traffic Control, Approach, and Landing System (ATCALs)</i>
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The Air Force Program Executive Officer (PEO) Digital is the PEO for ATCALs and is also the delegated milestone decision authority. Program management, contracts, logistics, and financial management support is provided by the Air Force Life Cycle Management Center Aerospace Management Systems Division (AFLCMC/HBA) which is aligned under PEO/Digital.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305114F / Air Traffic Control, Approach, and Landing System (ATCALs)	Project (Number/Name) 673587 / Air Traffic Control Systems
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Expeditionary Technology Development and Prototyping	C/FFP	AFLCMC/HBA : Hanscom AFB, MA	-	-		2.000	Jan 2020	2.811	Jul 2021	-		2.811	Continuing	Continuing	-
NOTAM Software	C/FFP	AFDW/PK : JB Andrews, MD	-	0.418	May 2020	0.421	May 2020	0.424	Jan 2021	-		0.424	Continuing	Continuing	-
Subtotal			-	0.418		2.421		3.235		-		3.235	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Research/Analysis	MIPR	FAA : Washington, DC	-	3.181	Oct 2018	1.615	Mar 2020	1.583	Oct 2020	-		1.583	Continuing	Continuing	-
Strategic Planning	WR	MITRE : Hanscom AFB, MA	-	0.471	Oct 2018	0.490	Mar 2020	0.510	Oct 2020	-		0.510	Continuing	Continuing	-
Subtotal			-	3.652		2.105		2.093		-		2.093	Continuing	Continuing	N/A

Remarks
 Various contract types, performing activity and city/states are result of the use of Military Interdepartmental Purchase Requests (MIPR), Work Request (WR), Purchase Requests (PR), Project Orders (PO), etc. that are sent to multiple agencies in support of some tasks.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Surveillance Radar/ Automation System Upgrades (Mode 5)	WR	Various : Various	-	1.441	Aug 2019	-		-		-		-	0.000	1.441	-
Remote Air Traffic Control Tower Capability EOA	WR	Various : Various	-	0.350	Feb 2019	0.900	Feb 2020	1.000	Feb 2021	-		1.000	0.000	2.250	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305114F / Air Traffic Control, Approach, and Landing System (ATCALs)	Project (Number/Name) 673587 / Air Traffic Control Systems
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	
ATCALs Operational Test & Evaluation (OT&E)	WR	Various : Various	-	0.250	Jun 2019	0.225	Apr 2020	0.225	Nov 2020	-		0.225	Continuing	Continuing	-
Infill Radar Certification	MIPR	FAA/AFRL : Washington/Griffiss, DC	-	1.940	Sep 2019	3.000	May 2020	-		-		-	0.000	4.940	-
Air Traffic Control of UASs	MIPR	AFRL : Griffiss, NY	-	4.822	Jul 2019	-		-		-		-	0.000	4.822	-
Subtotal			-	8.803		4.125		1.225		-		1.225	Continuing	Continuing	N/A

Remarks
 Various contract types, performing activity and city/states are result of the use of Military Interdepartmental Purchase Requests (MIPR), Work Request (WR), Purchase Requests (PR), Project Orders (PO), etc. that are sent to multiple agencies in support of some tasks.

 Operational FY22.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	12.873	8.651	6.553	-	6.553	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305114F / Air Traffic Control, Approach, and Landing System (ATCALs)	Project (Number/Name) 673587 / Air Traffic Control Systems

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Air Traffic Control, Approach, and Landing System (ATCALs)	
Surveillance Radar and Automation System Upgrade/D-RAPCON Mode-5 Identification Friend/Foe/Secure Comm Integration	
Expeditionary Launch and Recovery Technology Development and Prototyping	
Monitoring Emerging Mandates	
Optimizing Flight Operations	
Airspace Interoperability	
Notice to Airmen (NOTAMs) Software Development	
ATC Training and Technology Study	
Remote Virtual ATC EOA Tower Eng Design/ Site Prep	
Remote Virtual ATC Tower EOA Installation/ Integration	
Remote Virtual ATC Tower EOA	
Remote Virtual ATC Tower EOA Final Report (Mar 22)	
ATCALs Operational Test and Evaluation	
Infill Radar Windfarm Mitigation Program Definition (WBS/SOW)	
Infill Radar Windfarm Mitigation Criteria Development	
Infill Radar Trial Validation	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305114F / <i>Air Traffic Control, Approach, and Landing System (ATCALs)</i>	Project (Number/Name) 673587 / <i>Air Traffic Control Systems</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Air Traffic Control, Approach, and Landing System (ATCALs)</i>				
Surveillance Radar and Automation System Upgrade/D-RAPCON Mode-5 Identification Friend/Foe/Secure Comm Integration	2	2019	4	2019
Expeditionary Launch and Recovery Technology Development and Prototyping	1	2019	4	2025
Monitoring Emerging Mandates	1	2019	4	2025
Optimizing Flight Operations	1	2019	4	2025
Airspace Interoperability	1	2019	4	2025
Notice to Airmen (NOTAMs) Software Development	2	2019	4	2021
ATC Training and Technology Study	3	2019	2	2021
Remote Virtual ATC EOA Tower Eng Design/Site Prep	4	2019	4	2019
Remote Virtual ATC Tower EOA Installation/Integration	1	2020	3	2020
Remote Virtual ATC Tower EOA	3	2020	2	2022
Remote Virtual ATC Tower EOA Final Report (Mar 22)	2	2022	2	2022
ATCALs Operational Test and Evaluation	1	2019	4	2025
Infill Radar Windfarm Mitigation Program Definition (WBS/SOW)	1	2019	3	2020
Infill Radar Windfarm Mitigation Criteria Development	3	2019	4	2020
Infill Radar Trial Validation	4	2020	4	2021
UAS Management/Integration Into Civil Airspace WBS/SOW Prep	1	2019	2	2019
UAS Management/Integration Into Civil Airspace Policy/Data Exchange Model Development	3	2019	2	2020
UAS Management/Integration Into Civil Airspace Model Demonstration/Validation	3	2020	2	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	6.527	7.448	0.449	0.000	0.449	1.551	1.581	1.610	1.639	Continuing	Continuing
675136: <i>Target Systems Development</i>	-	4.588	3.478	0.449	0.000	0.449	1.551	1.581	1.610	1.639	Continuing	Continuing
675336: <i>QF-16 AST Budget Authority</i>	-	1.939	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
675366: <i>QF-16</i>	-	0.000	3.970	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Full-scale Aerial Targets assure warfighters' weapon systems perform effectively against real-world enemy fighters and cruise missiles. Aerial Targets support adherence to Public Law Title 10, Section 2366, which requires major systems and munitions programs to conduct live fire survivability and lethality testing before full-rate production. Targets are used to validate operational missile/weapon system effectiveness and fighter operational flight program (OFP) updates. Targets are required for developmental/operational testing for all air-to-air and surface-to-air missiles, and for the F-22A, F-35, F-18, F-16, F-15, and other aircraft. Funding supports simulator development and improvements on the QF-16 Full-scale Aerial Target, BQM-167A Subscale Aerial Target, and updates of Target Control Systems and specialized Target Payload Subsystems for requirements such as: missile scoring, electronic attack and infrared (IR) countermeasures, radar and IR signature augmentation, and chaff and flare dispensing systems. Enables analysis, development and prototyping of threat emulations/simulations, and presentation of evolving threat scenarios and target area environments to prepare for emerging weapons development activities. Development is required to evolve aerial targets and target control capabilities to meet current and future threats. Air Force is the Executive Agent for Full-scale Aerial Targets.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Full-scale Aerial Targets, Subscale Aerial Targets, and companion Target Control Systems (TCS) weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	6.683	7.448	5.491	0.000	5.491
Current President's Budget	6.527	7.448	0.449	0.000	0.449
Total Adjustments	-0.156	0.000	-5.042	0.000	-5.042
• 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	-0.156	0.000	-5.042	0.000	-5.042

Change Summary Explanation

The FY21 funding request was reduced by \$5.042 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>				Project (Number/Name) 675136 / <i>Target Systems Development</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675136: <i>Target Systems Development</i>	-	4.588	3.478	0.449	0.000	0.449	1.551	1.581	1.610	1.639	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Full-scale Aerial Targets, Subscale Aerial Targets, and companion Target Control Systems (TCS) assure the effectiveness and currency of warfighter weapon systems to combat real-world enemy fighters and cruise missiles. The BQM-167A Air Force Subscale Aerial Target (AFSAT) is a reusable jet-powered target aircraft measuring approximately 20 feet long with a mission to simulate threat aircraft for testing and evaluation of surface-to-air, ship-to-air, or air-to-air missiles. The target accomplishes this mission through the use of optional payloads including chaff and flare, electronic attack, and infrared (IR) devices. Funding supports continued improvement of overall performance enhancement efforts to meet evolving threats. Funding supports development, improvements, and updates of target control systems and specialized target payload subsystems for requirements to include, but not limited to: missile scoring, Electronic Attack (EA) and IR countermeasures, radar and IR signature augmentation, and chaff and flare dispensing systems.

EA payload upgrade provides new techniques and capabilities critical to subscale and full-scale targets to realistically emulate current and emerging foreign threat systems in support of weapons testing.

TCS provides a myriad of sub-systems that, together, deliver the capability to control and track mission aerial targets (full-scale and subscale) and to track a mix of other critical mission participants (to include relay platforms, shooters, and the missile system under test). In this role, TCS ensures an optimum integrated aerial target environment that enhances both weapon system assessments and companion aircrew skills, and the full safety of mission participants throughout the conduct and fulfillment of Test and Evaluation (T&E) objectives. Funding supports continued improvement of TCS capabilities to effectively meet the multi-service T&E demands of current and future warfighter weapon systems.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Full-scale Aerial Targets, Subscale Aerial Targets, and companion Target Control Systems (TCS) weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: AFSAT (BQM-167A) Development	1.955	3.037	0.000	0.000	0.000
Description: Provide enhancements to AFSAT (BQM-167A) ability to emulate emerging threats in support of weapon testing. Funding may be utilized for development of follow-on Aerial Target capabilities.					
FY 2020 Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675136 / <i>Target Systems Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Continue AFSAT (BQM-167A) improvement efforts to include enhanced payload capability and future weapon testing with realistic threats per LFTE Title 10 requirements. Efforts include Multi-Payload Control (MPC) enhancements to Gas, Aero, Power, and Payload (GAPP) capabilities.</p> <p>FY 2021 Base Plans: N/A</p> <p>FY 2021 OCO Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to higher service priorities.</p>					
<p>Title: Target Control System</p> <p>Description: Provide system enhancements to Advance Airborne Threat Target Control System, (AATTCS) formerly known as Gulf Range Drone Control System (GRDCS), for command and control and tracking of Aerial Targets. Funding may be utilized for development of follow-on Aerial Target capabilities.</p> <p>FY 2020 Plans: Continue system modernization enhancements to include, but not limited to: GRDCS software updates to support implementing QF-16 and AFSAT enhancements and future TCS capability assessments.</p> <p>FY 2021 Base Plans: Continue system upgrades to include, but not limited to: AATTCS software updates to support implementing QF-16 and AFSAT enhancements and future TCS capability assessments.</p> <p>FY 2021 OCO Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to manpower needs to address capability gaps in TCS.</p>	1.354	0.441	0.449	0.000	0.449
<p>Title: Digital Radio Frequency Memory (DRFM)</p> <p>Description: Develop, improve, and update specialized target payload subsystems both software and hardware for requirements to emulate evolving adversary EA, IR, and radar tactics and techniques. These efforts are continuous as new threat intelligence surfaces, and are level of effort projects based on available funding.</p> <p>FY 2020 Plans:</p>	1.279	0.000	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675136 / <i>Target Systems Development</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	4.588	3.478	0.449	0.000	0.449

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• APAF 04 Line Item 10TRGT: <i>Target Drones</i>	90.172	130.837	133.273	-	133.273	135.991	138.419	140.918	139.545	Continuing	Continuing
• APAF 06 000999: <i>Initials Spares</i>	0.579	0.589	0.600	-	0.600	0.612	0.623	0.634	0.646	Continuing	Continuing
• APAF 07 000074: <i>War Consumables</i>	4.599	4.012	4.757	-	4.757	4.854	4.940	5.029	5.122	Continuing	Continuing
• APAF 07 Line Item 000075: <i>Other Production Charges</i>	29.247	16.514	16.495	-	16.495	16.778	16.999	17.306	17.622	Continuing	Continuing

Remarks
RDTE, BA 07: Aerial Targets - Includes funding for BPAC 675336, QF-16 AST Budget Authority, as well as BPAC 675366, QF-16.

APAF, BA 04: Target Drones 10TRGT - Full Scale and Subscale Aerial Targets assure warfighters' weapon systems will perform effectively against real-world enemy fighters and cruise missiles. Adheres to Public Law title 10, Section 2366 "Live fire/Lethality" developmental/operational test requirements.

APAF, BA 06: Initial Spares/Repair Parts - Aircraft Initial Spares are required to fill the initial pipeline or inventory for all new aircraft systems, including modifications, support equipment, and other production categories. Initial spares include peculiar repairable and consumable components, assemblies, and sub-assemblies that must be available for issues at all levels of supply in time to support newly fielded end items.

APAF, BA 07: War Consumables - AFSAT Rocket-Assisted Take-Off (RATO) requirements executed at Hill AFB. A RATO is used in the initial launch phase to obtain appropriate speed and altitude.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675136 / <i>Target Systems Development</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
APAF, BA 07: Other Production Charges - ALQ-167 and/or DLQ-9 Electronic Attack (EA) payloads for target drones including support equipment. Payloads emulate threat aircraft electronic countermeasures and jamming capabilities.											

D. Acquisition Strategy

The AFSAT acquisition strategy is a sole source follow-on with fixed price and time and materials contracts. The Target Control System acquisition strategy includes several small projects to provide enhancements to Target Control System (to include AATTCS) and will be accomplished with other government agencies and contracts as needed. EA Payloads acquisition strategy includes several small projects managed by the US Navy program office to provide enhancements to the target payloads for subscale and full-scale targets.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675136 / <i>Target Systems Development</i>
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

Target Systems Development																												
BQM-167A: AFSAT GAPP																												
TCS: AATTCS Software Release																												
TCS: Future Capability Assessment																												
TCS: Future TCS																												
EA Pods-Multi Channel Digital Radio Frequency Memory (DRFM) Hardware																												
EA Pods-Multi Channel Digital Radio Frequency Memory (DRFM); Software Spiral Upgrade																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675136 / <i>Target Systems Development</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Target Systems Development</i>				
BQM-167A: AFSAT GAPP	2	2020	3	2023
TCS: AATTCS Software Release	1	2019	1	2019
TCS: Future Capability Assessment	1	2019	1	2019
TCS: Future TCS	1	2019	4	2024
EA Pods-Multi Channel Digital Radio Frequency Memory (DRFM) Hardware	1	2019	3	2022
EA Pods-Multi Channel Digital Radio Frequency Memory (DRFM); Software Spiral Upgrade	1	2019	3	2022

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675336 / <i>QF-16 AST Budget Authority</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675336: <i>QF-16 AST Budget Authority</i>	-	1.939	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This BPAC is an administrative continuation of BPAC 675366: QF-16, and encompasses the same efforts.

A. Mission Description and Budget Item Justification

Full-scale Aerial Targets ensure warfighters' weapon systems perform effectively against real-world enemy fighters and cruise missiles. Aerial Targets support adherence to Public Law Title 10, Section 2366, which requires major systems and munitions programs to conduct live fire survivability and lethality testing before full-rate production. Targets are used to validate operational missile/weapon system effectiveness and fighter operational flight program (OFP) updates. Targets are required for developmental/operational testing for all air-to-air and surface-to-air missiles, and for the F-22A, F-35, F-18, F-16, F-15 aircraft, and other aircraft. Funding supports simulator development and improvements on the QF-16 Full Scale Aerial Target, and updates of Target Control Systems and specialized target payload subsystems for requirements such as: missile scoring, electronic attack and infrared (IR) countermeasures, radar and IR signature augmentation, and chaff and flare dispensing systems. Development is required to evolve QF-16 threat capabilities to meet current and future threats identified by OSD.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Full-scale Aerial Targets, Subscale Aerial Targets, and companion Target Control Systems (TCS) weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: QF-16 Development Program	1.939	0.000	0.000	0.000	0.000
Description: Provide enhancements to emulate emerging threat in support of weapons testing. Funding may be utilized for development of follow-on Aerial Target capabilities.					
FY 2020 Plans: N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675336 / <i>QF-16 AST Budget Authority</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> N/A					
Accomplishments/Planned Programs Subtotals	1.939	0.000	0.000	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Line Item											
• APAF 04 10TRGT: <i>Target Drones</i>	90.172	130.837	133.273	-	133.273	135.991	138.419	140.918	139.545	Continuing	Continuing
• APAF 06 000999: <i>Initial Spares</i>	0.579	0.589	0.600	-	0.600	0.612	0.623	0.634	0.646	Continuing	Continuing
• APAF 07 000074: <i>War Consumables</i>	4.599	4.012	4.757	-	4.757	4.854	4.940	5.029	5.122	Continuing	Continuing
• APAF 07 000075: <i>Other Production Charges</i>	29.247	16.514	16.495	-	16.495	16.778	16.999	17.306	17.622	Continuing	Continuing

Remarks

RDTE, BA 07: Aerial Targets - Includes BPAC 675136, Target Systems Development, as well as BPAC 675366, QF-16.

APAF, BA 04: Target Drones 10TRGT - Full Scale and Subscale Aerial Targets assure warfighter's weapon systems will perform effectively against real-world enemy fighters and cruise missiles. Adheres to Public Law title 10, Section 2366 "Live fire/Lethality" developmental/operational test requirements.

APAF, BA 06: Initial Spares/Repair Parts - Aircraft Initial Spares are required to fill the initial pipeline or inventory for all new aircraft systems, including modifications, support equipment, and other production categories. Initial spares include peculiar repairable and consumable components, assemblies, and sub-assemblies that must be available for issues at all levels of supply in time to support newly fielded end items.

APAF, BA 07: War Consumables - AFSAT Rocket-Assisted Take-Off (RATO) requirements executed at Hill AFB. A RATO is used in the initial launch phase to obtain appropriate speed and altitude.

APAF, BA 07: Other Production Charges - ALQ-167 and/or DLQ-9 Electronic Attack (EA) payloads for target drones including support equipment. Payloads emulate threat aircraft electronic countermeasures and jamming capabilities.

D. Acquisition Strategy

The QF-16 was a competitive contract award, including fixed price incentive development contract with fixed priced production options (Lots 1-5). Planning is in progress to award a sole source follow-on production and sustainment contract to the incumbent for Lots 6-8.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675336 / <i>QF-16 AST Budget Authority</i>
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

QF-16 Development	
Q-16 Multi-Payload Control (MPC)	[REDACTED]
Radar Cross Section Study/Analysis	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675336 / <i>QF-16 AST Budget Authority</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>QF-16 Development</i>				
Q-16 Multi-Payload Control (MPC)	4	2019	1	2021
Radar Cross Section Study/Analysis	1	2019	3	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>				Project (Number/Name) 675366 / <i>QF-16</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675366: <i>QF-16</i>	-	0.000	3.970	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

Full-scale Aerial Targets ensure warfighters' weapon systems perform effectively against real-world enemy fighters and cruise missiles. Aerial Targets support adherence to Public Law Title 10, Section 2366, which requires major systems and munitions programs to conduct live fire survivability and lethality testing before full-rate production. Targets are used to validate operational missile/weapon system effectiveness and fighter operational flight program (OFP) updates. Targets are required for developmental/operational testing for all air-to-air and surface-to-air missiles, and for the F-22A, F-35, F-18, F-16, F-15 and other aircraft. Funding supports simulator development and improvements on the QF-16 Full Scale Aerial Target, and updates of Target Control Systems and specialized target payload subsystems for requirements such as: missile scoring, electronic attack and infrared (IR) countermeasures, radar and IR signature augmentation, and chaff and flare dispensing systems. Development is required to evolve QF-16 threat capabilities to meet current and future threats identified by OSD.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Full-scale Aerial Targets, Subscale Aerial Targets, and companion Target Control Systems (TCS) weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: QF-16 Development Program	0.000	3.970	0.000	0.000	0.000
Description: Provide enhancements to emulate emerging threat(s) in support of weapons testing. Funding may be utilized for development of follow-on Aerial Target capabilities.					
FY 2020 Plans: Continue threat realism improvements for countermeasures and their controls. Complete studies and analysis on QF-16 MPC.					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to reorganization of major thrust area funding.					
Accomplishments/Planned Programs Subtotals	0.000	3.970	0.000	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675366 / <i>QF-16</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 04 Line Item 10TRGT: <i>Target Drones</i>	90.172	130.837	133.273	-	133.273	135.991	138.419	140.918	139.545	Continuing	Continuing
• APAF 06 000999: <i>Initial Spares</i>	0.579	0.589	0.600	-	0.600	0.612	0.623	0.634	0.646	Continuing	Continuing
• APAF 07 000074: <i>War Consumables</i>	4.599	4.012	4.757	-	4.757	4.854	4.940	5.029	5.122	Continuing	Continuing
• APAF 07 Line Item 00075: <i>Other Production Charges</i>	29.247	16.514	16.495	-	16.495	16.778	16.999	17.306	17.622	Continuing	Continuing

Remarks

RDTE, BA07: Aerial Targets - Include BPAC 675136, Target Systems Development, as well as BPAC 675336, QF-16 AST Budget Authority.

APAF, BA 04: Target Drones 10TRGT - Full Scale and Subscale Aerial Targets assure warfighter's weapon systems will perform effectively against real-world enemy fighters and cruise missiles. Adheres to Public Law title 10, Section 2366 "Live fire/Lethality" developmental/operational test requirements.

APAF, BA 06: Initial Spares/Repair Parts - Aircraft Initial Spares are required to fill the initial pipeline or inventory for all new aircraft systems, including modifications, support equipment, and other production categories. Initial spares include peculiar repairable and consumable components, assemblies, and sub-assemblies that must be available for issues at all levels of supply in time to support newly fielded end items.

APAF, BA 07: War Consumables - AFSAT Rocket-Assisted Take-Off (RATO) requirements executed at Hill AFB. A RATO is used in the initial launch phase to obtain appropriate speed and altitude.

APAF, BA 07: Other Production Charges - ALQ-167 and/or DLQ-9 Electronic Attack (EA) payloads for target drones including support equipment. Payloads emulate threat aircraft electronic countermeasures and jamming capabilities.

D. Acquisition Strategy

The QF-16 was a competitive contract award, including fixed price incentive development contract with fixed priced production options (Lots 1-5). Planning is in progress to award a sole source follow-on production and sustainment contract to the incumbent for Lots 6-8.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675366 / <i>QF-16</i>
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

QF-16 Development	
QF-16 Multi-Payload Control (MPC)	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305116F / <i>Aerial Targets</i>	Project (Number/Name) 675366 / <i>QF-16</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>QF-16 Development</i>				
QF-16 Multi-Payload Control (MPC)	4	2020	1	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305128F / <i>Security and Investigative Activities</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.403	0.425	0.432	0.000	0.432	0.441	0.449	0.457	0.465	Continuing	Continuing
671931: <i>TECH SURVEIL COUNTER MEAS EQPT</i>	-	0.403	0.425	0.432	0.000	0.432	0.441	0.449	0.457	0.465	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Air Force Office of Special Investigations (AFOSI) conducts specialized investigative activities and force protection support for Air Force (AF) commanders worldwide. This assists AF commanders in protecting their people and resources. AFOSI's mission includes investigating criminal matters affecting AF personnel, contract fraud and economic crimes involving AF weapons systems and spare parts, the investigation of environmental crime, counterdrugs, computer intrusion detection and forensic media analysis of computer crimes. This element supports Technical Surveillance Countermeasures (TSCM), Computer Crime Investigations (CCI), and technical support to criminal and counterintelligence investigations and operations conducted by AFOSI. AFOSI's TSCM mission conducts counterintelligence investigations for both AF and DoD facilities and programs in order to deter and detect technical surveillance operations conducted by Foreign Intelligence Services to compromise classified or sensitive information. The purpose of CCI research is to improve AF and DoD Information Operations capability by enhancing AFOSI's ability to deter or prevent spies, hackers, or saboteurs from manipulating, damaging, or stealing sensitive war fighting data or systems. Failing that, to investigate, identify, and prosecute those who do. While most research to meet operational requirements is Operational System Development, there is also research in the category of Engineering and Manufacturing Development due to a need for modifications to present technology. The equipment required to provide technical support to investigations is unique and complex. This equipment must be continually updated to provide state-of-the-art capabilities to detect and neutralize criminal activities targeted against the AF and DoD. In an era of advancing technology, reduced manning, and increasingly high level fraud, environmental crime and computer crime investigations, technical investigative equipment must be continuously updated to enable AFOSI special agents to have the most cost effective and best possible means of thwarting criminal acts. The evolution of a new wave of computer crimes has made AFOSI responsible for the collection, investigative analysis, national level law enforcement coordination, and dissemination of hacker activity and intrusion incidents for the Air Force. AFOSI's computer crime equipment must stay on the leading edge of technology to collect criminal information as well as pursue and apprehend criminals through a global medium. AFOSI must continually update its existing high tech computer surveillance equipment to support ongoing and future investigative operations to identify hackers and hacker groups, as well as potential hostile government activities targeting Air Force communication and control systems. Critical Infrastructure Protection identifies weaknesses in the Air Force Critical infrastructure, highlights critical countermeasures and acquires and deploys cost-effective solutions. The intent is to provide an Air Force-wide review of current infrastructure vulnerabilities; prioritize AF protection planning and integrate with existing programs; identify gaps based on AF needs; direct studies to refine AF requirements.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force				Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0305128F / <i>Security and Investigative Activities</i>				
B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	
Previous President's Budget	0.418	0.425	0.433	0.000	0.433	
Current President's Budget	0.403	0.425	0.432	0.000	0.432	
Total Adjustments	-0.015	0.000	-0.001	0.000	-0.001	
• 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	-0.015	0.000	-0.001	0.000	-0.001	
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2019	FY 2020	FY 2021
Title: TSCM				0.403	0.425	0.432
Description: These funds will support development of a suite of specialized law enforcement and counterintelligence restricted tools needed to exploit cyberspace, digital media storage and mobile audio/visual/data communications for the collection of evidence against a wide variety of serious offenses. They will develop next generation Technical Surveillance Countermeasures (TSCM) to defend against emerging foreign technical intelligence capabilities targeting sensitive protected information for exploitation. The concerted efforts of criminal, terrorist and foreign intelligence elements to evade law enforcement and compromise protected systems, all while remaining undetected using the latest technical advances available, require persistent development of tools to defeat their efforts.						
FY 2020 Plans: need to meet reqts no OCO						
FY 2021 Plans: Develop law enforcement and counterintelligence restricted tools						
FY 2020 to FY 2021 Increase/Decrease Statement: Support contract increases						
Accomplishments/Planned Programs Subtotals				0.403	0.425	0.432

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305128F / <i>Security and Investigative Activities</i>	
D. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
E. Acquisition Strategy Market Research is accomplished jointly within the DoD, Counterintelligence, and Law Enforcement communities with the various government laboratories and major contractors to identify locations with the ability to develop investigative tools unique to our mission needs. These technologies, capabilities, and limitations of current and future investigative tools is sometimes highly sensitive or classified. Market Research also allows inter-agency coordination and deconfliction to occur, reducing or eliminating duplicitous development efforts. Annually, stakeholders meet to discuss initiatives, challenges and organizational goals to coordinate or consolidate requirements to increase efficiency. Once Market Research and any applicable coordination/deconfliction is completed, acquisition channels are analyzed and selected based on the ability to meet operational and technical security requirements.		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305128F / Security and Investigative Activities	Project (Number/Name) 671931 / TECH SURVEIL COUNTER MEAS EQPT
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
TSCM R/D #4	MIPR	HQ AFOSI : Quantico, VA	-	0.403		-		-		-		-	Continuing	Continuing	-
Subtotal			-	0.403		-		-		-		-	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
TSCM R/D	MIPR	HQ AFOSI : Quantico, VA	-	-		0.425		0.432	Oct 2021	-		0.432	Continuing	Continuing	-
Subtotal			-	-		0.425		0.432		-		0.432	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	0.403	0.425	0.432	-	0.432	Continuing	Continuing	N/A

Remarks
 Funds support AFOSI RDTE at the intelligence community's Interagency Test and Evaluation Lab at a secure location to identify, research, develop, test, and evaluate classified and unclassified technical surveillance and countermeasures solutions to emerging operational requirements in support of AFOSI services to protect Air Force and DoD resources.

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305128F / <i>Security and Investigative Activities</i>	Project (Number/Name) 671931 / <i>TECH SURVEIL COUNTER MEAS EQPT</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Technical Surveillance Equipment Test & Evaluation</i>				
Transition from Phase II TSCM LASER Project to Phase III	1	2019	4	2019
Complete Phase III (Final) TSCM LASER Project	1	2020	4	2020
Tech Service Ops Advanced Tool Development	1	2021	4	2024

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305145F / <i>Arms Control Implementation</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	24.804	41.546	0.000	0.000	0.000	37.543	0.000	0.000	0.000	0.000	103.893
674283: <i>Open Skies Treaty Aircraft Recap</i>	-	20.670	41.546	0.000	0.000	0.000	37.543	0.000	0.000	0.000	0.000	99.759
675063: <i>Digital Visual Imaging System (DVIS)</i>	-	4.134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.134

A. Mission Description and Budget Item Justification

The OC-135B aircraft supports the implementation of the United States Government (USG) Open Skies Treaty. This program addresses the requirements in the Presidential Policy Directive-15 (PPD-15). The Open Skies Treaty allows signatories to conduct observation flights over each other's territory using fixed-wing, unarmed observation aircraft. The aircraft can use optical cameras, video cameras, sideways-looking synthetic aperture radar, and infrared line scanning devices. There are 34 participating states to the Open Skies Treaty. The Air Force is required to allow over flight of USAF bases per multilateral request; to acquire, operate, and maintain the aircraft and equipment utilized during over flights of partner countries; to provide required sensor media and initial media processing; and to provide airfield servicing, logistics, and maintenance for foreign over flights of the US.

In October 2016, the Air Force used a multi-disciplinary High Performance Team to create and validate a series of required capabilities for an Open Skies aircraft, evaluate aircraft that could satisfy the required capabilities, and then consider each of the Doctrine, Organization, Training, materiel, Leadership and Education, Personnel, Facilities and Policy elements as part of a recommended solution. The effort accomplished two main purposes. First, it updated operational requirement and replaced the 1992 Operational Requirements Document to reflect both operational experience and expected Open Skies program needs for the foreseeable future. Second, it recommended an Air Force solution that best satisfied required capabilities within existing materiel solutions. The Joint Capabilities Board adopted the Air Force recommendation and directed acquisition of two small airliner class aircraft for the Open Skies Treaty mission to be acquired in a method consistent with the Federal Acquisition Regulation and other applicable guidance, training using existing contractor training facilities, equipment, and curriculum, and a maintenance concept with military personnel performing unit-level maintenance actions with contractor support for parts supply, and supply chain management, performed under a Low Utilization Maintenance Program.

This effort includes the design, development, and test activities for two OC-135B replacement weapon systems. This effort will modify a Federal Aviation Administration (FAA) certified, commercial-off-the-shelf, small airliner class aircraft. System Development requires structural design, interphone communications systems, flight deck avionics and modification to incorporate the Digital Visual Imaging System (DVIS) system.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver OSTAR weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

The FY2021 funding request was reduced by \$76.2 million to account for the availability of prior year execution balances.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305145F / <i>Arms Control Implementation</i>
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This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	21.374	54.546	76.200	0.000	76.200
Current President's Budget	24.804	41.546	0.000	0.000	0.000
Total Adjustments	3.430	-13.000	-76.200	0.000	-76.200
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-13.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	4.134	0.000			
• SBIR/STTR Transfer	-0.704	0.000			
• Other Adjustments	0.000	0.000	-76.200	0.000	-76.200

Change Summary Explanation

FY 2019 funding increased by \$4.134M for below threshold reprogramming actions.

FY 2020 funding reduced due to Congressional mark for "Open Skies Recap delays."

FY 2021 funding request reduced by \$76.2M to account for availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305145F / Arms Control Implementation				Project (Number/Name) 674283 / Open Skies Treaty Aircraft Recap			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
674283: Open Skies Treaty Aircraft Recap	-	20.670	41.546	0.000	0.000	0.000	37.543	0.000	0.000	0.000	0.000	99.759
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Open Skies Treaty permits unarmed overflight of the sovereign territory of 34 signatory nations. The Treaty enhances mutual understanding and confidence by giving all participants, regardless of size, a direct role in gathering information through aerial imaging on military forces and activities of concern. Open Skies is one of the most wide-ranging international arms control efforts to date to promote openness and transparency in military forces and activities.

The Department of Defense is responsible for oversight, implementation of, and compliance with, arms control agreements, including the Open Skies Treaty. The United States Air Force has a requirement to execute missions under the Open Skies Treaty and utilizes two OC-135B aircraft as the observation aircraft. All roles and responsibilities are called out in Presidential Policy Directive 15, "Implementation of the Treaty on Open Skies," Mar 1, 2012. The OC-135B fleet has experienced decreasing mission reliability due to age, difficulties with out-of-production parts, and increasing operating costs. Open Skies missions averaged a 65% mission completion rate over the ten-year period from 2007 to 2017 with leading non-mission capable drivers being the engines, fuel system, landing gear, generators, and airframe. Additionally, the OC-135B aircraft's 6,500 km range is insufficient to fully execute mission options within the 96-hour in-country Treaty observation time constraint permitted under Treaty.

The Department of Defense, motivated by operational limitations of the OC-135B experienced during Open Skies missions combined with declining mission capability, prompted program officials to request a Capabilities-Based Assessment in July 2015 to study aircraft issues. The effort which completed in June 2016 indicated that key requirements within the 1992 Open Skies Operational Requirements Document were no longer current, and that the OC-135B had known capability performance gaps in range and mission completion.

In October 2016, the Air Force used a multi-disciplinary High Performance Team to create and validate a series of required capabilities for an Open Skies aircraft, evaluate aircraft that could satisfy the required capabilities, and then consider each of the Doctrine, Organization, Training, materiel, Leadership and Education, Personnel, Facilities and Policy elements as part of a recommended solution. The effort accomplished two main purposes. First, it updated operational requirement and replaced the 1992 Operational Requirements Document to reflect both operational experience and expected Open Skies Treaty program needs for the foreseeable future. Second, it recommended an Air Force solution that best satisfied required capabilities within existing materiel solutions. The Joint Capabilities Board adopted the Air Force recommendation and directed acquisition of two small airliner class aircraft for the Open Skies Treaty Aircraft Recap (OSTAR) mission to be acquired in a method consistent with the Federal Acquisition Regulation and other applicable guidance, training using existing contractor training facilities, equipment, and curriculum, and a maintenance concept with military personnel performing unit-level maintenance actions with contractor support for parts supply, and supply chain management, performed under a Low Utilization Maintenance Program.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305145F / Arms Control Implementation	Project (Number/Name) 674283 / Open Skies Treaty Aircraft Recap
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This effort includes the design, development, and test activities for two OC-135B replacement weapon systems. This effort will modify a Federal Aviation Administration (FAA) certified, commercial-off-the-shelf, small airliner class aircraft. System Development requires structural design, interphone communications systems, flight deck avionics and modification to incorporate the Digital Visual Imaging System (DVIS).

This program element may include necessary civilian pay expenses required to manage, execute, and deliver OSTAR weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

The FY2021 funding request was reduced \$76.2 million to account for availability of prior year execution balances.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
<p>Title: Open Skies Treaty Aircraft Recap Development</p> <p>Description: The Open Skies System consists of the missionized aircraft (Digital Visual Imaging System sensor suite, flight deck avionics, and crew workstations) and Digital Ground Processing Station.</p> <p>The budget supports modification and Treaty Certification of two commercial-off-the-shelf, small airliner class OC-135B replacement aircraft. The program includes procurement of two commercial-derivative aircraft and Digital Visual Imaging System kits, design and development for mission system integration (structural design, interphone communications systems, flight deck avionics, and Digital Visual Imaging System hardware), test, and Federal Aviation Administration and Open Skies Treaty certification activities. Additionally, this effort establishes pre-operational support for aircraft, mission systems and Digital Ground Processing Station.</p> <p>FY 2020 Plans: Complete competitive source selection, award aircraft purchase contract. Release request for proposals for development and CLS contract.</p> <p>Major Milestones: - Aircraft Contract Award (Sep 2020)</p> <p>FY 2021 Plans: Developing the design to incorporate the Digital Visual Imaging System to include hardware, software, aircraft structures, observation windows, and interior modifications, communications capabilities (UHF, HF, SATCOM and other as required), and sensor operator workstations.</p> <p>Major Milestones: - Development and CLS Award Aug 2021</p>	20.670	41.546	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305145F / Arms Control Implementation	Project (Number/Name) 674283 / Open Skies Treaty Aircraft Recap
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
- Milestone B Sep 2021			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding decrease due to availability of prior year execution balances.			
Accomplishments/Planned Programs Subtotals	20.670	41.546	0.000

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APAF 01 C135B0: C-135B	125.000	-	-	-	-	-	-	-	-	0.000	125.000

Remarks

D. Acquisition Strategy

The Air Force Milestone Decision Authority approved the Open Skies Treaty Aircraft Recapitalization Materiel Development Decision (MDD) and revised Acquisition Strategy on 22 January 2020. The program will award two contracts for aircraft purchase and development with embedded services for Contractor Logistics Support and Engineering Services. The program will utilize Full and Open Competition under Part 12 and Part 14 of the Federal Acquisition Regulation. The program will procure aircraft capable of achieving Open Skies Treaty Missions, integrate new treaty certified commercial-off-the-shelf Digital Visual Imaging Systems, and perform required Developmental Test, Operational Test, and Treaty Certification Data Gathering. The program will establish Pre-operational Support for aircraft, mission systems and the Digital Ground Processing Station necessary to deliver an aircraft, ready for Treaty Certification, by 2024. The program provides for Engineering Services necessary to support the Treaty Certification process. Contractor Logistics Support elements include worldwide supply chain management, establishment of a Contractor Managed Base Supply, program management, depot maintenance, training services, field support, and engineering services for the aircraft, engines, and mission systems. The program Request for Proposals in April 2020 and award the contract to procure the aircraft by September 2020. Development/CLS Request for Proposals September 2020 and contract award August 2021.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305145F / Arms Control Implementation	Project (Number/Name) 674283 / Open Skies Treaty Aircraft Recap
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	17.896	Sep 2020	33.848	Aug 2021	-		-		-	Continuing	Continuing	-
Subtotal			-	17.896		33.848		-		-		-	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Tech Orders	TBD	Not specified. : TBD	-	-		1.900	Mar 2021	-		-		-	Continuing	Continuing	-
SIL	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
PIT/Program Integration	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Acquisition Support	Allot	Not specified. : TBD	-	0.574	Sep 2019	3.021	Sep 2020	-		-		-	Continuing	Continuing	-
Subtotal			-	0.574		4.921		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Government Support Costs	Various	Not specified. : Tinker AFB, OK	-	2.200	Apr 2019	2.777	Jan 2020	-		-		-	Continuing	Continuing	-
Subtotal			-	2.200		2.777		-		-		-	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	20.670	41.546	-	-	-	Continuing	Continuing	N/A

Remarks
Government Support Cost include costs related to program office travel and government led test.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305145F / <i>Arms Control Implementation</i>	Project (Number/Name) 674283 / <i>Open Skies Treaty Aircraft Recap</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
<i>Open Skies Treaty Aircraft Recap</i>																												
Aircraft Contract Source Selection																												
Aircraft Contract Award																												
Development Contract Source Selection																												
Development Contract Award																												
Design/Integration																												
Install/Test																												
Ready for Treaty Certification																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305145F / <i>Arms Control Implementation</i>	Project (Number/Name) 674283 / <i>Open Skies Treaty Aircraft Recap</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Open Skies Treaty Aircraft Recap</i>				
Aircraft Contract Source Selection	3	2020	4	2020
Aircraft Contract Award	4	2020	4	2020
Development Contract Source Selection	4	2020	4	2021
Development Contract Award	4	2021	4	2021
Design/Integration	4	2021	4	2023
Install/Test	4	2023	2	2024
Ready for Treaty Certification	2	2024	2	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0305145F / Arms Control Implementation				Project (Number/Name) 675063 / Digital Visual Imaging System (DVIS)				
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675063: Digital Visual Imaging System (DVIS)	-	4.134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.134
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The OC-135B aircraft supports the implementation of the United States Government (USG) Open Skies Treaty. This program addresses the requirements in the Presidential Policy Directive-15 (PPD-15). The Open Skies Treaty allows signatories to conduct observation flights over each other's territory using fixed-wing, unarmed observation aircraft. The aircraft can use optical cameras, video cameras, sideways-looking synthetic aperture radar, and infrared line scanning devices. There are 34 participating states to the Open Skies Treaty. The Air Force is required to allow over flight of USAF bases per multilateral request; to acquire, operate, and maintain the aircraft and equipment utilized during over flights of partner countries; to provide required sensor media and initial media processing; and to provide airfield servicing, logistics, and maintenance for foreign over flights of the US.

Open Skies Sensors - Mission equipment on the OC-135B includes wet film optical framing and panoramic cameras. Open Skies Sensors program addresses the requirements in the Presidential Policy Directive-15 (PPD-15), which states, "The United States shall begin budgeting no later than FY14 to upgrade the sensors on the current aircraft by replacing film-based cameras with available electro-optical sensors. (U)"

Test articles will be procured for the purpose of developmental testing and to support Treaty certification of the sensors.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver DVIS weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: OC-135 Open Skies Sensors	4.134	0.000	0.000
Description: Replace existing Open Skies aircraft wet film sensors with digital sensors.			
FY 2020 Plans: Conducted developmental test and complete development effort.			
Major Milestones: Dec-Feb 2020 Conduct Developmental Test			
FY 2021 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305145F / Arms Control Implementation	Project (Number/Name) 675063 / Digital Visual Imaging System (DVIS)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
N/A			
Accomplishments/Planned Programs Subtotals	4.134	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• APAF 05 C135BO: OC-135B	5.913	0.000	0.000	-	0.000	-	-	-	-	0.000	5.913

Remarks

D. Acquisition Strategy

The acquisition strategy is to acquire, develop, test, purchase, and install DVIS update the Open Skies Medial Processing Facility (OSMPF) through full and open competition. The contracting strategy is for a single award to one integrator (small business) for development, test, production, and installation, treaty certification support, and pre-operational support.

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305145F / <i>Arms Control Implementation</i>	Project (Number/Name) 675063 / <i>Digital Visual Imaging System (DVIS)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Open Skies Sensors</i>				
Flight Testing on Aircraft	1	2020	2	2020
Ready for Treaty Certification	3	2020	3	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305146F / <i>Defense Joint Counterintelligence Activities</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	3.845	6.858	4.890	0.000	4.890	6.862	6.868	6.859	6.202	Continuing	Continuing
671931: <i>TECH SURVEIL COUNTER MEAS EQPT</i>	-	3.845	6.858	4.890	0.000	4.890	6.862	6.868	6.859	6.202	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Technical Surveillance Countermeasures (TSCM) develops future technologies capable of thwarting advanced, hostile force technical capabilities. The technologies will provide secure environments for austere mission planning locations and theater commander centers, and will collect information for CI operations in support of DoD and AF requirements.

Cyber CI enables the Air Force Office of Special Investigations to detect and deter covert activities conducted by Foreign Intelligence Entities seeking to compromise classified or sensitive information in cyberspace. The technologies provided will provide state of the art capabilities to detect and neutralize criminal activities targeted against sensitive and classified AF and DoD information and activities.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	3.845	6.858	6.864	0.000	6.864
Current President's Budget	3.845	6.858	4.890	0.000	4.890
Total Adjustments	0.000	0.000	-1.974	0.000	-1.974
• 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	-1.974	0.000	-1.974

C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Technical Surveillance Countermeasures (TSCM)	0.371	0.378	0.382

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305146F / <i>Defense Joint Counterintelligence Activities</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Description: TSCM will develop future technologies capable of thwarting advanced, hostile force technical capabilities. They will be developed to provide secure environments to austere mission planning locations, theater commander centers, and will collect information for counterthreat operations in support of DoD and AF requirements.</p> <p>FY 2020 Plans: Continue advancement of BLUE LANCER for the collection/exploitation of evidence against a wide variety of serious offenses. Funds will also be used to develop next generation Technical Surveillance Countermeasures (TSCM) tools to defend against emerging foreign technical intelligence capabilities targeting sensitive protected information for exploitation.</p> <p>FY 2021 Plans: Continue advancement of BLUE LANCER</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increase program support.</p>			
<p>Title: Cyber Counterintelligence Pilot</p> <p>Description: N/A</p> <p>FY 2020 Plans: Continue R&D for new iterations of Cyber CI/COPPER CASTLE to address advancements in cyber domain, in order to neutralize foreign intelligence entities from stealing and exploiting sensitive DoD information.</p> <p>FY 2021 Plans: Continue R&D for new iterations for Cyber CI/COPER CASTLE</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Continue R&D for new iterations for Cyber CI/COPER CASTLE</p>	3.474	6.480	4.508
Accomplishments/Planned Programs Subtotals	3.845	6.858	4.890

D. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• O&M 35146F: <i>Defense Joint Counterintelligence Program</i>	45,925.000	57,429.000	61,430.000	-	61,430.000	64,082.000	66,005.000	67,312.000	-	Continuing	Continuing

Remarks

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305146F / <i>Defense Joint Counterintelligence Activities</i>
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E. Acquisition Strategy
Defense Joint Counterintelligence Program TSCM funds will be obligated on competitively awarded contracts. Cyber counterintelligence (CI) funding will be obligated on an existing Air Force contract with MIT/Lincoln Labs.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305146F / <i>Defense Joint Counterintelligence Activities</i>	Project (Number/Name) 671931 / <i>TECH SURVEIL COUNTER MEAS EQPT</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

<i>Develop Cyber CI/Copper Castle</i>																												
Develop Counterintelligence Equipment and Software																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305146F / <i>Defense Joint Counterintelligence Activities</i>	Project (Number/Name) 671931 / <i>TECH SURVEIL COUNTER MEAS EQPT</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Develop Cyber CI/Copper Castle</i>				
Develop Counterintelligence Equipment and Software	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305179F / <i>Integrated Broadcast Service (IBS)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	8.728	8.864	0.000	8.864	9.050	9.212	9.377	9.549	Continuing	Continuing
674779: <i>Integrated Broadcast Service (IBS)</i>	-	0.000	8.728	8.864	0.000	8.864	9.050	9.212	9.377	9.549	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2020 Integrated Broadcast Services (IBS) efforts funded in PE1203179F in FY2018 and FY2019, transferred to PE0305179F due to realignment of IBS to Major Force Program 03, Intelligence and Communication.

The IBS fulfills the warfighter's requirements for worldwide threat warning and situational awareness information with timely production and simultaneous dissemination of Intelligence, Surveillance, and Reconnaissance (ISR) derived combat information. It also provides target tracking data to support threat avoidance, targeting, force protection, and situational awareness. This information is continually refined in near real time by strategic, operational and tactical sensors.

IBS is comprised of the following:

- A Common Interactive Broadcast (CIB) on UHF (Ultra High Frequency) satellite channel using a Common Message Format (CMF) and a Military Standard (MIL-STD) Demand Assigned Multiple Access (DAMA) compliant waveform and Line of Sight (LOS) using the Wideband Networking Waveform (WNW) and Joint Tactical Terminal (JTT).
- IBS-Network Services (IBS-NS) includes two Global IBS Network Servers (GINS) and four Theater Interface Nodes (TINs) to support the geographic Combatant Commanders (COCOMs), all built to validated warfighter requirements.
- Two GINS receive data from each theater and integrate this data into a worldwide picture available to all network/broadcast users.
- Four regional TINs allow local and out-of-theater users (not directly receiving IBS broadcast) to receive the CIB information broadcast. Additionally, the TIN will receive and inject data into the CIB for producers without access to the theater CIB.

This PE funds:

- Development/upgrades of IBS (IBS-NS, CIB, and CMF)

This project will identify and implement an open, scalable system architecture that will accommodate growth as the virtual world grows and cyber operations change.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver IBS weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305179F / <i>Integrated Broadcast Service (IBS)</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	8.728	8.880	0.000	8.880
Current President's Budget	0.000	8.728	8.864	0.000	8.864
Total Adjustments	0.000	0.000	-0.016	0.000	-0.016
• 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	-0.016	0.000	-0.016

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: Development/upgrades of the Integrated Broadcast Service (IBS-NS, CIB, and CMF)</p> <p>Description: Development/upgrades of the IBS (IBS-NS, CIB, and CMF).</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continued to synchronize and integrate with DOD Intelligence Community (IC) Cloud as a potential producer/consumer; the capability will provide a long term searchable data store for IBS information. - Continued to upgrade the IBS Enterprise-level real-time and analytic views on Global and COCOM watch floors; further integrate uplink sites with associated TIN by reducing equipment overhead and streamlining data flows - Continued to upgrade volumetric increase to provide ten times performance enhancement to throughput, storage and replay to address message volume; this will increase the enterprise output. - Continued to provide resilience to the IBS CIB UHF Broadcast by utilizing the Mobile User Objective System (MUOS) Wideband Code Division Multiple Access (WCDMA) SATCOM payload supporting the receipt of IBS on 1st generation MUOS terminals - Continued to upgrade and connect the Combatant Command (COCOM) J2 CIB planning function with the COCOM J6 Integrated Waveform planning function - Continued to upgrade the CIB Planning Tool and IBS-NS capability at the COCOMs to allow automated planning to occur for active producers 	-	6.800	6.177

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305179F / <i>Integrated Broadcast Service (IBS)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<ul style="list-style-type: none"> - Continued development of the IBS Thin Client, which provides a light weight application to receive IBS information on mobile devices - Continued development of the CIB MUOS Group Integration - Many to Many, which achieves IBS Over the Air requirements on the MUOS - WCDMA payload - Continued to upgrade the P5 system health and welfare status at the COCOMs to include Alternate Path status update messages -- Continued to upgrade the resiliency of IBS to include polar coverage - Continued to upgrade and transition current classified dissemination path to new architecture and enable SCI-level dissemination of IBS data - Continued enhancement of uplink sites to handle operational surge increases - Continued to upgrade the monitoring and control tools to assist in assured dissemination tasks at COCOM uplink watch sites, development and fielding of Downlink Monitoring Element (DME) <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Will continue to synchronize and integrate with DOD Intelligence Community (IC) Cloud as a potential producer/consumer; the capability will provide a long term searchable data store for IBS information. - Will continue to upgrade the IBS Enterprise-level real-time and analytic views on Global and COCOM watch floors; further integrate uplink sites with associated TIN by reducing equipment overhead and streamlining data flows - Will continue to upgrade volumetric increase to provide ten times performance enhancement to throughput, storage and replay to address message volume; this will increase the enterprise output - Will continue to provide resilience to the IBS CIB UHF Broadcast by utilizing the Mobile User Objective System (MUOS) Wideband Code Division Multiple Access (WCDMA) SATCOM payload supporting the receipt of IBS on 1st generation MUOS terminals 			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0305179F / <i>Integrated Broadcast Service (IBS)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<ul style="list-style-type: none"> - Will continue to upgrade and connect the Combatant Command (COCOM) J2 CIB planning function with the COCOM J6 Integrated Waveform planning function - Will continue to upgrade the CIB Planning Tool and IBS-NS capability at the COCOMs to allow automated planning to occur for active producers - Will continue development of the IBS Thin Client, which provides a light weight application to receive IBS information on mobile devices - Will continue development of the CIB MUOS Group Integration - Many to Many, which achieves IBS Over the Air requirements on the MUOS - WCDMA payload - Will continue to upgrade the P5 system health and welfare status at the COCOMs to include Alternate Path status update messages -- Will continue to upgrade the resiliency of IBS to include polar coverage - Will continue to upgrade and transition current classified dissemination path to new architecture and enable SCI-level dissemination of IBS data - Will continue enhancement of uplink sites to handle operational surge increases - Will continue to upgrade the monitoring and control tools to assist in assured dissemination tasks at COCOM uplink watch sites, development and fielding of Downlink Monitoring Element (DME) <p>FY 2020 to FY 2021 Increase/Decrease Statement: Efficiencies in execution.</p>				
<p>Title: Enterprise System Engineering</p> <p>Description: Enterprise Systems Engineering/CMF Integration/CIB Integration</p> <p>FY 2020 Plans: - Continued Enterprise Systems Engineering/CMF/CIB Integration</p> <p>FY 2021 Plans:</p>		-	0.900	0.994

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305179F / <i>Integrated Broadcast Service (IBS)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
- Will continue Enterprise Systems Engineering/CMF/CIB Integration			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Minor update to test operating costs			
<i>Title:</i> Test & Evaluation <i>Description:</i> Test & Evaluation of the IBS System	-	1.028	1.693
<i>FY 2020 Plans:</i> Conducted Test and Evaluation activities for components of the IBS-NS system/subsystems			
<i>FY 2021 Plans:</i> Will conduct Test and Evaluation activities of the IBS-NS system/subsystems			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Increase activity to validate upgrades across the enterprise			
Accomplishments/Planned Programs Subtotals	-	8.728	8.864

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE 07 1203179F: <i>Integrated Broadcast Service (IBS)</i>	8.568	-	-	-	-	-	-	-	-	0.000	8.568
• SPAF 01 IBS000: <i>Integ Broadcast Service</i>	16.445	-	-	-	-	-	-	-	-	0.000	16.445
• OPAF 03 832070: <i>Intelligence Comm Equipment</i>	-	16.743	5.727	-	5.727	6.335	6.655	6.972	7.302	Continuing	Continuing

Remarks

E. Acquisition Strategy
 IBS is in the PEO Digital portfolio and executed by AFLCMC/HBG.
 IBS uses an Adaptive Life-cycle approach that provides incremental improvement and new capability in 90-day cycles.
 For contracting efforts, a Single Award IDIQ contract with multiple task orders was awarded to CACI International Inc.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305179F / <i>Integrated Broadcast Service (IBS)</i>	Project (Number/Name) 674779 / <i>Integrated Broadcast Service (IBS)</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
IBS (IBS-NS, CIB, and CMF) Development Upgrades	Various	CACI/OGA/Various : Fairfax, VA	-	-	7.068	Nov 2019		7.177	Nov 2020	-		7.177	Continuing	Continuing	-
Subtotal			-	-	7.068		7.177			-		7.177	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Interoperability and Development Testing	MIPR	JITC : Ft Hauchuca, AZ	-	-	0.500	Oct 2019		0.400	Nov 2020	-		0.400	Continuing	Continuing	-
Responsible Test Organization (RTO)	PO	46th Test Sqn : Eglin, AFB, FL	-	-	0.300			0.300	Nov 2020	-		0.300	Continuing	Continuing	-
Subtotal			-	-	0.800		0.700			-		0.700	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Program Management/ Engineering Support	C/CPFF	Credence : Warner Robins, GA	-	-	0.160	Oct 2019		0.197	Oct 2020	-		0.197	Continuing	Continuing	-
Enterprise Engineering/ CMF Integration/CIB Integration	SS/CPFF	L3 Comm IS : Greenville, TX	-	-	0.700	Nov 2019		0.790	Dec 2020	-		0.790	Continuing	Continuing	-
Subtotal			-	-	0.860		0.987			-		0.987	Continuing	Continuing	N/A

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305179F / <i>Integrated Broadcast Service (IBS)</i>	Project (Number/Name) 674779 / <i>Integrated Broadcast Service (IBS)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
IBS-NS				
Develop the monitoring and control tools to assist in assured dissemination	1	2020	1	2023
Integrate CMF updates into IBS-NS	1	2020	4	2025
Enterprise Systems Engineering of IBS (IBS-NS, CIB, and CMF)	1	2020	4	2025
Testing and Evaluation of IBS (IBS-NS, CIB, and CMF)	1	2020	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	87.618	36.389	18.660	0.000	18.660	18.319	19.813	20.167	0.000	Continuing	Continuing
674820: <i>Sensor Development</i>	-	87.618	36.389	18.660	0.000	18.660	18.319	19.813	20.167	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The U-2S Dragon Lady platform is a high-demand/low-density aircraft equipped with state-of-the-art sensor and data link systems providing mission essential Intelligence, Surveillance, and Reconnaissance (ISR) to the Combatant Commands, Joint and Combined forces, and the IC community in peacetime and wartime. The program supports core missions such as Sensitive Reconnaissance Operations (outlined in CJCSI 3250.01) in addition to other missions that include execution of CCMD OPLANs and CONPLANs, Humanitarian Assistance/Disaster Response (HADR), Counter-Insurgency (COIN) operations and third-party treaty verification/monitoring via the OLIVE HARVEST mission.

Currently, the Air Force plans to divest the U-2 in FY25. Until that time, in order to meet NDAA mandated capability and capacity, the Air Force continues to invest and modernize the U-2 program in the 2021 President's Budget. These investments will address reliability, maintainability, supportability, diminishing manufacturing sources/material shortages (DMS/MS), flight test, safety issues, and integration of capability development activities in support of the broader ISR portfolio. This continued investment in the platform ends in FY25, where the U-2 will be divested. Until that time, RDT&E efforts will address sustainment, modification, and modernization of sensors and associated mission equipment, and focus on integrating/expanding platform capabilities within the larger ISR portfolio; these efforts include (but are not limited to) ASARS 2B/C, avionics and navigation tech refresh, mission planning software and infrastructure upgrades, modernization of aircraft data links, next generation SIGINT, and developing a quick reaction capability (QRC), enabling improved collection against emerging threats and capabilities.

Additionally, the U-2 program will continue to prioritize emergent and/or experimental RDT&E efforts designed to mitigate the rapidly evolving combat environment (e.g. electromagnetic requirements) in order to maintain safety and operational relevance through current and future U-2 operating locations.

Currently, the U-2 Program provides funding for an Advanced Synthetic Aperture Radar System (ASARS) acquisition effort. This effort will design, fabricate, integrate, and demonstrate system capability enhancements for a high altitude deep look SAR system. This mitigates a Diminishing Manufacturing Supply and Material Shortages (DMSMS) issue with the current U-2 SAR sensor and processor.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	87.618	38.939	18.694	0.000	18.694
Current President's Budget	87.618	36.389	18.660	0.000	18.660
Total Adjustments	0.000	-2.550	-0.034	0.000	-0.034
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	-2.550			
• 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	-0.034	0.000	-0.034

Change Summary Explanation

FY19, FY20, FY21 numbers reflect retention of the U-2. Addresses prudent acquisition efforts to address safety-of-flight and DMSMS issues for airframe and sensors; FY19 previous/current PB reflects +17M Congressional add for EO/IR upgrade in FY19.

FY21 3600 budget reflects database error, and incorrect total. In FY21, PE 0305206F, (Airborne Reconnaissance Systems), Project 672001, (Next Generation Sensor) received \$18M in funds that were intended for PE 0305202F (Dragon U-2), Project 674820, (Sensor Development), per FY21 PBD & PDM. Upon initial distribution of funds, OSD and SAF/FM will coordinate for internal transfer of funds to the U-2 program to continue future and ongoing work for avionics and sensor efforts under PE 0305202F (Dragon U-2)."

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: U-2 Aircraft Update Block 20.1	40.498	35.839	18.110
Description: Aircraft sustainment and/or enhancement development includes activities such as, but not limited to, trade studies, analysis, preliminary system engineering, system and subsystem testing or demonstrations, sensor specification development, avionics system upgrades, emergency egress system sustainability and suitability effort, airframe Loads and Environment Spectra Survey (L/ESS) Compliance and Flight Data Recorder Installation, mission planning system migration, navigation system and stellar tracker initiatives, Open Mission Systems and Unmanned Aerospace Systems Command and Control Standard Initiative (OMS/UCI) standards compliance, GPS technical refresh, helmet and Full Pressure Suit technical refresh, and tactical data-link (L-16, IBS, IFDL, MADL, etc.) design and integration.			
FY 2020 Plans: Aircraft sustainment and/or enhancement development includes activities such as, but not limited to, trade studies, analysis, preliminary system engineering, system and subsystem testing or demonstrations, sensor specification development, avionics			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>system upgrades, emergency egress system sustainability and suitability effort, airframe Loads and Environment Spectra Survey (L/ESS) Compliance and Flight Data Recorder Installation, mission planning system software and infrastructure migration, navigation system and stellar tracker initiatives, advanced and agile systems, Open Mission Systems and Unmanned Aerospace Systems Command and Control Standard Initiative (OMS/UCI) standards compliance, GPS technical refresh, helmet and Full Pressure Suit technical refresh, quick reaction capability (QRC) development, enhanced communications/SIGINT system demo and development, and tactical data-link (L-16, IBS, IFDL, MADL, etc.) design and integration.</p> <p>FY 2021 Plans: Aircraft sustainment and/or enhancement development includes activities such as, but not limited to, trade studies, analysis, preliminary system engineering, system and subsystem testing or demonstrations, sensor specification development, avionics system upgrades, emergency egress system sustainability and suitability effort, airframe Loads and Environment Spectra Survey (L/ESS) Compliance and Flight Data Recorder Installation, mission planning system software and infrastructure migration, navigation system and stellar tracker initiatives, advanced and agile systems, Open Mission Systems and Unmanned Aerospace Systems Command and Control Standard Initiative (OMS/UCI) standards compliance, GPS technical refresh, helmet and Full Pressure Suit technical refresh, quick reaction capability (QRC) development, enhanced communications/SIGINT system demo and development, and tactical data-link (L-16, IBS, IFDL, MADL, etc.) design and integration.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Reduced sustainment and/or enhancement development.</p>				
<p>Title: U-2 Payload Update Block 20.1</p> <p>Description: Aircraft payload development supports sustainment and/or enhancement development includes activities such as, but not limited to, trade studies, analysis, preliminary system engineering, system and subsystem testing or demonstrations, sensor specification development, Advanced Synthetic Aperture Radar System (ASARS) development and test, SIGINT and multi-spectral sensor technical refresh integration and test, defensive systems, sensor range improvements, strategic and tactical data link (L-16, IBS, IFDL, MADL, etc.) design and integration.</p> <p>FY 2020 Plans: In FY20, the majority of planned RDT&E base funding will fall under that aircraft mod category. ACQ manager and HAF U-2 PEM have the authority to adjust funding between categories as mission and threat environment evolves.</p> <p>Payload mod funding will be used to integrate ASARS-2B radar onto the platform.</p> <p>FY 2021 Plans: In FY21, the majority of planned RDT&E base funding will fall under that aircraft mod category. ACQ manager and HAF U-2 PEM have the authority to adjust funding between categories as mission and threat environment evolves.</p>		47.120	0.550	0.550

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Payload mod funding will be used to integrate ASARS-2B radar onto the platform.			
Accomplishments/Planned Programs Subtotals	87.618	36.389	18.660

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>	Project (Number/Name) 674820 / <i>Sensor Development</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
ASARS Phase 1 Enhancements Design	SS/CPFF	Raytheon/Lockheed Martin : El Segundo, CA	-	-		1.700	Feb 2020	-		-		-	Continuing	Continuing	-
ASARS Phase 2 Integration & Demonstration	SS/CPFF	Raytheon/Lockheed Martin Aeronautics : El Segundo, CA	-	0.520	Mar 2019	0.550	Feb 2020	1.840	Dec 2020	-		1.840	Continuing	Continuing	-
Flight Test Support	SS/CPFF	Lockheed Martin Aeronautics : Palmdale, CA	-	-		-		-		-		-	Continuing	Continuing	-
Data Links Modernization	SS/CPFF	L3 Communications : Salt Lake City, UT	-	-		14.331	Mar 2020	2.843	Dec 2020	-		2.843	Continuing	Continuing	-
Navigation System	SS/CPFF	Lockheed Martin Aeronautics : Palmdale, CA	-	6.000	Mar 2019	-		-		-		-	Continuing	Continuing	-
Emergency Egress System Sustainability and Suitability Effort	SS/CPFF	Lockheed Martin Aeronautics : Palmdale, CA	-	16.665	Apr 2019	1.000	Feb 2020	1.010	Feb 2021	-		1.010	Continuing	Continuing	-
Avionics Technical Refresh	SS/CPFF	LMA : Palmdale, CA	-	11.234	Apr 2019	6.257	Jan 2020	5.567	Dec 2020	-		5.567	Continuing	Continuing	-
Loads and Environment Spectra Survey (L/ESS) Compliance and Flight Data Recorder Installation	SS/CPFF	LMA : Palmdale, CA	-	7.500	Jun 2019	-		-		-		-	Continuing	Continuing	-
Electro-Optical/Infrared Sensor Technical Refresh	SS/CPFF	Lockheed Martin Aeronautics : Palmdale, CA	-	24.500	Apr 2019	-		-		-		-	Continuing	Continuing	-
Mission Planning Software Technical Refresh	TBD	TBD : TBD	-	7.099	Apr 2019	6.096	Mar 2020	-		-		-	Continuing	Continuing	-
Electronic Warfare Suite (EWS) Advanced Threat	SS/CPFF	BAE : Nashua, NY	-	14.100		5.055	Apr 2020	6.000	Dec 2020	-		6.000	0.000	25.155	22.100
Subtotal			-	87.618		34.989		17.260		-		17.260	Continuing	Continuing	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>	Project (Number/Name) 674820 / <i>Sensor Development</i>
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

<i>U-2 Dragon Lady</i>	
Advanced Synthetic Aperture Radars System (ASARS)	
Data Links Modernization	
Navigation System	
Emergency Egress System Sustainability and Suitability Effort	
Avionics Tech Refresh	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305202F / <i>Dragon U-2</i>	Project (Number/Name) 674820 / <i>Sensor Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>U-2 Dragon Lady</i>				
Advanced Synthetic Aperture Radars System (ASARS)	1	2019	4	2025
Data Links Modernization	1	2019	4	2025
Navigation System	1	2019	1	2021
Emergency Egress System Sustainability and Suitability Effort	3	2019	4	2023
Avionics Tech Refresh	2	2020	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305205F / <i>Endurance Unmanned Aerial Vehicles</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	15.000	15.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
67A026: <i>MAGIC</i>	-	15.000	15.000	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 Medium Altitude Global ISR and Communications (MAGIC) project was an Air Force led technology and concept development to demonstrate the ability for a Remotely Piloted Aircraft (RPA) to stay airborne in the medium altitude structure for a multiple day duration mission with a minimum of 1,000 pounds payload capacity of intelligence, surveillance and reconnaissance sensor systems. The MAGIC concept was initiated by OSD/DDR&E in FY 2010 in response to the Combatant Commanders ranking this type of initiative as the highest priority for a Joint Concept and Technology Demonstration (JCTD). In FY 2011, the Air Force accepted this initiative as the sponsor and MAGIC was subsequently removed from consideration as a JCTD and transitioned into the Air Force as a developmental project.

The MAGIC project was intended to provide the USAF with data regarding sensor and aircraft performance parameters at a multiple day duration at medium altitude flight. The objectives laid out in the JCTD competition and selection of Aurora Flight Sciences' Orion RPA for the long endurance demonstration was managed by the 645th Aeronautical Systems Group (AESG).

In FY 2010, OSD/DDR&E (now ASD/R&E) provided \$5M of initial funding to AFRL to initiate the MAGIC project. In FY 2011, ASD/R&E provided an additional \$5M to keep the MAGIC project development moving forward. The Air Force provided \$10M of FY 2011. Congressional Adds of \$19M in FY 2012, \$50M in FY 2013 and \$20M in FY 2015, provided the program manager with the funding for the continuation of the Orion RPA development and initiation of the three phase flight testing series. Congressional adds of \$5M in FY 2016, \$50M in FY 2017 and \$40M in FY 2018, continues the Orion Unmanned Aerial System (UAS) spiral development of a long endurance UAS that meets airworthiness and cybersecurity requirements, and provides a minimum interoperability and mission capability.

Orion RPA flight test series and demonstrations were accomplished at Naval Air Weapons Station (NAWS) China Lake, CA between August 2013 and March 2015. The objectives to test/demonstrate basic air vehicle performance, expansion of the flight characteristic envelope and a multiple day sortie and integration of a nominal sensor payload, were successfully accomplished on the prototype (Block 0) Orion RPA in a controlled environment, non-representative of an operational setting. Subsequent development efforts concentrated on the validation of the Orion RPA system requirements and concept design/specifications for a follow-on air vehicle (Block 1) capable of operational deployment in the event that the Air Force chooses the Orion RPA as a quick reaction capable system for a theater of operation or a program of record. Currently, there is no validated requirement for the Orion RPA.

A Congressional Add of \$15M in FY 2019 completed flight software development, air vehicle system and ground test and begins performance characterization flight test.

A Congressional Add of \$15M in FY 2020 will continue performance characterization flight test and begin manufacturing of Air Vehicle 02.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305205F / <i>Endurance Unmanned Aerial Vehicles</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver Orion RPA capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	15.000	0.000	0.000	0.000	0.000
Current President's Budget	15.000	15.000	0.000	0.000	0.000
Total Adjustments	0.000	15.000	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	15.000			
• 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

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 67A026: *MAGIC*

Congressional Add: *MAGIC*

Congressional Add Subtotals for Project: 67A026

Congressional Add Totals for all Projects

	FY 2019	FY 2020
	15.000	15.000
	15.000	15.000
	15.000	15.000

C. Accomplishments/Planned Programs (\$ in Millions)

Congressional Add: *MAGIC*

FY 2019 Accomplishments: - Completed flight software development, air vehicle system and ground test
- Began performance characterization flight test

FY 2020 Plans: - Continues performance characterization flight test
- Begins manufacturing of Air Vehicle 02

	FY 2019	FY 2020
	15.000	15.000
Congressional Adds Subtotals	15.000	15.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305205F / <i>Endurance Unmanned Aerial Vehicles</i>	
D. Other Program Funding Summary (\$ in Millions) N/A		
Remarks		
E. Acquisition Strategy There is currently no validated requirement for the Orion RPA. The concept for the Air Force to develop a long endurance, persistent ISR capability for the Combatant Commanders was an outgrowth of a JCTD started in FY 2010. Previous development efforts included: completion of studies analysis, development of a prototype air vehicle (Block 0), bench testing of engines and other aircraft components, ground continuity testing of select avionics, flight controls, and engine components, slow and high speed ground taxiing and a full flight series testing of the Orion RPA capabilities to include a multiple day, long duration flight demonstration. Starting with a portion of the FY 2015 funds, Congressional adds have continued hardware and software engineering and development efforts, while working towards operational airworthiness and cybersecurity standards, and mission requirements for a deployable air vehicle (Block 1).		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305205F / <i>Endurance Unmanned Aerial Vehicles</i>	Project (Number/Name) 67A026 / <i>MAGIC</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : Manassas, VA	-	-		-		-		-		-	Continuing	Continuing	-
MAGIC Block 1 Initial Design and Development	SS/CPFF	Aurora : Manassas, VA	-	-		-		-		-		-	Continuing	Continuing	39.900
MAGIC Block 1 Design and Development Completion	SS/CPFF	Aurora : Manassas, VA	-	11.900	Aug 2019	11.900	Jul 2020	-		-		-	Continuing	Continuing	11.900
Subtotal			-	11.900		11.900		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
PMA	Allot	645 AESG : Dayton, OH	-	-		-		-		-		-	Continuing	Continuing	0.100
PMA, Final Block 1 Support	Allot	645 AESG : Dayton, OH	-	3.100	Mar 2020	3.100	Apr 2020	-		-		-	Continuing	Continuing	3.100
Not specified.	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Subtotal			-	3.100		3.100		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
	Project Cost Totals		-	15.000	15.000	-	-	-	Continuing	Continuing

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305205F / <i>Endurance Unmanned Aerial Vehicles</i>	Project (Number/Name) 67A026 / <i>MAGIC</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

MAGIC	
Block 1 Initial Design and Development	
MAGIC Block 1 Final	
Block 1 Design and Development Completion	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305205F / <i>Endurance Unmanned Aerial Vehicles</i>	Project (Number/Name) 67A026 / <i>MAGIC</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>MAGIC</i>				
Block 1 Initial Design and Development	1	2019	3	2021
<i>MAGIC Block 1 Final</i>				
Block 1 Design and Development Completion	3	2019	3	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305206F / <i>Airborne Reconnaissance Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	195.323	137.909	121.512	0.000	121.512	66.358	67.856	43.360	62.528	Continuing	Continuing
672001: <i>Next-Generation Sensors/ASI</i>	-	0.000	0.000	36.263	0.000	36.263	20.488	20.111	24.009	23.164	Continuing	Continuing
672002: <i>Agile ISR</i>	-	0.000	0.000	5.342	0.000	5.342	5.495	5.652	6.744	0.000	Continuing	Continuing
672003: <i>Sensors Open System Architecture</i>	-	0.000	0.000	3.891	0.000	3.891	0.745	0.766	0.914	0.000	Continuing	Continuing
674818: <i>Imaging and Targeting Support</i>	-	133.309	29.729	0.000	0.000	0.000	0.000	0.000	0.000	27.456	Continuing	Continuing
674820: <i>Sensor Development</i>	-	43.681	82.724	62.914	0.000	62.914	24.287	24.789	0.000	0.000	0.000	238.395
675092: <i>JTC/SIL MUSE</i>	-	3.454	3.521	3.574	0.000	3.574	3.647	3.713	3.779	3.848	Continuing	Continuing
675291: <i>Gorgon Stare</i>	-	10.000	15.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
676025: <i>Data Compression</i>	-	4.879	6.935	9.528	0.000	9.528	11.696	12.825	7.914	8.060	Continuing	Continuing

Note

This program, BA 7, PE 0305206F, project 674820, Advanced Synthetic Aperture Radar System (ASARS)-2C (back-end), is a new start.

In FY2021 all funding in PE 0305206, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) will be realigned to provide greater visibility and transparency of funding into the projects.

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Next-Generation Sensors were transferred to Project 672001, (Next-Generation Sensors) in order to provide greater visibility and transparency.

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Agile ISR were transferred to Project 672002, (Agile ISR) in order to provide greater visibility and transparency.

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to System Open System Architecture were transferred to Project 672003, (Sensor Open System Architecture) in order to provide greater visibility and transparency.

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related ASARS-2B were transferred to Project 674820, (Sensors Development) in order to provide greater visibility and transparency.

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674820, (Sensor Development) funds were transferred from PE 0604257F (Advanced Technology and Sensors), Project 645148, (Common Airborne Sense and Avoid), in order to align funding with Air Force project priorities and requirements.

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 672001, (Next Generation Sensor) received \$18M in funds that were intended for PE 0305202F (Dragon U-2), Project 674820, (Sensor Development), per FY21 PBD. Funds will be executed against U-2 avionics and sensor efforts under PE 0305202F (Dragon U-2).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305206F / <i>Airborne Reconnaissance Systems</i>	

A. Mission Description and Budget Item Justification

This program funds multi-domain, multi-Intelligence (multi-INT) research, development, test and evaluation (RDT&E) efforts in support of the National Defense Strategy (NDS) and 2018 DoD Artificial Intelligence Strategy, as applied by the Air Force in the Next Generation ISR Dominance Flight Plan. Specifically, Program 0305206F provides authorized and appropriated funding to multi-INT RDT&E efforts for utilization on airborne platforms. This program traditionally provides a venue for integration of technologies matured in both the Advanced Technology and Sensors(0604257F) and Airborne SIGINT Enterprise (0304260F) program elements.

According to the 2018 NDS, "we are facing an increasingly complex security environment as defined by ... adversaries in every operating domain." Additionally, to ensure (operations) sustainment while under persistent multi-domain attack, the Air Force has applied the NDS in the Next Generation ISR Dominance Flight Plan. The future ISR portfolio will "consist of a multi-domain, multi-intelligence," systems to "remain confident across the entire conflict spectrum." The Airborne Reconnaissance PE is integral to developing multi-domain, multi-INT systems capable of sustaining warfighter decisive advantage through all ranges of military operations, up to highly contested environments (HCE).

The Airborne Reconnaissance System (ARS) Program matures, develops, demonstrates, and rapidly transitions: next-generation, persistent, wide area surveillance and common imagery reconnaissance sensors, and both active and passive capabilities. ARS includes sensor data processing for multiple airborne platforms, in addition to sensor products aiding assisted target recognition algorithms and other artificial intelligence activities (e.g., geolocation models, sensor based exploitation tools, sensor networking capabilities). ARS provides for modeling & simulation, training and multi-INT systems engineering. This program also coordinates common collection, processing, and dissemination solutions for near-real-time multi-domain ISR development.

The ARS Program includes the following efforts: Next Generation Sensors efforts lead advancements in multi-INT, platform agnostic capability. The Next Generation Sensors (NGS) project is developing, demonstrating, and maturing Intelligence, Surveillance, and Reconnaissance (ISR) sensor suites in a platform agnostic environment. Sensor suites will include open architectures to further enable platform mobility and tech refresh as well as Artificial Intelligence (AI) algorithms to enable assisted target detection and identification. Efforts include but are not limited to, Triple Raven multi-GEOINT High Altitude Advanced Technology Demonstration, multi-INT Common Open Architecture Reconnaissance Programs Standard (MI-COARPS), and Assisted Target Recognition for ISR (ATRI). Agile ISR includes Detection Removal and Characterization Operations developing a robust image quality improvement capability for airborne synthetic aperture radar (SAR) products. Sensors Open Systems Architecture (SOSA) coordinates advanced technologies, and open architecture development for multi-INT sensor modalities. The program includes development of a family of government owned, open, platform agnostic pods - the AgilePod Family. Sensor Development includes Advanced Synthetic Aperture Radar System (ASARS) front end antenna array and receiver exciter advancements (ASARS-2B) and back end processor advancements (ASARS-2C). ASARS-2B follow on RDT&E extends range, enhances Ground Moving Target Indicator (GMTI) and Synthetic Aperture Radar (SAR) performance and introduces maritime capability while laying in the framework for future use of open architectures. ASARS-2C effort extends the functionality and performance of ASARS-2B through the addition of advanced radar capabilities by enabling use of third party vendor solutions and multi-platform integration. ASARS is the radar solution for Next Generation Sensors efforts. JTC supports ISR Training Systems Integration Laboratories. Gorgon Stare Wide Area Motion Imagery research, development, test and evaluation. Data Compression efforts are led by Reduction of Data Using Compression Enhancement (RDUCE). RDUCE develops data compression algorithms, addressing current and future data dissemination systems' bandwidth limitations. Consistent with NDS, algorithms are multi-INT sensor agnostic that are submitted for formal adoption by the DoD-Intelligence Community (IC) Joint Enterprise Standards Committee (JESC) GEOINT standards groups.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305206F / <i>Airborne Reconnaissance Systems</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	195.334	122.909	73.719	0.000	73.719
Current President's Budget	195.323	137.909	121.512	0.000	121.512
Total Adjustments	-0.011	15.000	47.793	0.000	47.793
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	15.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.011	0.000	47.793	0.000	47.793

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 674818: *Imaging and Targeting Support*

Congressional Add: *Sensor Open System Architecture (SOSA)*

Congressional Add Subtotals for Project: 674818

Project: 675291: *Gorgon Stare*

Congressional Add: *Gorgon Stare*

Congressional Add Subtotals for Project: 675291

Congressional Add Totals for all Projects

	FY 2019	FY 2020
	10.000	0.000
	10.000	0.000
	10.000	15.000
	10.000	15.000
	20.000	15.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems				Project (Number/Name) 672001 / Next-Generation Sensors/ASI			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672001: <i>Next-Generation Sensors/ASI</i>	-	0.000	0.000	36.263	0.000	36.263	20.488	20.111	24.009	23.164	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Next Generation Sensors were transferred to Project 672001, (Next Generation Sensors) in order to provide greater visibility and transparency. This project is not a new start.

A. Mission Description and Budget Item Justification

The Next Generation Sensors (NGS) project is developing, demonstrating, and maturing Intelligence, Surveillance, and Reconnaissance (ISR) sensor suites in a platform agnostic environment. Designated as a Middle Tier Acquisition, Section 804 effort, these sensor suites will include open architectures to further enable platform mobility and tech refresh as well as Artificial Intelligence (AI) algorithms to enable assisted target detection and identification. Efforts include but are not limited to, Triple Raven multi-GEOINT High Altitude Advanced Technology Demonstration, multi-INT Common Open Architecture Reconnaissance Program Standard (MI-COARPS), Assisted Target Recognition for ISR (ATRI), and radar open architecture development in support of ASARS-2B/2C.

NGS program efforts are set by capabilities gaps within the Challenging Targets Initial Capabilities Document and as approved by the Capabilities Decision Memorandum (Signed Jan 2019). These requirements have been further verified, modeled, and developed through the Airborne Sensors for ISR (ASI) Analysis of Alternatives (AoA) and the Triple Raven ATD, which was approved by the Advanced Technology Council (ATC) in FY19.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Next Generation Sensors	0.000	0.000	36.263	-	36.263
Description: Mold current and future ISR into a platform agnostic, non-proprietary, autonomous multi-INT cross cueing solution that is designed based on mission requirements. Sensors will have to penetrate up to highly contested domains and survive to operate. This project will also increase interoperability by developing common standards and interfaces for mission and sensor systems.					
FY 2020 Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 672001 / Next-Generation Sensors/ASI

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A.					
<p>FY 2021 Base Plans:</p> <ul style="list-style-type: none"> - Will transition projects from AFRL and Imaging & Targeting Support into programs of record to include new technologies in sensors and ISR technologies. - Triple Raven Advanced Technology Demonstration - Execute prototyping and requirements development for next generation platform agnostic, high altitude, non-obscured long-standoff telescope, dual-band EO/IR and multi-mode LiDAR prototype sensors. - Design and develop government owned, standards compliant sensor pods. - Develop specific Artificial Intelligence Target Recognition Algorithms for multi-mode, ISR platforms. Develop synthetic data sets to increase algorithm effectiveness. Maintain database of labeled data for assisted target recognition (ATR) community. Develop multi-INT Open Architecture processors and standards. - Mature open architectures for ISR systems including cybersecurity analysis, industry standardization, and open architecture demonstrations. - Begin integration of the dual-band EO/IR system, open architecture ISR standards, and an open architecture aircraft pod. <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased because PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Next-Generation Sensors were transferred to Project 672001, (Next-Generation Sensor) in order to provide greater visibility and transparency; and increased sensor development requirements for restoral of U-2 up to and through FY25.</p>					
Accomplishments/Planned Programs Subtotals	0.000	0.000	36.263	-	36.263

<p>C. Other Program Funding Summary (\$ in Millions)</p> <p>N/A</p> <p>Remarks</p> <p>In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 672001, (Next Generation Sensor) received \$18M in funds that were intended for PE 0305202F (Dragon U-2), Project 674820, (Sensor Development), per FY21 PBD. Funds will be executed against U-2 avionics and sensor efforts under PE 0305202F (Dragon U-2).</p>

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / <i>Airborne Reconnaissance Systems</i>	Project (Number/Name) 672001 / <i>Next-Generation Sensors/ASI</i>

D. Acquisition Strategy

Next Generation Sensors is currently executing under a Section 804, Middle Tier Acquisition authority and is currently in the Rapid Prototyping (Alpha) phase. Next Generation Sensors (Developed from and formerly known as ASI) is also utilizing Imaging and Targeting Support (I&TS) and other ISR programs to execute rapid Technology Maturation and Risk Reduction activities. Next Generation Sensors is leveraging Advanced Technology Demonstration authority to mature and demonstrate cutting-edge sensor technology. This program has established a forum consisting of multiple Other Government Agencies (OGAs), end users, and MAJCOMs to ensure that the program deliverables are answering identified warfighter needs, and have a clear transition path.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 672001 / Next-Generation Sensors/ASI
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Triple Raven ATD	SS/CPFF	Collins : Westford, MA	-	-		-		22.988	Nov 2020	-		22.988	Continuing	Continuing	-
Government-owned Podded Solution	Various	Various : TBD	-	-		-		4.000	Nov 2020	-		4.000	Continuing	Continuing	-
ATRI	Various	Various : TBD	-	-		-		2.000	Dec 2020	-		2.000	Continuing	Continuing	-
Open Architecture	Various	Various : TBD	-	-		-		2.000	Nov 2020	-		2.000	Continuing	Continuing	-
I&TS Technology Integration Efforts	Various	Various : TBD	-	-		-		2.000	Dec 2020	-		2.000	Continuing	Continuing	-
Subtotal			-	-		-		32.988		-		32.988	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMA: Other Gov't costs	Various	Not specified. : TBD	-	-		-		3.275	Oct 2020	-		3.275	Continuing	Continuing	-
Subtotal			-	-		-		3.275		-		3.275	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-	0.000	36.263	-	36.263	Continuing	Continuing	N/A

Remarks
 In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Next Generation Sensors were transferred to Project 672001, (Next Generation Sensor) in order to provide greater visibility and transparency.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 672001 / Next-Generation Sensors/ASI

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Next Generation Sensors	
Triple Raven ATD	
- CHASM Task Order #1 (NGS Telescope)	
- CHASM Task Order #2 (NGS LIDAR)	
- CHASM Task Order #3 (Sensor Integration)	
- CHASM Task Order #4 (EO/IR & LIDAR Demo)	
AgilePod	
ATRI	
Open Architecture	
- MITRE (MBSE & Studies)	
- MIT/LL (MI-COARPs)	
GTRI (Cybersecurity)	
I&TS Technology Integration Efforts	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / <i>Airborne Reconnaissance Systems</i>	Project (Number/Name) 672001 / <i>Next-Generation Sensors/ASI</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Next Generation Sensors				
Triple Raven ATD	1	2021	4	2024
- CHASM Task Order #1 (NGS Telescope)	1	2021	3	2022
- CHASM Task Order #2 (NGS LIDAR)	1	2021	4	2021
- CHASM Task Order #3 (Sensor Integration)	1	2021	3	2023
- CHASM Task Order #4 (EO/IR & LIDAR Demo)	1	2021	3	2022
AgilePod	1	2021	4	2025
ATRI	1	2021	4	2025
Open Architecture	1	2021	4	2025
- MITRE (MBSE & Studies)	1	2021	4	2022
- MIT/LL (MI-COARPs)	1	2021	4	2021
GTRI (Cybersecurity)	1	2021	4	2021
I&TS Technology Integration Efforts	1	2021	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 672002 / Agile ISR
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672002: Agile ISR	-	0.000	0.000	5.342	0.000	5.342	5.495	5.652	6.744	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Agile ISR were transferred to Project 672002, (Agile ISR) in order to provide greater visibility and transparency. This project is not a new start.

A. Mission Description and Budget Item Justification

The Agile ISR BPAC matures, develops, and deploys projects started under the Imaging & Targeting Support (I&TS) program in support of current and future platform agnostic, non-proprietary, autonomous, multi-INT cross cueing ISR solutions based on Advanced Battle Management System (ABMS) and Joint All-domain Command and Control (JADC2) mission requirements. This includes, but is not limited to, Detection Removal and Characterization Operations (DRACO), support and development of AgilePod, and other projects. Portions of the developmental efforts under Agile ISR are classified.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Title: DRACO</p> <p>Description: Detection Removal and Characterization Operations (DRACO) is a robust Image Quality improvement capability for Airborne Synthetic Aperture Radar (SAR) products. The software resides in multiple locations on the ground supporting the Air Force, Army, Navy and other customers. DRACO efforts include but are not limited to development, design, fabrication, integration, demonstration, test, and transition of image quality improvement capabilities. This project originated under the I&TS program. All other details are classified.</p> <p>FY 2020 Plans: N/A</p> <p>FY 2021 Base Plans:</p> <ul style="list-style-type: none"> - Will mature, develop and deploy DRACO capabilities in order to give the warfighter a more efficient and effective tool. - Will complete DRACO 5.0 efforts and initiating DRACO 6.0. - Will increase interoperability by developing common standards and interfaces. 	0.000	0.000	5.342	-	5.342

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 672002 / Agile ISR

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Will increase access and expand user base.					
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding increased because PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Agile ISR were transferred to Project 672002, (Agile ISR) in order to provide greater visibility and transparency.					
Accomplishments/Planned Programs Subtotals	0.000	0.000	5.342	-	5.342

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

Capabilities will be developed and integrated onto various platforms using an incremental acquisition approach. The projects will be executed and contracted with appropriate vendor(s) to deliver capability while driving competition where possible.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 672002 / Agile ISR
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DRACO	SS/CPFF	Lockheed Martin : King of Prussia, PA	-	0.000		0.000		5.312	Mar 2021	-		5.312	Continuing	Continuing	-
Subtotal			-	0.000		0.000		5.312		-		5.312	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	Various	Not specified. : TBD	-	-		-		0.030	Oct 2020	-		0.030	Continuing	Continuing	-
Subtotal			-	-		-		0.030		-		0.030	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		-	0.000	0.000	5.342	-	5.342	Continuing	Continuing	N/A

Remarks
 In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to Agile ISR were transferred to Project 672002, (Agile ISR) in order to provide greater visibility and transparency.

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 672002 / Agile ISR

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Agile ISR				
DRACO 5.0	1	2021	3	2021
DRACO 6.0	3	2021	1	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems				Project (Number/Name) 672003 / Sensors Open System Architecture			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672003: Sensors Open System Architecture	-	0.000	0.000	3.891	0.000	3.891	0.745	0.766	0.914	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to System Open System Architecture were transferred to Project 672003, (Sensor Open System Architecture) in order to provide greater visibility and transparency. This project is not a new start.

A. Mission Description and Budget Item Justification

The Sensors Open System Architecture (SOSA) project coordinates the advanced technologies open architecture development for modalities of sensors, such as: RADAR, SIGINT, EW, Communications and EO/IR (development of standards and open architecture interfaces for Software, Hardware, and Electrical/Mechanical interfaces) in support of multiple airborne reconnaissance platforms, both manned and unmanned. Its objectives are to develop, demonstrate, and rapidly upgrade/iterate 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 through development of abstraction interfaces for sense (such as RADAR, ADS-B, TCAS, Next Generation Sensors, ASIP, and ASARS) and avoid logic.

This project also coordinates the development of common collection, processing, and dissemination solutions for near-real time intelligence, surveillance, and reconnaissance. The SOSA project also increases interoperability by developing common standards and interfaces, as well as leveraging industry participation toward creating COTS solutions such as common C4ISR processor, AgilePOD interfaces, Red/Black separation on the sensor, data at rest, and security/AT with industry partners and other DoD services.

This project is designed to support development of the Next Generation Sensors program, as well as other AFLCMC/WI emerging and program of record needs. As part of the development effort SOSA will be funding and supporting first article development of key open architecture solutions to validate/verify open specifications as well as to prime the COTS vendors development strategies. The SOSA effort has stood up AFLCMC SIL (System Integration Laboratory) for Sensors Open System Architectures in order to establish a strong conformance/compliance program with industry partners for COTS products, in partnership with other DoD services.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Sensors Open System Architecture	-	0.000	3.891	-	3.891

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 672003 / Sensors Open System Architecture
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Description: The Sensors Open System Architecture (SOSA) project coordinates the advanced technologies open architecture development for modalities of sensors, such as: RADAR, SIGINT, EW, Communications and EO/IR (development of standards and open architecture interfaces for Software, Hardware, and Electrical/ Mechanical interfaces) in support of multiple airborne reconnaissance platforms, both manned and unmanned.</p> <p>FY 2020 Plans: N/A</p> <p>FY 2021 Base Plans:</p> <ul style="list-style-type: none"> - Will support of RPA Sense and Avoid Technology (C-ABSAA Technology Maturation & Risk Reduction Phase) - Will develop prototype of SOSA SAR/SIGINT capability - Will develop AgilePod internal electrical/mechanical interfaces - Will work with other Services in producing SOSA V 1.0 snapshots based on current set of USAF needs - Will support EO/IR article prototyping - Will prepare and host industry and DOD partner interoperability demonstrations <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased because PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to System Open System Architecture were transferred to Project 672003, (Sensor Open System Architecture) in order to provide greater visibility and transparency.</p>					
Accomplishments/Planned Programs Subtotals	-	0.000	3.891	-	3.891

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

Coalition of Industry, DoD, and OGA partnerships to develop Open Architecture specifications to support ACC and AFLCMC requirements for next generation sensors. At key specification milestones such as completion of incremental updates to SOSA a set of prototype activities will be generated to validate/verify solution, reduce risk to adopting programs and prime the industry investments.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 672003 / Sensors Open System Architecture
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Sensors Open System Architecture Development	Various	Not specified. : TBD	-	-		-		2.891	Nov 2020	-		2.891	Continuing	Continuing	-
Subtotal			-	-		-		2.891		-		2.891	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Program Management Administration (PMA)	Various	Not specified. : TBD	-	-		-		1.000	Mar 2021	-		1.000	Continuing	Continuing	-
Subtotal			-	-		-		1.000		-		1.000	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	-	0.000	3.891	-	3.891	Continuing	Continuing	N/A

Remarks
 In FY2021, PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to System Open System Architecture were transferred to Project 672003, (Sensor Open System Architecture) in order to provide greater visibility and transparency.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 672003 / Sensors Open System Architecture

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Sensors Open System Architecture	
Technical Standard Publications (Semi-Annual Deliveries)	
SOSA Demonstration	
SIL Activites	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / <i>Airborne Reconnaissance Systems</i>	Project (Number/Name) 672003 / <i>Sensors Open System Architecture</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Sensors Open System Architecture</i>				
Technical Standard Publications (Semi-Annual Deliveries)	1	2021	4	2025
SOSA Demonstration	1	2021	4	2025
SIL Activites	1	2021	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems			Project (Number/Name) 674818 / Imaging and Targeting Support				
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
674818: <i>Imaging and Targeting Support</i>	-	133.309	29.729	0.000	0.000	0.000	0.000	0.000	0.000	27.456	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2021, all funds in PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to NGS, Agile ISR, SOSA, and ASARS were transferred to Project 672001 (Next-Generation Sensors/ASI), Project 672002, (Agile ISR), Project 672003 (Sensors Open System Architecture), and Project 674820 (Sensor Development) in order to provide greater visibility and transparency.

A. Mission Description and Budget Item Justification

The I&TS purpose 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 but are not limited to: Radar, Electro-Optical/Infrared, hyperspectral imagery (HSI), Lidar/Ladar, and other technologies to improve measurement and signature intelligence, polarimetric imaging, ground moving target indicator (GMTI), maritime search/track, foliage penetration, 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, as supported by the Challenging Targets Initial Capabilities Document and set by the GCWG, for the goal of building a comprehensive GEOINT capability for the USAF. On an annual basis, developmental technologies are reviewed against warfighter capabilities and requirements based on strategic roadmaps and the results of the ASI AoA 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.

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 capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 674818 / Imaging and Targeting Support

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Title: Agile ISR</p> <p>Description: Mold current and future ISR into a platform agnostic, non-proprietary, autonomous Multi-INT fusion and cross cuing solution that is designed based on mission requirements. Sensors will have to penetrate up to highly contested domains and survive to operate. This project will also increase interoperability by developing common standards and interfaces for mission and sensor systems. Through the AoA execution, the solution set will improve requirements and the development path for High Altitude SAR (ASARS), Next Generation Sensors, DRACO, SOSA, as well as other GCWG approved projects.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continue Section 804 efforts and execute various ATD efforts including, but not limited to Triple Raven which supports Tech Maturation and Risk Reduction (TMRR), - M&S to advance current and future ISR into a platform agnostic, non-proprietary, autonomous Multi-INT fusion and cross cuing solution that is designed based on mission requirements. - Includes but not limited to Next Generation Sensors, Detection Removal and Characterization Operation (DRACO), Sensor Open System Architecture (SOSA), and other GCWG approved projects. - Continue working interoperability by developing common standards and interfaces. - Continue support of C-ABSAA Technology Maturation and risk reduction phase - Continue first article development of SOSA, SAR/SIGINT prototype - Continue support development of AgilePOD internal electrical/mechanical interfaces - Continue further work with other Services in producing SOSA V 1.0 snapshots based on current set of USAF needs. <p>FY 2021 Base Plans:</p> <ul style="list-style-type: none"> - Agile ISR, Next Generation Sensors and Sensors Open System Architecture will be transferred to individual Projects within PE0305206F in order to provide greater visibility and transparency into these activities. These transferred efforts will not be new starts. The new Projects are: <ul style="list-style-type: none"> -- Next Generation Sensors, Project 672001 -- Agile ISR, Project 672002 -- Sensors Open System Architecture, Project 672003 <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p> <p>Funding decreased because PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to NGS, Agile ISR, and SOSA were transferred to Project 672001 (Next-</p>	109.390	6.404	0.000	-	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 674818 / Imaging and Targeting Support
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Generation Sensors/ASI), Project 672002, (Agile ISR) and Project 672003 (Sensors Open System Architecture) in order to provide greater visibility and transparency.					
Title: ASARS-2B	13.919	23.325	0.000	-	0.000
Description: Develop/design/fabricate/integrate/demonstrate/test and field deep look high altitude ISR radar capabilities.					
FY 2020 Plans: - Continue to develop/design/fabricate/integrate/demonstrate/test and field deep look high altitude ISR radar capabilities.					
FY 2021 Base Plans: - ASARS efforts realigned to Project 674820 Sensor Development for consolidation and clarity of reporting.					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased because PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related ASARS-2B were transferred to Project 674820, (Sensors Development) in order to provide greater visibility and transparency.					
Accomplishments/Planned Programs Subtotals	123.309	29.729	0.000	-	0.000

	FY 2019	FY 2020
Congressional Add: Sensor Open System Architecture (SOSA)	10.000	0.000
FY 2019 Accomplishments: - Continue work with other Services in producing SOSA snapshots based on current set of USAF needs.		
FY 2020 Plans: N/A		
Congressional Adds Subtotals	10.000	0.000

C. Other Program Funding Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• RDTE 07 0305202F: <i>Dragon U-2</i>	87.618	36.389	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 674818 / Imaging and Targeting Support

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

A portion of the funding within the U-2 RDT&E line will be used to advance ASARS development/design/fabrication/integration/demonstration/testing and fielding deep look high altitude ISR radar capabilities.

D. Acquisition Strategy

Imaging and Targeting Support and Agile ISR 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.

ASARS / High Altitude SAR technology maturation is conducted by Air Force Life Cycle Management Center/Intelligence, Surveillance, and Reconnaissance and Special Operations Forces (AFLCMC/WIN), in conjunction and cooperation with AFLCMC/HBG (Robins AFB) for 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.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
3600 / 7				PE 0305206F / Airborne Reconnaissance Systems				674818 / Imaging and Targeting Support								
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
SOSA	Various	Various : TBD	-	13.523	Feb 2019	2.683	Feb 2020	-		-		-	0.000	16.206	-	
DRACO	SS/CPFF	Lockheed Martin : King of Prussia, PA	-	2.849	Nov 2018	3.721	Mar 2020	-		-		-	0.000	6.570	-	
ASARS-2B EMD	SS/CPFF	Raytheon : El Segundo, CA	-	13.481	Feb 2019	17.831	Feb 2020	-		-		-	0.000	31.312	170.430	
Triple Raven ATD	SS/CPFF	Collins : Westford, MS	-	67.092	Mar 2019	0.000		-		-		-	0.000	67.092	-	
Aether Spy	Various	Various : TBD	-	33.000	Sep 2019	-		-		-		-	0.000	33.000	-	
Subtotal			-	129.945		24.235		-		-		-	0.000	154.180	N/A	
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Test and Evaluation	MIPR	Not specified. : TBD	-	-		0.130	Nov 2019	-		-		-	0.000	0.130	-	
Subtotal			-	-		0.130		-		-		-	0.000	0.130	N/A	
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
PMA: Other Govt Cost	SS/T&M	Various : Dayton, OH	-	3.364	Mar 2020	5.364	Jan 2020	-		-		-	0.000	8.728	-	
Subtotal			-	3.364		5.364		-		-		-	0.000	8.728	N/A	
Project Cost Totals			-	133.309		29.729		-		-		-	0.000	163.038	N/A	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force							Date: February 2020			
Appropriation/Budget Activity 3600 / 7			R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems			Project (Number/Name) 674818 / Imaging and Targeting Support				
	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Remarks										
<p>In FY2019, The 267 line was rescinded -\$26M amount in FY19 of the FY20 HR1158 Appropriations Bill and is not reflected in this document. The rescission was applied towards the Aether Spy effort, but still listed due to technical error from PRCP transfer.</p> <p>In FY2021, all funds in PE 0305206F, (Airborne Reconnaissance Systems), Project 674818, (Imaging and Targeting Support) efforts related to NGS, Agile ISR, SOSA, and ASARS were transferred to Project 672001 (Next-Generation Sensors/ASI), Project 672002, (Agile ISR), Project 672003 (Sensors Open System Architecture), and Project 674820 (Sensor Development) in order to provide greater visibility and transparency.</p>										

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 674818 / Imaging and Targeting Support

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Imaging and Targeting Support				
Advance Airborne PCPAD Development	1	2019	4	2020
- SOSA	1	2019	4	2020
- DRACO	2	2019	4	2020
ASARS-2B				
ASARS-2B EMD	2	2019	4	2020
- NRE Contract Award (Feb 2019)	2	2019	2	2019
- PDR (Dec 2019)	1	2020	1	2020
- CDR (Apr 2020)	3	2020	3	2020
Next Generation Sensors				
- Triple Raven ATD	1	2019	4	2020
- Aether Spy	1	2019	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 674820 / Sensor Development
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
674820: <i>Sensor Development</i>	-	43.681	82.724	62.914	0.000	62.914	24.287	24.789	0.000	0.000	0.000	238.395
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 0305206F, project 674820, Advanced Synthetic Aperture Radar System (ASARS)-2C (back-end), is a new start.

A. Mission Description and Budget Item Justification

The Sensors Development project increases the range and collection capability, interoperability and processing of the Advanced Synthetic Aperture Radar Systems (ASARS) through design, development, testing, and fielding efforts. The Sensors Development efforts advance the capability of ASARS for U-2 employment, and is a critical component for the multi-INT Next Generation Sensors, project 672001, efforts. ASARS-2B (front-end) & ASARS-2C (back-end) efforts provide critical advancements and risk reduction in SAR/Moving Target Indication capability to be implemented in the future multi-INT, platform agnostic capability that Next Generation Sensors will provide.

The ASARS effort is a fifth generation, deep-look, high-altitude, ISR radar that is the foundation for the radar component of the Next Generation Sensors (NGS) family of systems as outlined in the AFROC approved ASARS-2C draft Capabilities Development Document (CDD). ASARS-2B (front-end) is the antenna and receiver exciter replacement. The ASARS-2C (back end) data processing efforts extend the ASARS-2B (front-end) radar capability using open architecture data processing and multi-platform integration. Open architecture improves performance and lowers cost by facilitating and enabling qualified third party software vendors to incorporate future multi-ISR capability to advance interoperability across joint operations. ASARS increases current capability and addresses National Defense Strategy Key Operational Problems and ISR Dominance flight plan.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Advanced Synthetic Aperture Radar System (ASARS)-2B (front-end)	43.681	82.724	60.914	-	60.914
Description: Develop, design, fabricate, integrate, test and field deep look high altitude ISR radar capabilities.					
FY 2020 Plans: - Develop, design, fabricate, integrate, test and field deep look high altitude ISR radar capabilities.					
FY 2021 Base Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 674820 / Sensor Development

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Will continue to develop, design, fabricate, integrate, test and field deep look high altitude ISR radar capabilities. FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to funding alignment with Air Force priorities and some related efforts funded through Project 672001, (Next-Generation Sensors).					
Title: Advanced Synthetic Aperture Radar System (ASARS)-2C (back-end) Description: Integrate open radar processing architectures for enhanced RF capabilities and third party mode development FY 2020 Plans: N/A FY 2021 Base Plans: - Will mature standards and technologies, and develop acquisition strategy for start in FY2021. FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to start of ASARS-2C (back-end) efforts.	0.000	0.000	2.000	-	2.000
Accomplishments/Planned Programs Subtotals	43.681	82.724	62.914	-	62.914

C. Other Program Funding Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• RDTE 07 0305202F: <i>Dragon U-2 (JMIP)</i>	87.618	36.389	18.660	-	18.660	18.319	19.813	20.167	0.000	Continuing	Continuing
• APAF 06 0305206F: Airborne Reconnaissance Systems	0.000	0.000	48.138	-	48.138	72.268	28.071	15.860	12.593	0.000	176.930

Remarks
A portion of the funding within the U-2 RDT&E line will be used to advance ASARS development / design/fabrication/integration/demonstration/testing and fielding deep look high altitude ISR radar capabilities.
In FY19/FY20, a portion of funding within project 674818 (Imaging and Targeting Support) is being used to advance ASARS-2B (front-end) efforts.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / <i>Airborne Reconnaissance Systems</i>	Project (Number/Name) 674820 / <i>Sensor Development</i>

D. Acquisition Strategy

ASARS / High Altitude SAR technology maturation is conducted by Air Force Life Cycle Management Center/Intelligence, Surveillance, and Reconnaissance and Special Operations Forces (AFLCMC/WIN), in conjunction and cooperation with AFLCMC/HBG (Robins AFB) for test support. Acquisition strategy is to maximize commercial and national development efforts and investment through multiple contracting methods, including but not limited to the use of engineering change proposals to modify existing contracts and new contracts that were awarded both competitively or on a sole source basis.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 674820 / Sensor Development
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ASARS-2B (front-end)	SS/CPPIF	Raytheon : El Segundo, CA	-	43.681	Feb 2019	82.724	Feb 2020	57.005	Nov 2020	-		57.005	Continuing	Continuing	-
ASARS-2C (back-end)	C/Various	Unknown : TBD	-	-		-		2.000	Jul 2021	-		2.000	Continuing	Continuing	-
Subtotal			-	43.681		82.724		59.005		-		59.005	Continuing	Continuing	N/A

Remarks
ASARS-2C, due to the competitive contracting method, it is unknown at this point who the winning contractor will be.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Not specified.	Various	Not specified. : TBD	-	-		-		3.909	Jan 2021	-		3.909	Continuing	Continuing	-
Subtotal			-	-		-		3.909		-		3.909	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	43.681	82.724	62.914	-	62.914	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 674820 / Sensor Development

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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																												
ASARS-2B EMD																												
-- NRE Contract Award (Feb 2019)																												
-- PDR (Dec 2019)																												
-- CDR (Apr 2020)																												
-- Testing (Combined Developmental/Operational)																												
ASARS-2C																												
ASARS-2C																												
-- Tech Maturation																												
-- NRE Contract Award (Dec 2021)																												
-- Testing (Combined Developmental/Operational)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 674820 / Sensor Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
ASARS-2B				
ASARS-2B EMD	2	2019	2	2023
-- NRE Contract Award (Feb 2019)	2	2019	2	2019
-- PDR (Dec 2019)	1	2020	1	2020
-- CDR (Apr 2020)	3	2020	3	2020
-- Testing (Combined Developmental/Operational)	3	2022	2	2023
ASARS-2C				
ASARS-2C	3	2021	4	2025
-- Tech Maturation	3	2021	3	2022
-- NRE Contract Award (Dec 2021)	1	2022	1	2022
-- Testing (Combined Developmental/Operational)	2	2024	1	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems			Project (Number/Name) 675092 / JTC/SIL MUSE				
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675092: JTC/SIL MUSE	-	3.454	3.521	3.574	0.000	3.574	3.647	3.713	3.779	3.848	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Multiple Unified Simulation Environment (MUSE) is the DoD flight simulation/training system of choice for many Unmanned Aircraft Systems (UAS), RPA, and airborne platforms. MUSE is also known as the Air Force Synthetic Environment for Reconnaissance and Surveillance (AFSERS) in its Air Force training application. The MUSE/AFSERS is a software suite that simulates UAS/RPA (e.g., MQ-9) systems, tailored air vehicle & data links, and visualization systems used for payload product outputs-including Full Motion Video (FMV), Fixed Frame Imagery (FFI), Ground Moving Target Indicator (GMTI) data, and Link 16 (J2.2 and J3.5) tracking messages. Outputs are compliant with applicable DoD standards and are continually tested against actual ground data processors to ensure DoD systems interoperability.

The Services and Combatant Commanders have a requirement for training with a system that provides a real-time simulation environment containing multiple domain systems that can be integrated with larger force-on-force simulations. The MUSE creates a realistic operational environment supporting military utility assessment, architecture, and employment concept development. Training, Tactics, Techniques and Procedures (TTP) refinement, practice Processing, Exploitation and Dissemination (PED) of multi-domain information. Conduct emerging concepts experimentation, optimizing Command, Control, Communications, and Computing (C4) with warfighting exercises and experiments. MUSE is the preferred UAS/RPA simulation system used by US Combatant Commanders and Joint Services to support command and battle staff C4 training.

The MUSE also creates a realistic operational environment that supports: an embedded training capability for new UAS/RPA system Program Managers; tools to minimize acquisition and life cycle cost and schedule impacts. MUSE conducts emerging concepts experimentation, future systems exploration, systems integration, and technology insertion; applications for Joint and Service-specific warfighting exercises; and C4 training optimization.

MUSE is currently used by all Services and most unified commands simulating MQ-1, MQ-9, RQ-4, MQ-1C, M/RQ-5, RQ-7, national and commercial satellite systems, P-3, E-8 and the U-2 during warfighting exercises. The AFSERS provides National Imagery Transmission Format (NITF) information for simulated data collection systems, supporting PED training. The MUSE is also used as a mission rehearsal tool for current, on-going military combat operations. Most of the MUSE/AFSERS software suite components are also used in multiple airborne platform system training devices. Including the MQ-9 [Medium Altitude Long Endurance Tactical (MALET) JSIL Aircrew Trainer (MJAT)] and RQ-4 [Global Hawk Sensor Operator Part Task Trainer (GHSOPTT), and Global Hawk Weapon System Trainer (WST)].

The Joint Technology Center/Systems Integration Laboratory (JTC/SIL) is the training center of excellence supporting UAS and RPA programs for the Services. JTC/SIL provides the system engineering, test and integration, interoperability, rapid technology insertion to address MUSE training requirements. The JTC/SIL combines the UAS/RPA knowledge of communications standards (such as STANAGs 4586, 4607, 4545 and 4609) with Hardware in the Loop (HIL) testing, MUSE, integrating with other DoD modeling and simulation (M&S) architectures. For those airborne assets normally not available for training, the JTC/SIL provides surrogate systems and interfaces. The JTC/SIL contributes to the distributed training environments, virtually linking participants from various locations worldwide, and are routinely supported

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 675092 / JTC/SIL MUSE
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within the MUSE architecture. The JTC/SIL continues to develop leading edge technologies supporting the rapidly evolving UAS/RPA training requirements required to support NDS future fighting force.

MUSE project funds may be utilized to cover the GCWG Secretariat, studies and analysis activities, supporting current program planning, execution, and future program planning.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Title: Air Force Synthetic Environment for Reconnaissance and Surveillance (AFSERS) Development</p> <p>Description: DoD's simulation/training system of choice for Intelligence Surveillance and Reconnaissance (ISR) systems, sensors, and platforms. Includes AFSERS, Common Ground Station Interface, and infrastructure support.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Development and release of MUSE/AFSERS RPA and ISR simulation capability supporting theater level exercises such as Dong Maeng (formerly Ulchi Freedom Guardian and Key Resolve), Yama Sakura, Talisman Saber, Pacific Sentry, Austere Challenge, and associated events. - Continue incorporation of mandated Cyber Security updates. - Develop higher fidelity in the Moving Target Indicator payload model into MUSE/AFSERS - Develop and integrate multi-sensor full motion video (FMV) payload simulations to support training missions - Complete the redesign of Connect and Netlink routing software to improve network routing and large data feeds, be web browser accessible, and incorporate the use of Windows Active Directory authentication. - Continue the re-architecture of Vignette Planning & Rehearsal Software (ViPRS) capability. - Continue software architecture optimization and modularization, to facilitate extensibility and scalability. - Extend current Link 16 simulation capabilities to include surface tracks (J3.3). - Conduct an image generator trade study to determine the best image generator to meet USAF training requirements of the future, to include investigating the use of "Gaming Engine" based Image Generation capability such as Unreal4. - Begin development the simulated GPS jamming effects on aircraft systems. - Improve Moving Target Indicator/Synthetic Aperture Radar payload models into MUSE/AFSERS - Continue integration testing with designated federations (ASCCE, JLVC, JLCCTC) ensuring joint interoperability with services and JS/J7 capabilities. 	3.454	3.521	3.574	-	3.574

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 675092 / JTC/SIL MUSE

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>- Complete certification and interoperability requirements of AFSERS components to run on the Distributed Mission Operations Network (DMON).</p> <p>FY 2021 Base Plans: JTC/SIL will:</p> <ul style="list-style-type: none"> - Continue development and release of MUSE/AFSERS RPA and ISR simulation capability supporting theater level exercises such as Dong Maeng (formerly Ulchi Freedom Guardian and Key Resolve), Yama Sakura, Talisman Saber, Pacific Sentry, Austere Challenge, and associated events. - Continue incorporation of mandated Cyber Security updates. - Complete the re-architecture of Vignette Planning & Rehearsal Software (ViPRS) capability to include transitioning it to be web browser accessible, developing an after action report (AAR) capability, and more realistic attrition. - Continue architecture software optimization and modularization to facilitate extensibility and scalability. - Begin prototype development of an improved image generator based upon the results of the image generator trade study conducted during FY20. - Fully integrate the high fidelity SAR model into the MUSE/AFSERS baseline which provides realistic SAR imagery based upon material encoded terrain. - Fully integrate MTI/SAR sensor cross-cuing capability in MUSE/AFSERS. - Develop and integrate low-cost, fixed-wing support to RPA operations. - Integrate a Vehicle and Dismount Exploitation Radar (VADER) sensor model in MUSE/AFSERS. - Begin development of the Long Range Radar (LRR) sensor MUSE/AFSERS model. - Develop IFF Modes 4, 5, & S in MUSE/AFSERS. - Continue integration testing with designated federations (ASCCE, JLVC, JLCCTC) ensuring joint interoperability with services and JS/J7 capabilities. - Assess services and Joint Staff emerging environments and the impact to MUSE/AFSERS integration and interoperability <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to small inflation increase</p>					
Accomplishments/Planned Programs Subtotals	3.454	3.521	3.574	-	3.574

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 675092 / JTC/SIL MUSE

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u>	
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	<u>Total Cost</u>
• RDTE 07 PE 0305204A: <i>Tactical Unmanned Aerial Vehicles</i>	4.748	4.954	4.833	-	4.833	4.327	4.244	4.099	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

This is an enterprise services effort, jointly funded and centrally managed by the US Army. AFLCMC/WIN MIPRs funds in support of Unmanned Aircraft Systems modeling and simulation efforts. JTC/SIL falls under US Army Futures Command. The Air Force POC is Dr. Lillian-Campbell from AF Agency for Modeling & Simulation which falls under HAF/A3T.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 675092 / JTC/SIL MUSE

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

JTC/SIL MUSE	
AFSERS Development	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 675092 / JTC/SIL MUSE

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
JTC/SIL MUSE				
AFSERS Development	1	2019	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 675291 / Gorgon Stare
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675291: <i>Gorgon Stare</i>	-	10.000	15.000	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 Gorgon Stare system is a podded airborne sensor suite that provides city-sized wide area airborne surveillance and is integrated on specially-modified MQ-9 Reaper RPA. The Air Force Requirements Oversight Council (AFROC) approved Air Combat Command's recommendation to transition Gorgon Stare from a Quick Reaction Capability (QRC) to an Air Force Enduring Capability in November 2014. Gorgon Stare's requirements are documented in the Gorgon Stare Wide Area Airborne Sensor Capabilities Production Document (draft). The acquisition strategy for this Air Force podded sensor suite solution is sustainment of the currently fielded capabilities with any upgrades implemented via validated -1067s or Urgent Operational Needs.

Development efforts conducted with FY 2015 Congressionally-added funds included efforts focused primarily on the development of a Beyond Line of Sight (BLOS) capability in support of an Urgent Operational Need. Development efforts conducted with FY 2016 Congressionally-added RDT&E funds included further development and system integration lab testing of Near Vertical Direction Finding (NVDF) with Gorgon Stare Increment 2 Wide Area Motion Imagery (WAMI) sensors. Funds spent on NVDF will provide a ramp for future airborne integration efforts as required. Development efforts conducted with FY 2017 Congressionally-added funds further progressed efforts associated with BLOS, to include first article testing for phase 1 and a limited BLOS capability delivered to the field in FY2019. Development efforts conducted with FY 2018 Congressional added funds included further development of the next phase of BLOS to enable freedom of maneuverability and development of system imagery improvements. Development efforts conducted with FY 2019 Congressionally added funds included completion of BLOS Phase II system design and aircraft certification to enable full freedom on maneuverability, completing imagery improvements and continuation of data automation through Area of Interest (AOI) tagging and tracking efforts. Development efforts to be conducted with FY2020 Congressionally added funds include but are not limited to continuation of tagging and tracking efforts, development of an electro-optical (EO)/infrared (IR) fusion capability, and development of tip and cue airborne cueing.

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

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Gorgon Stare capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

Congressional Add: Gorgon Stare	FY 2019	FY 2020
	10.000	15.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 675291 / Gorgon Stare
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020
<i>FY 2019 Accomplishments:</i> - BLOS Phase II pod system design approved and ground testing initiated.		
<i>FY 2020 Plans:</i> - Will continue tagging and tracking development efforts, development of an EO/IR fusion capability, and development of tip and cue airborne cueing.		
Congressional Adds Subtotals	10.000	15.000

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 PRDTB3: MQ-9 UAS Payloads	23.000	19.800	0.000	46.100	46.100	0.000	0.000	0.000	0.000	0.000	88.900
• APAF 06 PRDTB3: Gorgon Stare	7.500	1.500	0.000	10.700	10.700	0.000	0.000	0.000	0.000	0.000	19.700

Remarks

D. Acquisition Strategy

The wide area airborne surveillance requirement is being delivered via the Gorgon Stare podded wide area motion imagery sensor suite integrated on dedicated, specially-modified MQ-9 Reaper RPA. Gorgon Stare transitioned from a QRC to an Air Force Enduring Capability under AFROC authority in November 2014. The program is executed by the 645th Aeronautical Systems Group, Intelligence, Surveillance, and Reconnaissance and Special Operations Forces Directorate as a post-MS C program. The sensor suite will be sustained in its current configuration. Any future capability upgrades will be fielded as a result of validated -1067s or Urgent Operational Needs.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 675291 / Gorgon Stare

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Gorgon Stare	
EO/IR Co-Collect	██████████
Tagging and Tracking Full Field of View	██████████
Tip and Cue/Airborne Cueing Phase 2	██████████████████

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / <i>Airborne Reconnaissance Systems</i>	Project (Number/Name) 675291 / <i>Gorgon Stare</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Gorgon Stare</i>				
EO/IR Co-Collect	2	2020	1	2021
Tagging and Tracking Full Field of View	2	2020	4	2020
Tip and Cue/Airborne Cueing Phase 2	2	2020	2	2021

Note

Gorgon Stare will continue operations as required using sustainment funding.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems				Project (Number/Name) 676025 / Data Compression			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
676025: Data Compression	-	4.879	6.935	9.528	0.000	9.528	11.696	12.825	7.914	8.060	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

RDUCE provides efficient and integrated compression of airborne Intelligence, Surveillance, and Reconnaissance (ISR) sensor data, maximizing the use of limited bandwidth and delivering more data to the tactical user in the field. RDUCE develops, tests, and implements new sensor data compression algorithms for current and emerging airborne ISR sensors. The program develops compression capabilities for manned and unmanned airborne platforms, associated ground stations, and the Distributed Common Ground System (DCGS). Outputs will meet standard certification for use within the Department of Defense and Intelligence Community (IC) Geospatial Intelligence (GEOINT), Signals Intelligence (SIGINT), and Measurement and Signatures Intelligence (MASINT) compression applications.

Activities also include continuous studies, analysis and updates to support program planning and execution.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver technology and sensor capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Data Compression	4.879	6.935	9.528	-	9.528
Description: The Data Compression effort provides the warfighter capabilities to efficiently compress ISR data and to enable dissemination in near real time to tactical users through bandwidth limited dissemination systems. The program focuses on current and emerging ISR sensors, including incorporation into open architectures like Common Open Architecture Radar Programs (COARPs), Future Airborne Capability Environment (FACE), and Sensor Open System Architecture (SOSA). The algorithms can be leveraged for any platform. For example, the HSI algorithm was selected by NASA to be included in an experimental system on the ISS. Outputs will meet standards certification for use within the DoD Geospatial Intelligence, Signals Intelligence and Measurement and Signatures Intelligence data compression applications.					
FY 2020 Plans: - For mature algorithms (e.g. SAR, Hyper-Spectral Imagery (HSI), SAR Phase History) optimize software reference implementations, provide integration assistance, and SME support to platforms/sensors (e.g. ASARS, MP-RTIP/EISS, others) seeking to adopt the algorithm(s)					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 676025 / Data Compression

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<ul style="list-style-type: none"> - For less mature algorithms (e.g. SIGINT, LIDAR, and EO/IR) refine the algorithms, identify platform and exploitation partners for initial testing, and analyze results in an operationally representative environment - Publish and update compressed SAR and HSI samples to promote standards acceptance - Publish initial SAR Phase History draft standard and begin the process of formal acceptance through relevant and/or appropriate standards bodies - Incorporate the TRL mature algorithms into DoD open architectures such as SOSA, Open Mission Systems (OMS), COARPs, and FACE <p>FY 2021 Base Plans:</p> <ul style="list-style-type: none"> - Will provide continuous updates and integration support for the mature TRL modalities (SAR, HSI, SAR Phase History) - Will finalize SAR Phase history standard for formal adoption - Will complete initial development of LIDAR and SIGINT modalities - Will identify platform/sensor partners for initial test/integration - Will begin feature updates to address any issues or previously uncaptured use cases to ensure the compression algorithms are operationally relevant - Will begin studies and initial development of EO/IR compression algorithms <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to additional sensor modes added to the Data Compression portfolio.</p>					
Accomplishments/Planned Programs Subtotals	4.879	6.935	9.528	-	9.528

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

In FY21/22/23, Project 676025-Data Compression, is adding additional sensor modes to its portfolio each year.

D. Acquisition Strategy

Data Compression program is conducted by Air Force Life Cycle Management Center/ Intelligence, Surveillance, and Reconnaissance and Special Operations Forces (AFLCMC/WIN). Acquisition strategy is to develop data compression hardware/software, and data compression standards for various ISR applications to include airborne, ground stations, data storage facilities, and exploitation tools. RDUCE will utilize existing contracts with full and open competition where appropriate. Integration will be accomplished by the requisite program offices.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 676025 / Data Compression
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LIDAR	Various	Various : Various	-	1.800	Mar 2019	1.000	Feb 2020	1.000	Dec 2020	-		1.000	Continuing	Continuing	-
SIGzip Phase II	Various	Various : Various	-	-		2.100	Jan 2020	2.000	Jun 2021	-		2.000	Continuing	Continuing	-
EO/IR	Various	Various : Various	-	-		0.100	May 2020	1.786	Jun 2021	-		1.786	Continuing	Continuing	-
Subtotal			-	1.800		3.200		4.786		-		4.786	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Standardization Development	C/CPAF	Various : Various	-	1.427	Feb 2019	1.000	Dec 2019	0.000		-		0.000	0.000	2.427	-
Standardization Development (FLEX)	C/CPAF	Various : Various	-	-		-		1.000	Dec 2020	-		1.000	Continuing	Continuing	-
Standardization Development (SARzip)	C/CPAF	Various : Various	-	-		-		0.690	Dec 2020	-		0.690	Continuing	Continuing	-
Standardization Development (zPHD)	C/CPAF	Various : Various	-	-		-		1.000	Dec 2020	-		1.000	Continuing	Continuing	-
Subtotal			-	1.427		1.000		2.690		-		2.690	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ADDA Lab	C/CPAF	Various : Various	-	0.500	Jan 2019	1.750	Jan 2020	0.500	Nov 2020	-		0.500	Continuing	Continuing	-
COMPASE Lab	C/CPAF	Various : Various	-	0.300	Jan 2019	0.100	Jan 2020	0.400	Nov 2020	-		0.400	Continuing	Continuing	-
Subtotal			-	0.800		1.850		0.900		-		0.900	Continuing	Continuing	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 676025 / Data Compression

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
<i>RDUCE</i>																												
-LIDAR																												
-EO/IR																												
-SIGzip Phase II																												
-COMPASE Lab																												
ADDA Lab																												
Standardization Development																												
Standardization Development (SARzip)																												
Standardization Development (FLEX)																												
Standardization Development (zPHD)																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305206F / Airborne Reconnaissance Systems	Project (Number/Name) 676025 / Data Compression

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>RDUCE</i>				
-LIDAR	2	2019	4	2025
-EO/IR	3	2020	4	2025
-SIGzip Phase II	2	2020	4	2025
-COMPASE Lab	2	2019	4	2025
ADDA Lab	2	2019	4	2025
Standardization Development	2	2019	4	2020
Standardization Development (SARzip)	2	2021	4	2025
Standardization Development (FLEX)	2	2021	4	2025
Standardization Development (zPHD)	2	2021	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305207F / <i>Manned Reconnaissance Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	14.223	11.787	14.711	0.000	14.711	15.021	15.291	15.564	15.851	Continuing	Continuing
674754: <i>RC-135 Systems</i>	-	14.223	11.787	14.711	0.000	14.711	15.021	15.291	15.564	15.851	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

RC-135 operational systems development and enhancement activities support design studies, engineering analysis, non-recurring engineering and other efforts associated with the integration and modification of the RC-135 programs and their specialized mission systems, both air and ground. Associated ground systems include RIVET JOINT Ground Data Processing Systems (GDPS), Distributed Mission Shelters (DMS), Mission Crew Training Systems (MCTS), Airborne Capabilities Extension System (ACES), and the Operational Flight Trainers (OFT, a.k.a. flight deck simulators). Extensive utilization of Commercial-Off-The-Shelf (COTS) based solutions allows rapid fielding of needed capabilities through upgrades and supports Diminishing Manufacturing Sources (DMS)/Vanishing Vendor Items (VVI) logistics mitigation efforts. The results of these efforts provide for preliminary assessments of technical feasibility, operability, or military utility as well as specific engineering implementations for integration into the various systems baseline configurations.

These activities are managed by the 645th Aeronautical Systems Group (645 AESG). The 645 AESG (a.k.a. BIG SAFARI) manages engineering, ground and support systems modifications, integration, flight testing, product assurance, acceptance testing, logistics, and training activities.

Aircraft, sensor systems, and associated ground support system engineering planned for FY 2021 budget includes developmental planning, execution and support for the RC-135V/W RIVET JOINT Baselines 13 and 14 (BL-13 and BL-14), the RC-135U COMBAT SENT Baseline 6 (BL-6), and the RC-135S COBRA BALL BL-6 and BL-7 configurations. The world-wide challenge of keeping pace against technologically agile targets used by both nation and non-nation-state adversaries and the rapid evolution of COTS technologies demands a responsive and adaptive acquisition strategy for fielding incremental spiral upgrades and baseline capabilities that are logistically supportable at all locations. The 645 AESG uses an incremental baseline strategy to mitigate risk, find affordable solutions and field needed capabilities on the aircraft and associated ground support and training systems. Obsolescence and DMS/VVI logistical concerns are addressed with each baseline upgrade and assessed annually as part of the fleet sustainment responsibilities.

RIVET JOINT BL-13 upgrades consist of, but are not limited to, providing a continuous recording capability, Super Wideband Compressive Receiver (SWCR) and Nyquist Folding Receiver (NYFR), CNS/ATM avionics upgrades such as new autopilot, automated data system-broadcast (ADS-B) and Mode 5 identify friendly or foe (IFF) systems, and family of beyond-line-of-sight terminals (FAB-T) advanced extremely high frequency (AEHF) communications suite.

COMBAT SENT BL-6 developmental enhancements consist of, but are not limited to, steerable beams for the COMINT sub-system, improved SWCR capability and specific emitter identification (SEI) electronic intelligence (ELINT) sub- system, Primary Sensor Measurement System (PRISMS) merge with manual precision collections, millimeter wave and low band capabilities with PRISMS, digitizing antennas, direction finding of High Frequency signals and expanded streaming audio services and 360 degree aircraft tracking system. BL-6 RDT&E is funded via PE 0305206G.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305207F / <i>Manned Reconnaissance Systems</i>
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COBRA BALL BL-6 developmental enhancements consist of, but are not limited to, high gain S-Band antenna, large format Sapphire windows, RJ BL-13 COMINT capability, foreign instrumentation signals intelligence (FISINT) analog to digital receiver, and Brave version of the digital cockpit avionics systems to continue CNS/ATM compliance initiatives. BL-6 RDT&E is funded via PE 0301314F.

Ground Systems Baseline upgrades add the capabilities found in the corresponding RIVET JOINT Baseline upgrades (i.e., RIVET JOINT BL-12 corresponds to Ground System BL-12, RIVET JOINT BL-13 corresponds to Ground System BL-14, RIVET JOINT BL-15 corresponds to Ground System BL-15) to the Ground Systems to ensure crews receive training on the appropriate mission system configurations. 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 RC-135 capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	14.223	11.787	14.738	0.000	14.738
Current President's Budget	14.223	11.787	14.711	0.000	14.711
Total Adjustments	0.000	0.000	-0.027	0.000	-0.027
• 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	-0.027	0.000	-0.027

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Manned Reconnaissance Systems	14.223	11.787	14.711
Description: Non-recurring engineering (NRE) for Baseline system developments and enhancements to improve mission capabilities of the RIVET JOINT BL-14 and BL-15, COMBAT SENT BL-6, COBRA BALL BL-7, and Ground Systems BL-13 and BL-14.			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305207F / <i>Manned Reconnaissance Systems</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<i>FY 2020 Plans:</i> Initiated contracts to: <ul style="list-style-type: none"> • Continue Engineering Analysis • Continue NRE and other efforts associated with the integration and modification of the RC-135 primary mission equipment • Continue Specialized Mission Systems development for the collection of both air and ground signals. 			
<i>FY 2021 Plans:</i> Will initiate contracts to: <ul style="list-style-type: none"> • Continue Engineering Analysis • Continue NRE and other efforts associated with the integration and modification of the RC-135 primary mission equipment • Continue Specialized Mission Systems development for the collection of both air and ground signals. 			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding increased due to FY20 prioritization reduction being corrected in FY21 to planned programmed levels.			
Accomplishments/Planned Programs Subtotals	14.223	11.787	14.711

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item DARP01: <i>RC-135</i>	394.532	227.673	191.332	-	191.332	211.736	210.502	85.720	232.123	Continuing	Continuing
• APAF 06 Line Item DARP01: <i>Initial Spares/Repair Parts</i>	49.464	83.572	51.282	-	51.282	52.328	53.262	24.699	25.150	Continuing	Continuing
• APAF 07 Line Item DARP01: <i>Aircraft Support</i> <i>Equipment & Facilities</i>	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• OPAF 04 Line Item 846070: <i>DARP RC-135</i>	26.262	80.654	27.663	-	27.663	27.658	28.142	28.647	29.172	Continuing	Continuing
• RDTE 07 PE 0304260F: <i>Airborne SIGINT Enterprise</i>	50.577	33.396	45.066	-	45.066	45.954	46.725	47.507	48.327	Continuing	Continuing

Remarks

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force Date: February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305207F / <i>Manned Reconnaissance Systems</i>
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E. Acquisition Strategy

The RC-135 RIVET JOINT, COBRA BALL, and COMBAT SENT configured aircraft are maintained and kept technologically relevant through an incremental baseline upgrade acquisition strategy. Technology upgrades and Quick Reaction Capability (QRC) developments are acquired through the 645 AESG in accordance with the BIG SAFARI Program Management Directive (PMD) and Class Justification and Approval (J&A) document for acquisition of supplies and services using an "other than full and open competition" criteria. The supplies and services procured by 645 AESG satisfy National Security requirements (FAR 6.302-6) through the use of their standing J&A or address Unusual and Compelling Urgency requirements (FAR 6.302-2) through an individually prepared J&A supported by the BIG SAFARI Life Cycle Management Plan (LCMP) across the full spectrum of system life cycle management from developmental engineering to system retirement ("cradle to grave") support. Due to the ever changing threat and rapidly evolving electromagnetic combat environment encountered during our prolonged commitment to Overseas Contingency Operations (OCO), the acquisition program manager has the authority to redirect funding as necessary to meet current stated and emerging Combatant Command (CCMD) and/or Intelligence Community (IC) requirements to better meet the war fighting objectives.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305207F / <i>Manned Reconnaissance Systems</i>	Project (Number/Name) 674754 / <i>RC-135 Systems</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	SS/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Operational Systems Development	SS/ Various	L3Harris Technologies : Greenville, TX	-	14.223	Dec 2018	11.787	Dec 2019	14.711	Dec 2020	-		14.711	Continuing	Continuing	-
Subtotal			-	14.223		11.787		14.711		-		14.711	Continuing	Continuing	N/A

Remarks
 All activity is based around the Programmed Depot Maintenance (PDM) airframe and missions systems schedule which includes multiple contracts and organizations with overlapping and continuous periods of performance. Due to the rapidly changing threat environment encountered during our prolonged commitment to Overseas Contingency Operations (OCO), the acquisition program manager has the authority to redirect funding as necessary to meet current stated and emerging Combatant Command (CCMD) and/or Intelligence Community (IC) requirements.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	14.223	11.787	14.711	-	14.711	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305207F / <i>Manned Reconnaissance Systems</i>	Project (Number/Name) 674754 / <i>RC-135 Systems</i>
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Baseline Spiral Development																												
RIVET JOINT Baseline 12 Integration, Test and Fielding																												
RIVET JOINT Baseline 13 Integration, Test and Fielding																												
RIVET JOINT Baseline 14 Development																												
RIVET JOINT Baseline 14 Integration, Test and Fielding																												
RIVET JOINT Baseline 15 Development																												
RIVET JOINT Baseline 15 Integration, Test and Fielding																												
COMBAT SENT Baseline 6 Development																												
COMBAT SENT Baseline 6 Integration, Test and Fielding																												
COBRA BALL Baseline 6 Integration, Test and Fielding																												
COBRA BALL Baseline 7 Development																												
COBRA BALL Baseline 7 Integration, Test and Fielding																												
Ground Systems Baseline 13 Development, Integration, Test and Fielding																												
Ground Systems Baseline 14 Development, Integration, Test and Fielding																												
Ground Systems Baseline 15 Development, Integration, Test and Fielding																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305207F / <i>Manned Reconnaissance Systems</i>	Project (Number/Name) 674754 / <i>RC-135 Systems</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Baseline Spiral Development</i>				
RIVET JOINT Baseline 12 Integration, Test and Fielding	1	2019	2	2020
RIVET JOINT Baseline 13 Integration, Test and Fielding	1	2019	2	2023
RIVET JOINT Baseline 14 Development	1	2020	2	2022
RIVET JOINT Baseline 14 Integration, Test and Fielding	2	2022	4	2025
RIVET JOINT Baseline 15 Development	4	2021	4	2023
RIVET JOINT Baseline 15 Integration, Test and Fielding	4	2023	4	2025
COMBAT SENT Baseline 6 Development	1	2019	2	2020
COMBAT SENT Baseline 6 Integration, Test and Fielding	2	2020	4	2023
COBRA BALL Baseline 6 Integration, Test and Fielding	1	2019	3	2020
COBRA BALL Baseline 7 Development	1	2019	3	2020
COBRA BALL Baseline 7 Integration, Test and Fielding	3	2020	4	2023
Ground Systems Baseline 13 Development, Integration, Test and Fielding	1	2019	4	2020
Ground Systems Baseline 14 Development, Integration, Test and Fielding	2	2022	4	2023
Ground Systems Baseline 15 Development, Integration, Test and Fielding	3	2023	4	2025

Note

Ground systems include the RIVET JOINT Mission Crew Training Systems (MCTS), Ground Data Processing System (GDPS), Modular Processing System (MPS), Airborne Capabilities Extension Systems (ACES) and Operational Flight Trainers (OFT). Baseline upgrades are determined by the aircraft programmed depot maintenance schedule. Hardware, firmware or software enhancements to the ground systems are set up to match the aircraft baseline upgrades. Typically, baseline configuration changes and enhancements are incorporated first into the MCTSs and OFTs, and then integrated into GDPS, MPS, and ACES. Delivery of the enhancements to the MCTSs and OFTs are planned to arrive concurrently, if not slightly prior, to the delivery of the first aircraft with an upgraded cockpit or mission system in a given baseline configuration to allow for aircrew and ground personnel training and qualification.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	52.421	25.009	14.152	0.000	14.152	25.933	26.399	26.871	27.366	Continuing	Continuing
674826: <i>Common Imagery Ground / Surface Systems</i>	-	26.421	25.009	14.152	0.000	14.152	25.933	26.399	26.871	27.366	Continuing	Continuing
675246: <i>MQ-9 Development and Fielding</i>	-	26.000	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

Air Force Distributed Common Ground System (AF DCGS) is the Combat Air Force (CAF) weapon system for planning and direction, collection, processing and exploitation, analysis and production, and dissemination (PCPAD) of data from Intelligence, Surveillance, and Reconnaissance (ISR) missions. Since AF DCGS is also a major component of the DoD DCGS, the system is designed to complement and interoperate with the DoD, Army, Navy and Marine Corps DCGS. The AF DCGS mission is to provide Joint Task Force (JTF) Commanders, Air Component Commanders, Unified Commands, and other directed organizations with global, time-sensitive ISR PCPAD across the spectrum of military operations. AF DCGS is a multi-INT, federated weapon system (AN/GSQ-272) capable of exploiting intelligence data from manned platforms, remotely piloted aircraft (RPA), non-traditional ISR platforms, national and commercial satellites and other collection systems.

AF DCGS is designed to support Joint operational requirements by providing a common PCPAD means to provide time-sensitive intelligence to field commanders and in support of the Air Operations Center (AOC) mission requirements and supports the "kill chain" across the full range of military operations. Currently, AF DCGS is composed of eight core sites (two active duty worldwide, three active duty regional and three Air National Guard regional), three remote Air Force Forces (AF FOR) sites, six SIGINT Distributed Mission Sites (four collocated with National Mission Partner), three Air National Guard full-motion video sites, three support sites, three training sites, and three integration and test sites. AF DCGS currently supports ongoing operations from forward deployed and in-garrison CONUS and OCONUS-based locations. AF DCGS provides integrated ISR by providing quality, fused Geospatial Intelligence (GEOINT), Signals Intelligence (SIGINT), and Measurement and Signature Intelligence (MASINT) tailored to the warfighter for all levels of conflict.

In alignment with DoD and AF direction, AF DCGS is migrating to an open architecture (OA DCGS) to rapidly incorporate new technologies and tools to easily integrate new and/or improved sensor capabilities, as well as provide improved mission applications to meet emerging and urgent operational needs. AF DCGS integrates commercial-off-the-shelf and government-off-the-shelf services and applications to the maximum extent possible to fulfill operational requirements and data sharing requirements across the DoD DCGS community. The next iteration will involve transitioning to a hybrid cloud (mix of private on premise and public cloud) architecture.

Program management consists of five ACAT III efforts: GEOINT Transformation, SIGINT Transformation, Multi-INT, Network Infrastructure Transformation, and DCGS Reference Imagery Transition (DRT)

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>	
<p>1. GEOINT Transformation: Rapidly integrates new GEOINT capabilities, enables quick/seamless integration of new sensors, data types, sensor planning, and command and control (C2) capabilities and migrates GEOINT-specific applications into the open architecture framework. Leverages mission partner methods and tools to the maximum extent possible.</p> <p>2. SIGINT Transformation: Rapidly integrates new SIGINT capabilities, enables quick/seamless integration of new sensors, data types, sensor planning, command and control (C2) capabilities and migrates SIGINT-specific applications into the open architecture framework. Leverages mission partner methods and tools to the maximum extent possible.</p> <p>3. Multi-INT-1: Rapidly integrates new and updated enterprise applications, to include voice/video/chat communications, collaboration and situational awareness, multi-INT fusion, and data analytics capabilities into the open architecture framework. Also includes Intelligent Modeling and Predictive Analysis of Cyberspace Targeting (IMPACT) program, which develops concepts, Tactics/Techniques/Procedures (TTPs) and technologies for synchronizing ISR and non-kinetic capabilities. Addressees program office test and evaluation activities.</p> <p>4. Network Infrastructure Transformation: Modernizes the AF DCGS infrastructure to a cyber-resilient, open, scalable, commercial-based, architecture, improving data ingest, transfer, and storage capabilities, collaboration, and content driven discovery. OA DCGS Platform as a Service, along with migration to a hub-based architecture and public cloud represents the AF DCGS hybrid cloud (mix of private on premise and public cloud) architecture.</p> <p>5. *DRT: The Air Force DCGS Reference Imagery Transition (DRT) effort provides data ingest, transfer, and storage capabilities for NGA reference imagery data. NOTE: *No additional RDT&E or Investment Funding planned in FY20 or outyears; ACAT will be closed once the capability is installed at all sites</p> <p>This program element may include necessary civilian pay expenses required to manage, execute, and deliver AF DCGS weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.</p> <p>This program is in Budget Activity 7, Operational System 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.</p>		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	54.054	25.009	25.443	0.000	25.443
Current President's Budget	52.421	25.009	14.152	0.000	14.152
Total Adjustments	-1.633	0.000	-11.291	0.000	-11.291
• 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	-1.633	0.000	-11.291	0.000	-11.291

Change Summary Explanation

In FY 2019, funding reduced \$1.633 million to support higher AF priorities.

In FY 2021, funding reduced \$3.529 million to support higher AF priorities.

Also in FY 2021, funding request was reduced by \$7.762 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>				Project (Number/Name) 674826 / <i>Common Imagery Ground / Surface Systems</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
674826: <i>Common Imagery Ground / Surface Systems</i>	-	26.421	25.009	14.152	0.000	14.152	25.933	26.399	26.871	27.366	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Program management consists of five ACAT III efforts: GEOINT Transformation, SIGINT Transformation, Multi-INT, Network Infrastructure Transformation, and DCGS Reference Imagery Transition (DRT)

1. GEOINT Transformation: Rapidly integrates new GEOINT capabilities, enables quick/seamless integration of new sensors, data types, sensor planning, and command and control (C2) capabilities and migrates GEOINT-specific applications into the open architecture framework. Leverages mission partner methods and tools to the maximum extent possible.
2. SIGINT Transformation: Rapidly integrates new SIGINT capabilities, enables quick/seamless integration of new sensors, data types, sensor planning, command and control (C2) capabilities and migrates SIGINT-specific applications into the open architecture framework. Leverages mission partner methods and tools to the maximum extent possible.
3. Multi-INT-1: Rapidly integrates new and updated enterprise applications, to include voice/video/chat communications, collaboration and situational awareness, multi-INT fusion, and data analytics capabilities into the open architecture framework. Also includes Intelligent Modeling and Predictive Analysis of Cyberspace Targeting (IMPACT) program, which develops concepts, Tactics/Techniques/Procedures (TTPs) and technologies for synchronizing ISR and non-kinetic capabilities. Addressees program office test and evaluation activities.
4. Network Infrastructure Transformation: Modernizes the AF DCGS infrastructure to a cyber-resilient, open, scalable, commercial-based, architecture, improving data ingest, transfer, and storage capabilities, collaboration, and content driven discovery. OA DCGS Platform as a Service, along with migration to a hub-based architecture and public cloud represents the AF DCGS hybrid cloud (mix of private on premise and public cloud) architecture.
5. *DRT: The Air Force DCGS Reference Imagery Transition (DRT) effort provides data ingest, transfer, and storage capabilities for NGA reference imagery data.

NOTE:

*No additional RDT&E or Investment Funding planned in FY20 or out-years; ACAT will be closed once the capability is installed at all sites.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 674826 / <i>Common Imagery Ground / Surface Systems</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Title: GEOINT Transformation</p> <p>Description: The GEOINT Transformation effort rapidly integrates new GEOINT capabilities, enables quick/seamless integration of new sensors, data types, sensor planning, and command and control (C2) capabilities and migrates GEOINT-specific applications into the open architecture framework. Leverages mission partner methods and tools to the maximum extent possible.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> • Continue High Altitude (HA) and Full Motion Video (FMV) Agile Release Trains to rapidly integrate new GEOINT-specific capabilities on OA DCGS. <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> • Will continue High Altitude (HA) and Full Motion Video (FMV) Agile Release Trains to rapidly integrate new GEOINT-specific capabilities on OA DCGS. <p>FY 2020 to FY 2021 Increase/Decrease Statement: n/a</p>		3.500	0.500	0.500
<p>Title: SIGINT Transformation</p> <p>Description: The SIGINT Transformation effort rapidly integrates new SIGINT capabilities, enables quick/seamless integration of new sensors, data types, sensor planning, command and control (C2) capabilities and migrates SIGINT-specific applications into the open architecture framework. Leverages mission partner methods and tools to the maximum extent possible.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> • Continue SIGINT Modernization Agile Release Train to rapidly integrate new SIGINT-specific capabilities into OA DCGS. • Continue componentization of SIGINT mission applications <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> • Will continue SIGINT Modernization Agile Release Train to rapidly integrate new SIGINT-specific capabilities into OA DCGS. <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease due to completion of SIGINT mission applications componentization development work.</p>		10.587	2.899	0.500
<p>Title: Multi-INT Transformation</p> <p>Description: The Multi-INT effort rapidly integrates new and updated enterprise applications, to include voice/video/chat communications, collaboration and situational awareness, multi-INT fusion, and data analytics capabilities into the open architecture framework. Also includes Intelligent Modeling and Predictive Analysis of Cyberspace Targeting (IMPACT) program,</p>		10.426	21.110	12.652

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 674826 / <i>Common Imagery Ground / Surface Systems</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>which develops concepts, Tactics/Techniques/Procedures (TTPs) and technologies for synchronizing ISR and non-kinetic capabilities. Addressees program office test and evaluation activities.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> • Continue Multi-INT Correlation and Fusion Agile Release Train to rapidly integrate new Multi-INT and data analytics capabilities into OA DCGS • Continue agile development of IMPACT program capabilities • Begin development of Enterprise Voice Communications Capability <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> • Will continue Multi-INT Correlation and Fusion Agile Release Train to rapidly integrate new Multi-INT and data analytics capabilities into OA DCGS • Will continue agile development and fielding of IMPACT program capabilities • Will continue development of the Enterprise Voice Communications Capability <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease due to completion of some of the Multi-INT Correlation and Fusion and Enterprise Collaboration capability development</p>				
<p>Title: Network Infrastructure Transformation</p> <p>Description: The Network Infrastructure Transformation effort modernizes the AF DCGS infrastructure to a cyber-resilient, open, scalable, commercial-based, architecture, improving data ingest, transfer, and storage capabilities, collaboration, and content driven discovery. OA DCGS Platform as a Service, along with migration to a hub-based architecture and public cloud represents the AF DCGS hybrid cloud (mix of private on premise and public cloud) architecture.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> • Continue to develop releasable open architecture, hybrid-cloud infrastructure <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> • Will continue to develop releasable open architecture, hybrid-cloud infrastructure <p>FY 2020 to FY 2021 Increase/Decrease Statement: n/a</p>		1.908	0.500	0.500
Accomplishments/Planned Programs Subtotals		26.421	25.009	14.152

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 674826 / <i>Common Imagery Ground / Surface Systems</i>
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 04 Line Item, 846080: <i>DCGS-AF</i>	359.267	94.137	99.240	-	99.240	128.084	130.408	132.843	135.278	Continuing	Continuing

Remarks

D. Acquisition Strategy

AF DCGS acquisition strategy is to use approved lean and agile industry practices and leverage to the maximum extent possible commercial off the shelf, government off the shelf, and mission partner capabilities to continuously develop and field new and improved operational capabilities hosted on its open, hybrid cloud environment to meet mission requirements. Contracting strategy involves a combination of Basic Ordering Agreements (BOAs), Indefinite Delivery/Indefinite Quantity (IDIQ) contracts awarded to execute program funds and delivery/task orders are negotiated/awarded individually.

The program is managed as five ACAT III efforts: GEOINT Transformation, SIGINT Transformation, Multi-INT-1, Network Infrastructure Transformation, and DCGS Reference Imagery Transition (DRT).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020				
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>					Project (Number/Name) 674826 / <i>Common Imagery Ground / Surface Systems</i>						

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
GEOINT Transformation	Various	Various : Various	-	3.500	Jan 2019	0.500	May 2020	0.500	May 2021	-		0.500	Continuing	Continuing	-
SIGINT Transformation	Various	Various : Various	-	10.167	Apr 2019	2.400	Apr 2020	0.500	Apr 2021	-		0.500	Continuing	Continuing	-
Multi-Intelligence	Various	Various : Various	-	9.291	Apr 2019	16.259	Mar 2020	9.902	Mar 2021	-		9.902	Continuing	Continuing	-
Network Infrastructure Transformation	Various	Various : Various	-	1.683	Jun 2019	0.500	Jun 2020	0.500	Jun 2021	-		0.500	Continuing	Continuing	-
Subtotal			-	24.641		19.659		11.402		-		11.402	Continuing	Continuing	N/A

Remarks
 Note on "various" entries - Contract Method, Contract Type, Performing Activity, Target Value of Contract are entered as "various" because there are multiple projects within each upgrade and depending on the type of effort to be completed determines the contract vehicle to use. There is no way on this document to delineate the contracts that support each upgrade as they are numerous.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Support	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Multi-Intelligence	Various	Various : Various	-	0.183	Jan 2019	0.251	Jan 2020	0.251	Jan 2021	-		0.251	Continuing	Continuing	-
Subtotal			-	0.183		0.251		0.251		-		0.251	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
PMA	Various	Various : Various	-	1.597	Dec 2018	5.099	Dec 2019	2.499	Dec 2020	-		2.499	Continuing	Continuing	-
Subtotal			-	1.597		5.099		2.499		-		2.499	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 674826 / <i>Common Imagery Ground / Surface Systems</i>
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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			

Remarks
 Note on "various" entries - Contract Method, Contract Type, Performing Activity, Target Value of Contract are entered as "various" because there are multiple projects within in each upgrade and depending on the type of effort to be completed determines the contract vehicle to use. There is no way on this document to delineate the contracts that support each upgrade as they are numerous.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	26.421	25.009	14.152	-	14.152	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 674826 / <i>Common Imagery Ground / Surface Systems</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
<i>AF Distributed Common Ground System</i>																												
GEOINT Transformation HA and FMV Agile Release Trains (ART)																												
SIGINT Transformation ART																												
Multi-INT Transformation Correlation and Fusion ART																												
Multi-INT Transformation: Enterprise Voice Communication Capability (ECC)																												
Multi-INT Transformation: IMPACT (SUTER)																												
Network Infrastructure Transformation: OA Hybrid Cloud Services																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 674826 / <i>Common Imagery Ground / Surface Systems</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>AF Distributed Common Ground System</i>				
GEOINT Transformation HA and FMV Agile Release Trains (ART)	1	2019	4	2025
SIGINT Transformation ART	1	2019	4	2025
Multi-INT Transformation Correlation and Fusion ART	1	2019	4	2025
Multi-INT Transformation: Enterprise Voice Communication Capability (ECC)	3	2019	4	2022
Multi-INT Transformation: IMPACT (SUTER)	2	2019	4	2024
Network Infrastructure Transformation: OA Hybrid Cloud Services	1	2019	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>				Project (Number/Name) 675246 / <i>MQ-9 Development and Fielding</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675246: <i>MQ-9 Development and Fielding</i>	-	26.000	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

Due to a Database Error, the additional \$26M in FY19 OCO for "MQ-9 Development and Fielding" (Project 675246) was erroneously added to PE 0305208. This funding belongs in Air Force PE 0305829F, "Video Data Link".

Video Data Link (VDL) Family of Systems (FoS) provides situational awareness (SA) to the operator on the ground using real time Full Motion Video (FMV) from secure line of sight links to airborne ISR, NTISR, PR and SF platforms. The FoS consists of interoperable Mounted (Airborne/Ground) and Handheld terminal variants. Current variants are utilized with 20 different platforms. Crypto Core Modernization (CCM) driven by NSA will create an imminent DMS issue by FY21; the current VDL equipment is incompatible with the enhanced Crypto Core.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Video Data Link	26.000	0.000	0.000
Description: Video Data Link (VDL) Family of Systems (FoS) provides situational awareness (SA) to the operator on the ground using real time Full Motion Video (FMV) from secure line of sight links to airborne ISR, NTISR, PR and SF platforms.			
FY 2020 Plans: - Continue technology refresh for Mounted and Airborne Video Data Link. Focus areas will be Mobile Ad-Hoc Networking, updated cryptographic hardware, and improved waveforms for LPI/LPD (Low Probability of Intercept/ Low Probability of Detection) operation.			
FY 2021 Plans: No additional funding.			
Accomplishments/Planned Programs Subtotals	26.000	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 675246 / <i>MQ-9 Development and Fielding</i>

D. Acquisition Strategy

The Video Data Link acquisition strategy will be to conduct a competitive acquisition that will involve a CPIF contract vehicle to encourage proposals to integrate the required capability rapidly and within the identified budget.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 675246 / <i>MQ-9 Development and Fielding</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
<i>Video Data Link Crypto Core Modernization</i>																												
Multi-Domain and Hand-held																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305208F / <i>Distributed Common Ground/Surface Systems</i>	Project (Number/Name) 675246 / <i>MQ-9 Development and Fielding</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Video Data Link Crypto Core Modernization</i>				
Multi-Domain and Hand-held	2	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	954.123	221.675	191.733	134.589	0.000	134.589	29.283	19.318	30.757	41.307	Continuing	Continuing
675145: <i>RQ-4 Block 30</i>	523.843	0.121	30.761	0.000	0.000	0.000	0.000	0.000	0.474	0.000	0.000	555.199
675149: <i>RQ-4 Capability Enhancements</i>	185.486	221.554	160.472	134.589	0.000	134.589	29.283	19.318	30.283	41.307	Continuing	Continuing
67RTIP: <i>MP-RTIP</i>	244.794	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	245.294

Program MDAP/MAIS Code: 252
Project MDAP/MAIS Code(s): 293

Note

The sum of all Prior Years is actually \$2,291.016 million more than the represented total due to several projects ending.

A. Mission Description and Budget Item Justification

Beginning in FY21, to support the divestiture of the Block 20/30 aircraft, efforts will be pivoted to focus on supporting the Block 40 fleet and closing out Block 30 efforts to maximize value to the USAF and DoD.

This program element funds related Air Force projects sharing the RQ-4 platform in common: the RQ-4 Block 30, the RQ-4 Block 40, RQ-4 Capability Enhancements, and Multi-Platform Radar Technology Insertion Program (MP-RTIP). The RQ-4 Block 30 and Block 40 projects support the development and testing of the ACAT 1C RQ-4 capability and the initiation of the major modification ACAT programs. The majority of the modernization funding was transferred to the Capability Enhancement project (675149) to support upgrades and modifications, including established ACAT I and II programs, to the fielded RQ-4 weapon system to meet evolving threats and warfighter requirements. The MP-RTIP project completes development and testing of the baseline MDAP MP-RTIP sensor capability.

When judged feasible and affordable, this program will participate in the development, testing, and implementation of international standards to enhance joint, allied, and coalition interoperability. Studies and activities may be initiated to further explore the utility of incorporating the emerging architectural standards such as the USAF Unmanned Aerial Systems (UAS) Command and Control Initiative (UCI) or the DoD's Unmanned Control Segment standards (UCS) and Open Mission Systems (OMS). Ground Segment Modernization Program (GSMP) will incorporate UCI and UCS standards.

Per direction of USD(AT&L), the RQ-4 program was restructured from the original project 675144 (Baseline) into multiple projects: (1) Block 30, (2) Block 40, (3) GroundSegment/Communications System, and (4) Common-Airborne Sense and Avoid (C-ABSAA). In FY17 the Ground Segment/Communications System project (675147) ended. In FY18 the RQ-4 Block 40 project (675146) ended. Prior year funds in the amount of \$2031.377M were accounted for in project 675144, \$85.375M were accounted for in project 675147, and \$174.264M were accounted for in project 675146.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver RQ-4 UAV capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	221.690	191.733	243.252	0.000	243.252
Current President's Budget	221.675	191.733	134.589	0.000	134.589
Total Adjustments	-0.015	0.000	-108.663	0.000	-108.663
• 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	-0.015	0.000	-108.663	0.000	-108.663

Change Summary Explanation

Beginning in FY21, to support the divestiture of the Block 20/30 aircraft, efforts will be pivoted to focus on supporting the Block 40 fleet and closing out Block 30 efforts to maximize value to the USAF and DoD.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV				Project (Number/Name) 675145 / RQ-4 Block 30			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675145: RQ-4 Block 30	523.843	0.121	30.761	0.000	0.000	0.000	0.000	0.000	0.474	0.000	0.000	555.199
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The RQ-4 Block 30 Project was directed by an Acquisition Decision Memorandum (ADM) signed 14 Jun 2011 by USD (AT&L). At the time of the ADM signature, and subsequent designation of projects, budgets had already been finalized. Prior budgets for all projects are captured under the RQ-4 Baseline project, as its related Project (675144) was the core project for the RQ-4 program prior to the directed restructure.

In FY 2021, PE 0305220F, RQ-4 UAV, Project 675145, RQ-4 Block 30, efforts were transferred to PE 0305220F, RQ-4 UAV, Project 675149, RQ-4 Capability Enhancements, in order to close out Block 30 efforts and focus on supporting the Block 40 fleet.

A. Mission Description and Budget Item Justification

The RQ-4 Remotely Piloted Aircraft (RPA) provides a high altitude, deep look, long-endurance Intelligence, Surveillance, and Reconnaissance (ISR) capability that complements space and other airborne collectors during peacetime, crisis, and war-fighting scenarios. RDT&E funding in this project supports design, development, integration, and testing of capabilities needed to meet validated requirements for Block 30 aircraft, including continuing aircraft system upgrade for Enhanced Integrated Sensor Suite (EISS) sensors, the Airborne Signals Intelligence Payload (ASIP), and alternate sensor payloads.

This project supports system engineering/program management, test and evaluation, management services, and fielding support for all RQ-4 projects. This reflects contracting/acquisition strategy for these common elements within the Global Hawk program to provide efficiencies.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver RQ-4 UAV weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: RQ-4 Block 30 Development and Demonstration	0.121	11.800	-
Description: Global Hawk Unmanned Aerial Vehicle Development and Demonstration includes enterprise management, test and evaluation, software integration, and fielding support for all RQ-4 projects as well as periodic Operational Flight Program updates and releases, studies and analysis supporting future system enhancements.			
FY 2020 Plans: - Conclude EISS, ASIP, and MAU modification efforts			
FY 2020 to FY 2021 Increase/Decrease Statement:			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675145 / RQ-4 Block 30

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
- Funding decreased due to Block 20/30 divestiture			
Title: RQ-4 Infrastructure	-	18.961	-
Description: RQ-4 Infrastructure includes systems engineering, program management, test and evaluation, and fielding support for all RQ-4 projects as well as periodic Operational Flight Program updates and releases, studies, development testing, and Other Government Costs (OGC). This funding was previously included in the RQ-4 Block 30 Development and Demonstration and Block 30 Government Test and Non-Prime Support Accomplishments/Planned Programs, including funding for the 412 TW at Edwards AFB, AFOTEC, JTIC DCGS and other interoperability partners.			
FY 2020 Plans: - Continue development of Operational Flight Program updates - Continue program test activities - Continue non-prime engineering and technical support and Other Government Costs			
FY 2020 to FY 2021 Increase/Decrease Statement: - Funding decreased due to Block 20/30 divestiture			
Accomplishments/Planned Programs Subtotals	0.121	30.761	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• APAF 05 Line Item HAWK00: RQ-4 Mods	123.715	1.704	40.468	-	40.468	41.076	64.433	123.305	8.991	0.000	403.692
• APAF 07 Line Item RQ4DIS: RQ-4 Post Production Support	40.641	47.246	32.585	-	32.585	63.487	66.819	15.962	0.000	0.000	266.740

Remarks

D. Acquisition Strategy

The RQ-4 program uses an evolutionary acquisition strategy to provide the warfighter with a near-term combat capability with increased time-phased capability improvements as technology and risk achieve satisfactory levels. Northrop Grumman Corporation is the prime contractor. A suite of contract vehicles is used for development efforts: primarily, Indefinite Delivery, Indefinite Quantity (IDIQ) contracts cover development, system upgrade, production, retrofit, fielding, and sustainment efforts. MS-177 Sensor Enhancement RDT&E is being contracted directly with the Original Equipment Manufacturer (OEM), Collins Aerospace.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
3600 / 7	PE 0305220F / RQ-4 UAV	675145 / RQ-4 Block 30

The program successfully completed Milestone (MS) C in February 2015 and is transitioning core program activities to the Operations and Support phase of the Defense Acquisition System over the next several years. Future required capabilities beyond the core Acquisition Category (ACAT) IC RQ-4 program will be completed as separate ACAT II and ACAT III modification programs.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675145 / RQ-4 Block 30
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Global Hawk Engineering Manufacturing and Development	SS/ Various	Northrop Grumman Integrated Systems : San Diego, CA	323.010	0.121	Jun 2019	11.800	Jan 2020	-		-		-	0.000	334.931	346.557
RQ-4 MS-177 Sensor Integration	SS/ Various	Various : Various	121.332	-		-		-		-		-	0.000	121.332	212.033
RQ-4 Infrastructure	Various	Various : Various	18.806	-		13.961	Mar 2020	-		-		-	106.646	139.413	147.214
Subtotal			463.148	0.121		25.761		-		-		-	106.646	595.676	N/A

Remarks
 Target Value of the Global Hawk EMD, IDIQ, and EPIC Contracts are not segregated by Budget Project Number.
 Target Value of MS-177 contract includes \$90.602M of funding in Budget Project Number 675149, RQ-4 Capability Enhancements.
 Target Value of RQ-4 Infrastructure Contracts are not segregated by Budget Project Number.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Non Prime Technical Support	Various	Various : Dayton, OH	3.516	-		-		-		-		-	0.000	3.516	3.516
Subtotal			3.516	-		-		-		-		-	0.000	3.516	N/A

Remarks
 Target Value of the Global Hawk effort is not segregated by Budget Project Number.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Flight Test & Evaluation	MIPR	412 TW : Edwards AFB, CA	40.626	-		5.000	Jan 2020	-		-		-	0.000	45.626	50.789
Subtotal			40.626	-		5.000		-		-		-	0.000	45.626	N/A

Remarks
 Target Value of the Global Hawk effort is not segregated by Budget Project Number.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675145 / RQ-4 Block 30
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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMA: A&AS	Various	Various : Dayton, OH	12.526	-		-		-		-		-	0.000	12.526	12.526
PMA: Other Government Costs	Various	Various : Dayton, OH	4.027	-		-		-		-		-	0.000	4.027	6.060
Subtotal			16.553	-		-		-		-		-	0.000	16.553	N/A

Remarks
Target Value of the Global Hawk effort is not segregated by Budget Project Number.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	523.843	0.121	30.761	-	-	-	106.646	661.371	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675145 / RQ-4 Block 30
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

RQ-4 Block 30	
Enhanced Weather Capability Development	
ASIP Inc 1 Development	
RQ-4 Infrastructure & Test	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675145 / RQ-4 Block 30
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
RQ-4 Block 30				
Enhanced Weather Capability Development	1	2019	2	2020
ASIP Inc 1 Development	1	2019	3	2020
RQ-4 Infrastructure & Test	1	2019	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675149 / RQ-4 Capability Enhancements
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675149: RQ-4 Capability Enhancements	185.486	221.554	160.472	134.589	0.000	134.589	29.283	19.318	30.283	41.307	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The RQ-4 Remotely Piloted Aircraft (RPA) provides a high altitude, deep look, long-endurance Intelligence, Surveillance, and Reconnaissance (ISR) capability that complements space and other airborne collectors during peacetime, crisis, and war-fighting scenarios. RDT&E funding in this project supports design, development, integration, and testing of capabilities needed to meet validated requirements for RQ-4 aircraft, including continuing aircraft system upgrade for current and alternate sensor payloads.

This funding also supports aircraft systems upgrades to include continuing airframe updates, aircraft operations surety, cybersecurity, airspace and interoperability enhancements, information assurance, and mission critical repair of Government Furnished Equipment (GFE). This project will include systems engineering/program management, configuration and data management, test and evaluation, management services, Deficiency Report (DR)/Military Intelligence Program (MIP) Investigations, studies and analysis and fielding support for Block 30, Block 40, and Ground Segment/Communication Systems.

Activities include airspace and interoperability and communication enhancements and updates, periodic Operational Flight Program updates and releases, airframe and software upgrades, effort to bring early production aircraft to current operational configurations, deficiency report resolution across RQ-4 fleet, sensor enhancements including data distribution and storage, and alternate sensor upgrades including the MS-177, ISR Payload Adapter, enhanced communications capabilities, support for demonstration and technology insertion, development and testing of ice protection system, enhanced mission flexibility to accommodate changes to mission objectives inflight, enhancements to support multi-domain contested environment operations, and studies and analysis supporting future system enhancements. Additionally, this project supports design, development, integration, and testing of items needed to meet validated requirements for Block 20/30/40 aircraft, including further development, mode creation, integration and test of the Multi-Platform Radar Technology Insertion Program (MP-RTIP) sensor capabilities, continued aircraft/communications systems upgrade, increased power generation, additional radar modes, reliability and maintainability improvements, Ground Segment Modernization Program (GSMP) efforts, as well as next-generation communications capabilities. GSMP resolves fleet grounding Diminishing Manufacturing Sources (DMS) and obsolescence issues associated with ground segment equipment and provides critical warfighter capabilities such as building-based multi-aircraft control. It will also enhance interoperability data dissemination as well as provide training capability. This funding also addresses DMS resolution for other mission critical equipment.

RDT&E funding in this project also supports design, development, integration and testing of the weapon system's legacy ground elements and communications capabilities to enhance functionality and maintain interoperability prior to GSMP fielding. The ground segment currently includes the Mission Control Elements (MCE), the Launch and Recovery Elements (LRE), and the networking resources required to simultaneously disseminate intelligence information while remaining compliant with DoD cybersecurity network requirements to operate in the DoD Information Network (DoDIN).

This project supports system engineering/program management, test and evaluation, management services and fielding support for all RQ-4 projects. This reflects contracting/acquisition strategy for these common elements within the Global Hawk program to provide efficiencies.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675149 / RQ-4 Capability Enhancements
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The RQ-4 program will maintain and upgrade interoperability for Blocks 20/30/40 with system of systems partners and continue to incorporate applicable synergies with other platforms such as the U.S. Navy's Triton, other RPA weapon systems, and Processing, Exploitation & Dissemination (PED) elements. The networking capability for intelligence dissemination is required to provide the data transport interface between the Weapons System, Operations Centers, and external Intelligence Community customers.

Beginning in FY21, to support the divestiture of the Block 20/30 aircraft, efforts will be pivoted to focus on supporting the Block 40 fleet and closing out Block 30 efforts to maximize value to the USAF and DoD.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver RQ-4 UAV weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F.

When judged feasible and affordable, this program will participate in the development, testing, and implementation of international standards to enhance joint, allied, and coalition interoperability. Studies and activities may be initiated to further explore the utility of incorporating the emerging architectural standards such as the USAF Unmanned Aerial Systems (UAS) Command and Control Initiative (UCI) or the DoD's Unmanned Control Segment standards (UCS) and Open Mission Systems (OMS). Ground Segment Modernization Program (GSMP) will incorporate UCI and UCS standards.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
<p>Title: RQ-4 Capability Enhancements</p> <p>Description: RQ-4 Development and Demonstration (includes development, system integration, software integration, development test, and fielding support for RQ-4 projects including reliability and maintainability (R&M), diminishing manufacturer sourcing (DMS) as well as studies and analysis supporting future system enhancements). Also supports RQ-4 development testing at the 412 Test Wing at Edwards AFB, CA and also includes funding for support from Air Force Operational Test and Evaluation Center (AFOTEC), Joint Interoperability Test Command (JITC), Distributed Common Ground System (DCGS), other interoperability partners and Other Government Costs (OGC).</p> <p>FY 2020 Plans: - N/A</p> <p>FY 2021 Plans: - N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: - N/A</p>	7.107	0.000	0.000
<p>Title: Integrated Functional Capability 9 (IFC 9)</p>	7.771	0.000	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675149 / RQ-4 Capability Enhancements
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Description: IFCs are periodic hardware and software capability, releases similar to an Operational Flight Program (OFF). IFC 9 provides, radar Software Development (RSD) 1.5, Nose Wheel Steering enhancement, in flight Waypoint Modification as well as numerous software enhancement and deficiency resolutions, and Other Government Costs (OGC).</p> <p>FY 2020 Plans: - N/A</p> <p>FY 2021 Plans: - N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: - N/A</p>			
<p>Title: RQ-4 Ground Segment Modernization Program (GSMP)</p> <p>Description: GSMP resolves fleet grounding DMS and obsolescence issues associated with ground segment equipment and provides critical warfighter capabilities such as building-based multi-aircraft control. It will also enhance interoperability data dissemination as well as provide training capability.</p> <p>FY 2020 Plans: - Continue hardware purchase and installation for OT locations - Continue development technical publications, courseware and a trainer for the GSMP - Begin Developmental Test and Evaluation of GSMP.</p> <p>FY 2021 Plans: - Will conclude Developmental Test of GSMP. - Will prepare system for entry into Initial Operational Test and Evaluation.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: - Funding decreased due to completion of system integration.</p>	130.897	101.381	81.500
<p>Title: RQ-4 MS-177 Sensor Integration</p> <p>Description: Integration of MS-177 multispectral sensor into Block 30</p> <p>FY 2020 Plans: - Reduce MS-177A development and integration to minimal, demonstration for potential use on other DOD platforms.</p> <p>FY 2021 Plans:</p>	19.305	18.140	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675149 / RQ-4 Capability Enhancements

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
- N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: - Funding decreased due to FY21 funding being eliminated as part of Block 20/30 divestiture.			
Title: RQ-4 Infrastructure	56.474	40.951	53.089
Description: RQ-4 Infrastructure includes system engineering, program management, test and evaluation, and fielding support for all RQ-4 projects as well as periodic Operational Flight Program (OFP) updates and releases, development testing, and Other Government Costs (OGC). This funding was previously included in the RQ-4 Capability Enhancements Accomplishment/Planned Program, including funding for the 412th TW at Edwards AFB, AFOTEC, JTIC DCGS and other interoperability partners.			
FY 2020 Plans: - Continue to develop OFP releases - Perform government test and non-prime engineering and technical support and OGC - Continue to perform Contractor Test supporting MS-177, GSMP, and other capabilities being developed - Conduct risk reduction and analysis of ice protection solutions, continued system interoperability and upgrades, cybersecurity and information assurance and reliability & maintainability, and associated testing			
FY 2021 Plans: - Will begin to support the divestiture of the Block 20/30 aircraft, efforts will be pivoted to focus on supporting the Block 40 fleet and closing out Block 30 efforts to maximize value to the USAF and DoD			
FY 2020 to FY 2021 Increase/Decrease Statement: - Funding increased due to transfer of funds from Project 675145. Funds required to fulfill existing contractual obligations.			
Accomplishments/Planned Programs Subtotals	221.554	160.472	134.589

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item HAWK00: RQ-4 Mods	123.715	1.704	40.468	-	40.468	41.076	64.433	123.305	8.991	0.000	403.692
• APAF 07 Line Item RQ4DIS: RQ-4 Post Production Support	40.641	47.246	32.585	-	32.585	63.487	66.819	15.962	0.000	0.000	266.740

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675149 / RQ-4 Capability Enhancements
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D. Acquisition Strategy

The RQ-4 program uses an evolutionary acquisition strategy to provide the warfighter with a near-term combat capability with increased time-phased capability improvements as technology and risk achieve satisfactory levels. Northrop Grumman Corporation is the prime contractor. A suite of contract vehicles is used for development efforts: primarily, Indefinite Delivery, Indefinite Quantity (IDIQ) contracts cover development, system upgrade, production, retrofit, fielding, and sustainment efforts. MS-177 Sensor Enhancement RDT&E is being contracted directly with the Original Equipment Manufacturer (OEM), Collins Aerospace.

The program successfully completed Milestone (MS) C in February 2015 and is transitioning core program activities to the Operations and Support phase of the Defense Acquisition System over the next several years. Future required capabilities beyond the core Acquisition Category (ACAT) IC RQ-4 program will be completed as separate ACAT II and ACAT III modification programs.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675149 / RQ-4 Capability Enhancements
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
RQ-4 Capability Enhancements	SS/ Various	Northrop Grumman Integrated Systems : San Diego, CA	1.297	1.083	Dec 2019	-		-		-		-	Continuing	Continuing	2.380
Integrated Functional Capability 9	SS/CPIF	Northrop Grumman Integrated Systems : San Diego, CA	0.000	7.771	Feb 2020	-		-		-		-	Continuing	Continuing	7.771
RQ-4 Ground Segment Modernization Program (GSMP)	SS/CPIF	Northrop Grumman Integrated Systems : San Diego, CA	74.614	130.897	Nov 2018	101.381	Jan 2020	81.500	Jan 2021	-		81.500	Continuing	Continuing	414.785
RQ-4 MS-177 Sensor Integration	SS/ Various	Various : San Diego, CA	53.158	19.305	Feb 2019	18.140	Jan 2020	-		-		-	Continuing	Continuing	212.033
RQ-4 Infrastructure	Various	Various : Various	26.282	53.045	Mar 2019	22.751	Mar 2020	35.600	Mar 2021	-		35.600	Continuing	Continuing	203.878
RQ-4 Block 40 ISR Payload Adapter Design Study	SS/TBD	NGAS : San Diego, CA	8.000	-		-		-		-		-	Continuing	Continuing	8.000
Subtotal			163.351	212.101		142.272		117.100		-		117.100	Continuing	Continuing	N/A

Remarks
 Target Value of the RQ-4 EMD, IDIQ, and EPIC Contracts is not segregated by Budget Project Number.
 Target Value of IFC 9 is \$7.771M, paying for proposal prep costs only.
 Target Value of GSMP contract includes \$43.414M of funding in Budget Project Number 675147, RQ-4 Grnd Segment/Comm System
 Target Value of MS-177 contract includes \$121.431M of funding in Budget Project Number 675145, RQ-4 Block 30
 Target Value of RQ-4 Infrastructure is not segregated by Budget Project Number.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Non Prime Technical Support	Various	Various : Dayton, OH	0.527	1.590	Jan 2019	0.900	Jan 2020	1.290	Jan 2021	-		1.290	Continuing	Continuing	-
Subtotal			0.527	1.590		0.900		1.290		-		1.290	Continuing	Continuing	N/A

Remarks
 Target Value of the RQ-4 effort is not segregated by Budget Project Number.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675149 / RQ-4 Capability Enhancements
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Flight Test & Evaluation	MIPR	412 TW : Edwards AFB, CA	16.421	5.134	Mar 2019	5.360	Jan 2020	5.562	Jan 2021	-		5.562	Continuing	Continuing	-
Subtotal			16.421	5.134		5.360		5.562		-		5.562	Continuing	Continuing	N/A

Remarks
Target Value of the RQ-4 effort is not segregated by Budget Project Number.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMA: A&AS	Various	Various : Dayton, OH	4.829	0.655	Jan 2019	4.700	Nov 2019	4.200	Nov 2020	-		4.200	Continuing	Continuing	-
PMA: Other Government Costs	Various	Varous : Dayton, OH	0.358	2.074	Oct 2018	7.240	Oct 2019	6.437	Oct 2020	-		6.437	Continuing	Continuing	-
Subtotal			5.187	2.729		11.940		10.637		-		10.637	Continuing	Continuing	N/A

Remarks
Target Value of the RQ-4 effort is not segregated by Budget Project Number.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	185.486	221.554	160.472	134.589	-	134.589	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675149 / RQ-4 Capability Enhancements
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
<i>RQ-4 Capability Enhancements</i>																												
Sensor Enhancements & Upgrades (MS-177) Development																												
Ice Protection System Risk Reduction & Analysis																												
Ground Segment Maintenance/Upgrades Development																												
Ground Segment Modernization Program Development																												
Comms Systems Maintenance/Upgrades Development																												
RQ-4 Infrastructure & Test																												
Block 40 ISR Payload Adapter Design Study																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 675149 / RQ-4 Capability Enhancements

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
RQ-4 Capability Enhancements				
Sensor Enhancements & Upgrades (MS-177) Development	1	2019	4	2020
Ice Protection System Risk Reduction & Analysis	1	2019	4	2020
Ground Segment Maintenance/Upgrades Development	1	2019	4	2019
Ground Segment Modernization Program Development	1	2019	1	2023
Comms Systems Maintenance/Upgrades Development	1	2019	4	2025
RQ-4 Infrastructure & Test	1	2019	4	2025
Block 40 ISR Payload Adapter Design Study	4	2019	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 67RTIP / MP-RTIP
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67RTIP: MP-RTIP	244.794	0.000	0.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	245.294
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Project MDAP/MAIS Code: 293

Note

Beginning in FY09, the Multi-Platform Radar Technology Insertion Program (MP-RTIP) funding was transferred to program 0305220F (RQ-4) Global Hawk (GH). Therefore, the data in this package includes only FY09 and subsequent funding related to program 0305220F.

A. Mission Description and Budget Item Justification

The MP-RTIP sensor was designed as a family of modular, scalable sensors to provide next generation capabilities to support sustainable network centric operations with integrated Command and Control, Intelligence, Surveillance and Reconnaissance (C2ISR) capability. MP-RTIP provides the RQ-4 Block 40 aircraft with advanced Synthetic Aperture Radar (SAR) and Moving Target Indicator (MTI) sensor capabilities.

This project (67RTIP) includes MP-RTIP modernization and integration efforts for the RQ-4 Block 40 Platform. MP-RTIP modernization studies and development insertion include the implementation of Maritime Modes (MM), Maritime Inverse SAR (MISAR), product improvements and other advanced capabilities. GH Program Office will continue integration of radar capabilities to include Maritime Modes integration into RQ-4 aircraft and ground systems.

Activities also include studies and analysis supporting current and future program planning and future modes development based on user requirements.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MPRTIP weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Multi-Platform Radar Tech Insertion Program (MP-RTIP)	0.000	0.500	-
Description: MP-RTIP development and integration			
FY 2020 Plans: - Complete close-out actions for Prime contract.			
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to completion of project 67RTIP.			
Accomplishments/Planned Programs Subtotals	0.000	0.500	-

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 67RTIP / MP-RTIP
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C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item HAWK00: RQ-4 Mods	123.715	1.704	40.468	-	40.468	41.076	64.433	123.305	8.991	0.000	403.692
• APAF 07 Line Item RQ4DIS: RQ-4 Post Production Support	40.641	47.246	32.585	-	32.585	63.487	66.819	15.962	0.000	0.000	266.740
• RDTE 07 PE 0305238F: NATO AGS	51.745	33.322	37.675	-	37.675	1.745	1.784	1.826	1.869	0.000	129.966

Remarks

D. Acquisition Strategy

- Will complete transition to sustainment and GH Program Office will have responsibility for future radar development.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 67RTIP / MP-RTIP
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
MP-RTIP	SS/CPFF	Northrop Grumman Integrated Systems : El Segundo, CA	196.996	0.000		0.500		-		-		-	0.000	197.496	-
Subtotal			196.996	0.000		0.500		-		-		-	0.000	197.496	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
IRT Study	Various	Various : Various, NV	0.105	-		-		-		-		-	0.000	0.105	-
Logistics Planning	SS/CPFF	Northrop Grumman Integrated Systems : El Segundo, CA	3.667	-		-		-		-		-	0.000	3.667	-
Subtotal			3.772	-		-		-		-		-	0.000	3.772	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
Flight Test & Evaluation	MIPR	Various : Various, NV	9.536	-		-		-		-		-	0.000	9.536	-
Subtotal			9.536	-		-		-		-		-	0.000	9.536	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 67RTIP / MP-RTIP
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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PMA: A&AS	C/CPFF	Various : Various, NV	30.698	-		-		-		-		-	0.000	30.698	-
PMA: Other Gov't Cost	Various	Various : Boston, MA	3.792	-		-		-		-		-	0.000	3.792	-
Subtotal			34.490	-		-		-		-		-	0.000	34.490	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		244.794	0.000	0.500	-	-	-	245.294	N/A

Remarks
Funds are required in FY20 to close out the entire MP-RTIP SDD contract #F19628-00-C-0100.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 67RTIP / MP-RTIP
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

MP-RTIP	
SDD Contract Close Out	██████████

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305220F / RQ-4 UAV	Project (Number/Name) 67RTIP / MP-RTIP
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
MP-RTIP				
SDD Contract Close Out	2	2020	3	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305221F / <i>Network-Centric Collaborative Targeting</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	14.256	10.757	15.049	0.000	15.049	17.761	17.238	12.322	6.557	Continuing	Continuing
675197: <i>NCCT Core Technology</i>	-	14.256	10.757	15.049	0.000	15.049	17.761	17.238	12.322	6.557	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Network Centric Collaborative Targeting (NCCT) is the Air Force program of record for geo-location and is responsible for developing core technologies supporting the horizontal and/or vertical integration of Intelligence, Surveillance and Reconnaissance (ISR) sensor systems. The result of such integration is a multi-intelligence (multi-INT) sensor network. Operationally, NCCT Core Technologies provide a tactical collaborative multi-INT geolocation capability employed against high-value targets. NCCT software supports Machine-to-Machine (M2M) cross-cueing and Internet Protocol (IP) connectivity to coordinate collection activities across the NCCT network. NCCT correlation and fusion software ingests collection data to produce a single, composite track (geolocation and identification) in near real-time for high-value targets. NCCT research and development funding supports evolutionary development of the NCCT message set and network management systems (for example Operations Interfaces, Network Controllers, Fusion Engines, Data Guards, Interface to Command & Control, and Interface to Overhead Intelligence Operations (OIO)), the migration of the NCCT technologies to emerging network centric technologies, global web-enabled services, and satisfying DoD standards and Information Assurance requirements.

NCCT Core Technology includes, but is not limited to, network management software, a network messaging standard, correlation and fusion software, software supporting tactical-to-national Signals Intelligence (SIGINT) Concept of Operations (CONOPS), NCCT multi-level security hardware and software items and operator interfaces. Development funds support software modifications required for technology modernization specific to network and fusion architecture design, data fusion algorithms and cyber security, while keeping pace with evolving adversary tactics, techniques, and procedures (TTPs). FY 2021 funding will be dedicated to completing the transition of NCCT Core Technology to a cloud-enabled architecture across the enterprise, integrating with other intelligence phenomenologies, developing new multi-INT use cases, and the continuation of rapid software deliveries based on continuous user feedback and agile methodologies.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver NCCT weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.”

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305221F / <i>Network-Centric Collaborative Targeting</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	14.288	10.757	15.077	0.000	15.077
Current President's Budget	14.256	10.757	15.049	0.000	15.049
Total Adjustments	-0.032	0.000	-0.028	0.000	-0.028
• 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	-0.032	0.000	-0.028	0.000	-0.028

Change Summary Explanation

FY19: -0.032 reflects actuals
FY21: -0.028 is inflation adjustment

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: Core Technology</p> <p>Description: Accomplishments and planned efforts include development and upgrade of Network-Centric Collaborative Targeting (NCCT) Core Technology; technical support to users, fielding new user capabilities, and management activities</p> <p>FY 2020 Plans: Completes development efforts to include, but would not be limited to, historical data archiving/retrieval, mission replay, user interface upgrades and "ease of use" functionality/features enhancing the user experience, features improving the Target Definition (TD) management process, cloud computing development efforts, OS transition (from Windows to Linux), and simulation tools/applications upgrades.</p> <p>FY 2021 Plans: Will be dedicated to completing the transition of NCCT Core Technology to a cloud-enabled architecture across the enterprise, integrating with other intelligence phenomenologies, developing new multi-INT use cases, and the continuation of rapid software deliveries based on continuous user feedback and agile methodologies.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: -\$4M reprogramming in FY20. Increase from inflation based on original ramp.</p>	14.256	10.757	15.049
Accomplishments/Planned Programs Subtotals	14.256	10.757	15.049

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305221F / <i>Network-Centric Collaborative Targeting</i>
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D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 832070: <i>Intelligence Comm Equipment</i>	3.095	3.148	2.997	-	2.997	3.261	3.318	3.378	5.409	Continuing	Continuing

Remarks

E. Acquisition Strategy

The Network-Centric Collaborative Targeting (NCCT) Core Technology capabilities are developed, maintained and sustained with baseline/incremental upgrades plus any Quick Reaction Capability (QRC) developments acquired through the 645th Aeronautical System Group (645 AESG) in accordance with their Program Management Directive (PMD), Class Justification and Approval (J&A), and Life Cycle Management Plan (LCMP) across the full spectrum of system life cycle management ("cradle to grave" support concept). Due to the rapidly changing threat environment encountered during our prolonged commitment to Overseas Contingency Operations (OCO), the acquisition program manager has the authority to redirect funding as necessary to meet current stated and emerging/evolving Combatant Commander requirements.

645 AESG, Wright Patterson AFB OH, manages the Cost Plus Fixed Fee (CPFF) contracts used to develop NCCT Core Technology. 645 AESG will develop NCCT Core Technology software on common hardware for systems and platforms designated to field this ISR capability. Individual platform program management offices may contract directly with their prime contractors or through the 645 AESG for integration of NCCT capabilities on their respective systems and platforms.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force			Date: February 2020				
Appropriation/Budget Activity 3600 / 7		R-1 Program Element (Number/Name) PE 0305221F / <i>Network-Centric Collaborative Targeting</i>			Project (Number/Name) 675197 / <i>NCCT Core Technology</i>		

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Core Technology	
Version 5.2 - 5.4 Fielding	
Version 6.0 Development, Integration, and Test	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305221F / <i>Network-Centric Collaborative Targeting</i>	Project (Number/Name) 675197 / <i>NCCT Core Technology</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Core Technology				
Version 5.2 - 5.4 Fielding	1	2020	4	2022
Version 6.0 Development, Integration, and Test	1	2019	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305238F / NATO AGS
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	51.527	32.567	36.731	0.000	36.731	0.795	0.809	0.824	0.839	Continuing	Continuing
676001: NATO AGS	-	51.527	32.567	36.731	0.000	36.731	0.795	0.809	0.824	0.839	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program funds the U.S. contribution to the Alliance Ground Surveillance (AGS) system, a North Atlantic Treaty Organization (NATO), Direct Commercial Sale acquisition. AGS is an airborne ground surveillance capability that provides continuous, wide area surveillance in all weather conditions. It will provide NATO decision makers with near real time information and situational awareness concerning friendly, neutral and opposing ground and maritime forces to support mission planning and execution, including force protection and targeting. All NATO nations will have access to AGS collection data, creating opportunities for burden sharing with the processing and exploitation of Intelligence, Surveillance, and Reconnaissance (ISR) data.

The AGS program includes: air and ground segment acquisitions, operations of the NATO AGS Management Agency (NAGSMA), development of operations and support definition and establishment of an initial support capability. The air segment consists of five (5) air vehicles based on unique exportable configurations of the United States Air Force Global Hawk air frame, Navy Triton command and control architecture and the U.S. Multi-Platform Radar Technology Insertion Program (MP-RTIP) radar. The U.S. will also integrate new Maritime Moving Target and Inverse Synthetic Aperture Radar capability into the MP-RTIP radar for NATO AGS. The ground segment consists of fixed site and transportable/mobile ground stations for air vehicle Command and Control (C2), data exploitation and distribution. Operations and continuing In-Service Support will be funded through a future NATO Military Commanders' Capability Package funded within the NATO Security Investment Program (NSIP).

U.S. participation in NATO AGS was ratified by Secretary of Defense (SECDEF) signature/approval of the NATO AGS Program Memorandum of Understanding (PMOU) in June 2009 and includes 15 nations. In FY 2012, OSD transferred the NATO AGS program to the U.S. Air Force (USAF) for management and execution of the Research and Development effort.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Alliance Ground Surveillance weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305238F / NATO AGS
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	51.527	32.567	1.787	0.000	1.787
Current President's Budget	51.527	32.567	36.731	0.000	36.731
Total Adjustments	0.000	0.000	34.944	0.000	34.944
• 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	34.944	0.000	34.944

Change Summary Explanation

Funding increased due to contract award for maritime modes and program protection integration and testing.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
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Title: Design / Development of NATO Alliance Ground Surveillance (AGS)	5.848	5.848	0.254
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Description: U.S. contribution to NATO for AGS development acquisition and initial fielding. Supports configuration changes at a system level and air vehicle exportability modifications.

FY 2020 Plans:
-Completing production/development and integration

FY 2021 Plans:
- Will support U.S. Government's contribution to NATO AGS Management Agency (NAGSMA) closeout costs.

FY 2020 to FY 2021 Increase/Decrease Statement:
Funding decreased due to imminent delivery of aircraft and transition to maritime mode updates.

Title: Design/Development of Maritime Modes	43.663	24.682	23.507
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Description: Supports development and flight testing of maritime modes capability for RTIP and additional configuration changes that cannot be performed under the direct commercial sale contract between Northrop Grumman and NAGSMA.

FY 2020 Plans:

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0305238F / NATO AGS		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>-Continuing development of maritime modes capability and additional configuration changes. Includes pre-contract negotiations and final award with Northrop Grumman.</p> <p>FY 2021 Plans: -Will continue development of Maritime Modes Capability and additional configuration changes. Will integrate new software into ground systems for test.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: Technical Support for NATO Alliance Ground Surveillance (AGS)</p> <p>Description: Provide engineering and logistics support for NATO AGS development, fielding, deferred capabilities, and obsolescence studies.</p> <p>FY 2020 Plans: -Continuing engineering, logistics and program office support for NATO AGS development and initial fielding.</p> <p>FY 2021 Plans: -Will continue engineering, logistics, and program office support for NATO AGS initial fielding. Will support evaluation of fielded aircraft to inform studies on sustainment requirements.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to transition to the initial fielding phase of the program.</p>		0.981	1.002	0.103
<p>Title: Test and Evaluation Support for NATO Alliance Ground Surveillance (AGS)</p> <p>Description: Provide testing and evaluation via the Air Force Test Center.</p> <p>FY 2020 Plans: -Continuing flight test support to AGS development and initial fielding.</p> <p>FY 2021 Plans: -Will conduct Maritime Modes flight testing.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to flight testing of maritime mode updates.</p>		1.035	1.035	12.867
Accomplishments/Planned Programs Subtotals		51.527	32.567	36.731

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305238F / NATO AGS
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D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• RDTE 07 PE 0305220F: RQ-4 UAV	221.690	191.733	140.291	-	140.291	29.327	19.347	-	-	Continuing	Continuing

Remarks

E. Acquisition Strategy

Acquisition of the AGS system is being accomplished via a single delivery strategy. The system will be delivered via a fixed price direct commercial sale contract between Northrop Grumman Integrated System Sector International, Incorporated (NGISSII) & NATO, which was signed on 20 May 2012. The program is managed by the NATO AGS Management Agency (NAGSMA). A US contract will be utilized for the integration and testing of Maritime Modes and will be finalized in FY20.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305238F / NATO AGS	Project (Number/Name) 676001 / NATO AGS
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
NATO AGS Design / Development	SS/FFP	NATO AGS Management Agency : Brussels, Belgium	-	5.848	Oct 2018	5.848	Oct 2019	0.254	Oct 2020	-		0.254	Continuing	Continuing	-
MP-RTIP for NATO AGS Design / Development	SS/FFP	AFLCMC/HB : Hanscom AFB, MA	-	43.663	Dec 2018	24.682	Dec 2019	23.407	Dec 2020	-		23.407	Continuing	Continuing	-
Subtotal			-	49.511		30.530		23.661		-		23.661	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
NATO AGS Technical Support	SS/FFP	Multiple : Hanscom, WPAFB, OH	-	0.300	Oct 2018	0.300	Dec 2019	0.103	Oct 2020	-		0.103	Continuing	Continuing	-
Subtotal			-	0.300		0.300		0.103		-		0.103	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
NATO AGS Test and Evaluation Support	SS/FFP	Multiple: AFLCMC/WI, AFLCMC/HB, 412 TW, 88 CG : Hanscom, WPAFB, Edwards	-	1.035	Oct 2018	1.035	Oct 2019	12.867	Oct 2020	-		12.867	Continuing	Continuing	-
Subtotal			-	1.035		1.035		12.867		-		12.867	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305238F / NATO AGS	Project (Number/Name) 676001 / NATO AGS
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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
NATO AGS Management Services	SS/FFP	Multiple : Hanscom, WPAFB, Pax River	-	0.681	Jan 2019	0.702	Oct 2019	0.100	Oct 2020	-		0.100	Continuing	Continuing	-
Subtotal			-	0.681		0.702		0.100		-		0.100	Continuing	Continuing	N/A
Project Cost Totals			-	51.527		32.567		36.731		-		36.731	Continuing	Continuing	N/A

Remarks
 The Industrial Structure consists of Northrop Grumman (Northrop Grumman Integrated Systems Sector International, Incorporated - NGISSII) prime contractor, three subcontractors, and 15 participating nation industries that will receive direct work. There are no indirect offsets. The technical support of the NATO AGS program includes Advisory & Assistance Services to NATO. The test and evaluation support of the NATO AGS program includes the AFMC 412 Test Wing support of Flight Testing and Frequency Management by the AFMC 88 Communication Group. The management services support of the NATO AGS program includes MITRE Engineering, U.S. Navy's Triton program office support, U.S. government travel, and supplies.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305238F / NATO AGS	Project (Number/Name) 676001 / NATO AGS
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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 AGS																												
Design and Development - NATO AGS																												
Aircraft #1 Ferry Flight to Main Ops Base (November 2019)																												
Aircraft #2 Delivery to NATO (December 2019)																												
Aircraft #3 & #4 Delivery to NATO (March 2020)																												
Aircraft #5 Delivery to NATO																												
System Level Performance Verification (December 2019 - February 2020)																												
IOC (March 2020)																												
FOC (September 2023)																												
Test & Eval Support to NATO AGS																												
Flight Test - NATO AGS (September 2019 - March 2020)																												
Design & Development- Maritime Mode																												
Tech Support - NATO AGS																												
Maritime Mode Test Support																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305238F / NATO AGS	Project (Number/Name) 676001 / NATO AGS
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
NATO AGS				
Design and Development - NATO AGS	1	2019	4	2021
Aircraft #1 Ferry Flight to Main Ops Base (November 2019)	1	2020	1	2020
Aircraft #2 Delivery to NATO (December 2019)	1	2020	1	2020
Aircraft #3 & #4 Delivery to NATO (March 2020)	2	2020	2	2020
Aircraft #5 Delivery to NATO	3	2020	3	2020
System Level Performance Verification (December 2019 - February 2020)	1	2020	2	2020
IOC (March 2020)	2	2020	2	2020
FOC (September 2023)	4	2023	4	2023
Test & Eval Support to NATO AGS	1	2019	4	2020
Flight Test - NATO AGS (September 2019 - March 2020)	4	2019	2	2020
Design & Development- Maritime Mode	1	2019	2	2022
Tech Support - NATO AGS	1	2019	4	2023
Maritime Mode Test Support	2	2020	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305240F / <i>Support to DCGS Enterprise</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	26.579	37.774	33.547	0.000	33.547	14.496	14.699	14.913	15.147	Continuing	Continuing
674826: <i>Common Imagery Ground / Surface Systems</i>	-	15.100	15.382	1.088	0.000	1.088	2.371	2.358	2.350	2.353	Continuing	Continuing
675265: <i>Common Imagery Processor (CIP)</i>	-	11.479	22.392	32.459	0.000	32.459	12.125	12.341	12.563	12.794	Continuing	Continuing

Note

In FY 2021, the majority of funding in PE 0305240F, Support to DCGS Enterprise, Project 674826, Common Imagery Ground/Surface Systems, was transferred to PE 0305208L Distributed Common Ground/Surface System for the Defense Intelligence Agency's Common Data Fabric effort.

A. Mission Description and Budget Item Justification

This Program Element funds 1) the Intelligence Integration Office (I2O), formerly the Distributed Common Ground System (DCGS) Multi-service Execution Team (MET) Office (DMO), which oversees the DCGS Integration Backbone (DIB) development, modernization, integration, test, and community support in support of Defense Intelligence Information Enterprise (DI2E), Combatant Commands and Coalition/Partner Intel Operations and 2) the DCGS Enterprise Interoperability effort and 3) the Imagery Processing effort which consists of the Virtual Imagery Processing Capability (VIP-C) program.

1)The I2O oversees Enterprise Interoperability for Defense Intelligence Information Enterprise (DI2E), Combatant Commands and Coalition/Partner Intel Operations. All Services must pursue a common path based on a set of common enterprise services consistent with the DoD's net-centric vision. The DoD charged the Air Force to lead the development, modernization, integration, test, and community support of the Enterprise services to include implementation of international standards (including NATO standardization agreements) to ensure joint, allied, and coalition interoperability. The DIB is a set of enterprise standards and services that enable interoperability and component reuse and provide a flexible and singularly sustainable path to information sharing across the global ISR enterprise including, Next Generation Interoperability (NGI), which will deliver modernized federation profiles, interfaces, methodologies, and data interchange standards without relying upon legacy DIB federation standards and dependencies through common language, common mechanisms, and quality exposure. The deployment of these services into the DI2E Common Data Fabric (CDF) will provide common applications and a managed service framework for the development, test and integration of machine-aided decision making capabilities. The I2O manages the DCGS Test Laboratory (DTL) at Hanscom AFB. This facility supports software development and test for DI2E evaluation during exercises such as Enterprise Challenge and Storm Force.

2) The DCGS Enterprise Interoperability effort provides support to OUSD(I), AF DCGS and NATO interoperability efforts. This includes the development, testing, and implementation of international standards (to include NATO standardization agreements) to ensure joint, allied, and coalition interoperability.

3) The Imagery Processing effort develops the Virtual Imagery Processing Capability (VIP-C) within the DCGS architecture. The VIP-C provides end-to-end image processing to include raw data ingest, data format standardization to facilitate exploitation, secondary image processing, metadata conditioning, and image quality enhancements. Current efforts are focused on 1) ensuring new sensors being fielded and associated data types can be processed and 2) increasing investment in the

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305240F / <i>Support to DCGS Enterprise</i>
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Machine Assisted Geospatial Intelligence (GEOINT) Exploitation (MAGE) capability.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver AF DCGS system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	26.579	37.774	50.844	0.000	50.844
Current President's Budget	26.579	37.774	33.547	0.000	33.547
Total Adjustments	0.000	0.000	-17.297	0.000	-17.297
• 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	-17.297	0.000	-17.297

Change Summary Explanation

In FY 2021, \$13.3 million in PE 0305240F, Support to DCGS Enterprise, Project 674826, Common Imagery Ground/Surface Systems, was transferred to PE 0305208L Distributed Common Ground/Surface System for the Defense Intelligence Agency's Common Data Fabric (CDF) effort.

In addition, the FY 2021 funding request was reduced by \$3.997 million to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305240F / Support to DCGS Enterprise				Project (Number/Name) 674826 / Common Imagery Ground / Surface Systems			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
674826: <i>Common Imagery Ground / Surface Systems</i>	-	15.100	15.382	1.088	0.000	1.088	2.371	2.358	2.350	2.353	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2021, \$13.3 million in PE 0305240F, Support to DCGS Enterprise, Project 674826, Common Imagery Ground/Surface Systems, was transferred to PE 0305208L Distributed Common Ground/Surface System for the Defense Intelligence Agency's Common Data Fabric (CDF) effort. (A total of \$69.5 million was transferred from FY 2021-2025 for the CDF effort.)

A. Mission Description and Budget Item Justification

This Program Element funds the Intelligence Integration Office (I2O), formerly the Distributed Common Ground System (DCGS) Multi-service Execution Team (MET) Office (DMO), which oversees the DCGS Integration Backbone (DIB) development, modernization, integration, test, and community support in support of Defense Intelligence Information Enterprise (DI2E), Combatant Commands and Coalition/Partner Intel Operations.

The I2O oversees Enterprise Interoperability for Defense Intelligence Information Enterprise (DI2E), Combatant Commands and Coalition/Partner Intel Operations. All Services must pursue a common path based on a set of common enterprise services consistent with the DoD's net-centric vision. The DoD charged the Air Force to lead the development, modernization, integration, test, and community support of the Enterprise services to include implementation of international standards (including NATO standardization agreements) to ensure joint, allied, and coalition interoperability. The DIB is a set of enterprise standards and services that enable interoperability and component reuse and provide a flexible and singularly sustainable path to information sharing across the global ISR enterprise including, Next Generation Interoperability (NGI), which will deliver and maintain modernized federation profiles, interfaces, methodologies, and data interchange standards without relying upon legacy DIB federation standards and dependencies through common language, common mechanisms, and quality exposure. The deployment of these services into the DI2E Common Data Fabric (CDF) will provide common applications and a managed service framework for the development, test and integration of machine-aided decision making capabilities. The I2O manages the DCGS Test Laboratory (DTL) at Hanscom AFB. This facility supports software development and test for DI2E evaluation during exercises such as Enterprise Challenge and Storm Force.

The funding also provides support to OUSD(I), AF DCGS and NATO interoperability efforts. This includes the development, testing, and implementation of international standards (to include NATO standardization agreements) to ensure joint, allied, and coalition interoperability.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver AF DCGS system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305240F / Support to DCGS Enterprise	Project (Number/Name) 674826 / Common Imagery Ground / Surface Systems		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Title: Distributed Common Ground / Surface System (DCGS) Integration Backbone and Test/Community Support for the DCGS Enterprise</p> <p>Description: Develop, modernize, integrate, test and manage the DIB and provide test/community support to the DCGS enterprise.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continue to re-architect Enterprise Hub Node to cloud native deployment. - Continue to develop/deploy tactical node implementation. - Continue to enhance synchronization of data and products between cloud and tactical node implementations to support Disconnected, Disrupted, Intermittent, and Limited (DDIL) operations. - Continue to implement and deploy NGI capabilities and prove out concepts during Enterprise Challenge/Storm Force, 20 Spirals, and Main Exercise. - Continue to leverage an Object Based Production strategy and utilize machine learning to enhance explicit Content, Discovery and Retrieval (CD&R). <p>FY 2021 Plans: None due to transfer of funds to DIA's Common Data Fabric (CDF) effort.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease due to funding transfer from PE 0305240F to PE 0305208L</p>		12.933	13.075	0.000
<p>Title: DCGS Enterprise Interoperability</p> <p>Description: Provide support to OUSD(I), AF DCGS and NATO Interoperability Enterprise efforts.</p> <p>FY 2020 Plans: Continue to support to OUSD(I), AF DCGS and NATO Interoperability Enterprise efforts.</p> <p>FY 2021 Plans: Will continue to support to OUSD(I), AF DCGS and NATO Interoperability Enterprise efforts.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding request was reduced to account for the availability of prior year execution balances.</p>		2.167	2.307	1.088
Accomplishments/Planned Programs Subtotals		15.100	15.382	1.088
C. Other Program Funding Summary (\$ in Millions)				
N/A				

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305240F / <i>Support to DCGS Enterprise</i>	Project (Number/Name) 674826 / <i>Common Imagery Ground / Surface Systems</i>

C. Other Program Funding Summary (\$ in Millions)

Remarks

D. Acquisition Strategy

The Air Force uses an evolutionary acquisition approach with version releases and periodic upgrades to develop, field, and upgrade the capabilities. The Air Force structures contracts to provide the improved capabilities through full and open competition to the maximum extent possible. For management, the Air Force leads the Intelligence Integration Office (I2O) which coordinates the Multi-Service requirements for the DIB and modern enterprise services in support of USD(I) direction.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)							
3600 / 7				PE 0305240F / Support to DCGS Enterprise					674826 / Common Imagery Ground / Surface Systems							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
DIB Modernization, Integration, DT and Interoperability	C/T&M	Various : Various	-	8.032	Jan 2019	8.729	Feb 2020	-		-		-	Continuing	Continuing	-	
DCGS Test and Community Support and Enterprise Support	C/CPAF	Various : Various	-	1.564	Feb 2019	-		-		-		-	Continuing	Continuing	-	
Subtotal			-	9.596		8.729		-		-		-	Continuing	Continuing	N/A	
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
HCIC & IA	C/Various	Various : Various	-	0.444	Jan 2019	0.173	Jan 2020	-		-		-	Continuing	Continuing	-	
DCGS Enterprise Interoperability	C/Various	Various : Various	-	2.167	Apr 2019	2.307	Apr 2020	1.088	Apr 2021	-		1.088	Continuing	Continuing	-	
Subtotal			-	2.611		2.480		1.088		-		1.088	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
FFRDC	C/CPFF	Various : Bedford, MA	-	0.121	Apr 2019	-		-		-		-	Continuing	Continuing	-	
A&AS	C/CPAF	Various : Various	-	2.574	Feb 2019	3.326	Feb 2020	-		-		-	Continuing	Continuing	-	
Program Management Administration	C/CPAF	Various : Various	-	0.198	Oct 2019	0.847	Oct 2020	-		-		-	Continuing	Continuing	-	
Subtotal			-	2.893		4.173		-		-		-	Continuing	Continuing	N/A	
Project Cost Totals			-	15.100		15.382		1.088		-		1.088	Continuing	Continuing	N/A	

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force							Date: February 2020			
Appropriation/Budget Activity 3600 / 7			R-1 Program Element (Number/Name) PE 0305240F / <i>Support to DCGS Enterprise</i>			Project (Number/Name) 674826 / <i>Common Imagery Ground / Surface Systems</i>				
	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305240F / Support to DCGS Enterprise	Project (Number/Name) 674826 / Common Imagery Ground / Surface Systems

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

DIB																												
DIB Version 4.6.X																												
DIB Version 4.7.X																												
DIB Next Generation Interoperability Version																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305240F / Support to DCGS Enterprise	Project (Number/Name) 674826 / Common Imagery Ground / Surface Systems

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>DIB</i>				
DIB Version 4.6.X	1	2019	3	2019
DIB Version 4.7.X	4	2019	4	2020
DIB Next Generation Interoperability Version	4	2019	4	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0305240F / Support to DCGS Enterprise				Project (Number/Name) 675265 / Common Imagery Processor (CIP)			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675265: Common Imagery Processor (CIP)	-	11.479	22.392	32.459	0.000	32.459	12.125	12.341	12.563	12.794	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Imagery Processing effort develops the Virtual Imagery Processing Capability (VIP-C) within the DCGS architecture. VIP-C accepts airborne imagery data, processes it into an exploitable format, and provides it to other elements within the weapon system and/or the DCGS Enterprise. Current efforts include further developing the virtual software capability to improve processing across the enterprise and testing, development, and demonstrations integrating updated and new/emerging sensors into DCGS. In addition, the project involves increasing capability through the Machine Assisted Geospatial Intelligence (GEOINT) Exploitation (MAGE) effort.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver AF DCGS system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Imagery Processor	11.479	22.392	32.459
Description: Continue developing VIP-C to keep pace with growing sensor baseline and enhance imagery data quality.			
FY 2020 Plans:			
- Continue to upgrade and improve VIP-C to enable better geo-coordinate accuracy, facilitate automated intelligence discovery and integrate new algorithms.			
- Continue MAGE research and development			
FY 2021 Plans:			
- Will continue to upgrade and improve VIP-C to enable better geo-coordinate accuracy, facilitate automated intelligence discovery and integrate new algorithms.			
- Will continue MAGE research and development by leveraging Department of Energy and Air Force Research Laboratory expertise. This includes identification of targets through machine learning algorithms, use and refinement of test harness, validation of new algorithms, and generation test data and methods.			
FY 2020 to FY 2021 Increase/Decrease Statement:			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305240F / Support to DCGS Enterprise	Project (Number/Name) 675265 / Common Imagery Processor (CIP)
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Increase due to additional funding for the MAGE effort.			
Accomplishments/Planned Programs Subtotals	11.479	22.392	32.459

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> Base	<u>FY 2021</u> OCO	<u>FY 2021</u> Total	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> Complete	<u>Total Cost</u> Continuing
• OPAF 04 Line Item 846080: DCGS-AF	38.720	21.918	22.288	-	22.288	22.694	23.091	23.507	23.937	Continuing	Continuing

Remarks

D. Acquisition Strategy

For imagery processing the Air Force uses an evolutionary acquisition approach with increments and spirals to develop, field, and upgrade the system and structure contracts for the improved capabilities through full and open competition to the maximum extent possible. In terms of management, Air Force leads the Cross Service Working Group that aligns imagery processing capabilities across the Joint Services in support of USD(I) direction.

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305240F / Support to DCGS Enterprise	Project (Number/Name) 675265 / Common Imagery Processor (CIP)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Virtual Imagery Processing Capability</i>				
Software Release (3.52)	2	2019	4	2019
Software Release (3.54)	4	2019	2	2020
Machine Assisted GEOINT Exploitation Investment	2	2020	4	2021
Software Release (3.56)	2	2020	4	2020
Software Release (3.58)	4	2020	1	2021
Software Release (3.60)	1	2021	4	2021
Software Release (3.x)	3	2021	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305600F / <i>International Intelligence Technology and Architectures</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	11.564	13.515	13.635	0.000	13.635	13.690	13.755	13.910	12.580	Continuing	Continuing
675898: <i>International Intelligence Technology and Arc</i>	-	11.564	13.515	13.635	0.000	13.635	13.690	13.755	13.910	12.580	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

International Intelligence Technology and Architectures oversees, manages, and provides the United States (US) component of the multi-national Battlefield Information Collection and Exploitation Systems (BICES) with a collaborative environment and intelligence sharing enterprise required for processing and disseminating critical intelligence information between and among US, North Atlantic Treaty Organization (NATO), allied and coalition forces. The US BICES program procures and maintains a standing intelligence information sharing capability across Department of Defense (DoD), Combat Support Agencies (CSA), and multiple Combatant Commands (CCMD) for the Office of the Under Secretary of Defense, Intelligence (OUSD(I)). At the request of OUSD(I), US BICES is extended beyond NATO nations into all CCMDs to support their unique partner relationships. This architecture is known as US BICES Extended (US BICES-X). US BICES provides an "enduring" US and Coalition interoperable intelligence and information sharing multi-level secure technical architecture utilizing releasable elements of the Defense Intelligence Information Enterprise (DI2E) framework and functions to support the full spectrum of intelligence operations and dissemination throughout the DoD community. US BICES/US BICES-X has been designated the enduring intelligence and information sharing component of the Mission Partner Environment (MPE).

Research and Development funding will:

- Provide increased intelligence information sharing capabilities in support of US and coalition forces utilizing the US BICES and NATO virtual networks and provide increased database information via Distributed Common Ground System Family of Systems.
- Expand available intelligence disciplines (Geospatial Intelligence, Signal Intelligence, and potentially Human Intelligence) to support US and allied/coalition forces.
- Support increased intelligence advanced analytics tools, Joint Intelligence Operation Center-IT and DI2E developments to significantly increase the timeliness of intelligence and bring US BICES/NATO Special Operations Forces Headquarters/NATO Intelligence Fusion Center capabilities into the current technology baselines.
- Develop and enhance a federated Trusted Network Environment (TNE) that incorporates Foreign Partner information sharing networks globally to support the National Defense Strategy.
- Develop multi-level security intelligence bi-laterals and multi-laterals to meet Combatant Commander Integrated Priority Lists.
- Expand capabilities for bi-lateral and multi-lateral federated TNEs in support of CCMD requirements.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305600F / <i>International Intelligence Technology and Architectures</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	8.464	13.515	13.660	0.000	13.660
Current President's Budget	11.564	13.515	13.635	0.000	13.635
Total Adjustments	3.100	0.000	-0.025	0.000	-0.025
• 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	3.100	0.000	-0.025	0.000	-0.025

Change Summary Explanation

N/A

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: International Intelligence Technology and Architectures</p> <p>Description: Continue the research and development in emerging and maturing technologies and capabilities for modernizing and transforming US BICES/US BICES-X for improved agility, scalability, access, cybersecurity, and data and information sharing tools and infrastructure.</p> <p>FY 2020 Plans: Continue development of US BICES-X capabilities including further integration of TNE into the MPE, and development and testing of coalition intelligence, surveillance, and reconnaissance (ISR) coalition capabilities. These efforts enable the modernization and transformation of the US BICES/BICES-X worldwide enterprise to enable the instantiation or interconnection of any partner network to support any operation.</p> <p>FY 2021 Plans: Continue development of US BICES-X capabilities including further integration of TNE into the MPE, and development and testing of coalition ISR coalition capabilities. These efforts will enable the modernization and transformation of the US BICES/BICES-X worldwide enterprise to enable instantiation or interconnection of any partner network to support any operation.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increase based on economic assumptions for inflation.</p>	11.564	13.515	13.635
Accomplishments/Planned Programs Subtotals	11.564	13.515	13.635

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305600F / <i>International Intelligence Technology and Architectures</i>
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D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• O&M PE 0305600F: <i>Int'l Intel Tech Architecture</i>	133.064	129.632	135.358	-	135.358	133.312	132.745	130.336	132.508	Continuing	Continuing
• OPAF 03 Line item 832050: <i>International Intelligence Technology and Architecture</i>	8.290	11.386	9.283	-	9.283	10.874	11.152	11.353	10.621	Continuing	Continuing

Remarks

The FY 2021 O&M funding was increased by \$5.670 million to support US BICES-X sustainment requirements.

The FY 2021 OPAF funding was decreased by \$2.016 million to account for the availability of prior year execution balances.

E. Acquisition Strategy

Utilize existing General Dynamics Mission Systems (GDMS) contract number FA8240-18-D-0360. The contract is structured as an Indefinite Delivery Indefinite Quantity (IDIQ) contract with a period of performance beginning 1 April 2018 through 31 March 2024. US BICES also utilizes the Air Force Research Laboratory as required for all third-party lab-based security assessments of TNE upgrade releases.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305600F / <i>International Intelligence Technology and Architectures</i>	Project (Number/Name) 675898 / <i>International Intelligence Technology and Arc</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
TNE Software	Various	AFRL : Rome, NY	-	11.564	Jan 2019	13.515	Jan 2020	13.635	Jan 2021	-		13.635	Continuing	Continuing	-
Subtotal			-	11.564		13.515		13.635		-		13.635	Continuing	Continuing	N/A
Project Cost Totals			-	11.564		13.515		13.635		-		13.635	Continuing	Continuing	N/A

Remarks

N/A

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305600F / <i>International Intelligence Technology and Architectures</i>	Project (Number/Name) 675898 / <i>International Intelligence Technology and Arc</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Trusted Network Environment (TNE) Software Version 4.1 features Web application programming interface (API), advanced search, user notifications, user-editable GAL, 2nd phase OS upgrade</i>				
TNE	4	2019	2	2021
<i>Trusted Network Environment Software Version 4.2 features UX enhancements, Cross-Domain VDI, VoIP/Video HD/VTC enhancements, 3rd phase OS upgrade</i>				
TNE	1	2020	4	2021
<i>Trusted Network Environment Software Version 4.3 features UX enhancements, FMV, chat peer federation, support for mission applications, 1st phase single sign-on, final phase OS upgrade</i>				
TNE	3	2019	2	2022
<i>Trusted Network Environment Software Version 5.0 features cloud-based implementation and virtualized connection methods</i>				
TNE	3	2021	2	2025

Note

- GAL - Global Address List
- OS - Operating System
- VDI - Virtual Desktop Infrastructure
- VoIP - Voice of IP
- UX - User Experience
- FMV - Full Motion Video
- HD/VTC - High Definition / Video Teleconferencing

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305881F / <i>Rapid Cyber Acquisition</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	4.146	4.383	4.262	0.000	4.262	4.545	4.627	9.271	9.441	Continuing	Continuing
670374: <i>Electronic Combat Spt, C3 Protection/Multi-Mission, Technology and Spt</i>	-	4.146	4.383	4.262	0.000	4.262	4.545	4.627	9.271	9.441	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Rapid Cyber Acquisition (RCA) initiative provides new cyber capabilities in response to a continuously evolving threat environment. The delivery of capabilities to Combatant and Joint Force Commanders, in mission relevant timeframes (0-60 days), enhances the nation's ability to operate within the highly-dynamic cyberspace domain.

The RCA initiative expedites cyber development and modifications of USAF cyber capabilities through the integration with and technical support to other Service and Government Agency activities to leverage select Air Force-developed technologies and/or operational capabilities. RCA develops material or non-material cyber solutions and conducts rapid prototyping, integration, and transition activities of cyber capabilities. Activities include but are not limited to development of software/hardware systems, integration and transition of lab-developed cyber capabilities, developmental testing, operational evaluation, manpower, studies, analysis, pilots, demonstrations, and risk reduction efforts for emerging technologies.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Rapid Cyber Acquisition capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F.

The FY 2021 funding request was reduced by \$0.198 million to account for the availability of prior year execution balance.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305881F / <i>Rapid Cyber Acquisition</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	4.303	4.383	4.460	0.000	4.460
Current President's Budget	4.146	4.383	4.262	0.000	4.262
Total Adjustments	-0.157	0.000	-0.198	0.000	-0.198
• 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	-0.157	0.000			
• Other Adjustments	0.000	0.000	-0.198	0.000	-0.198

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Rapid Cyber Acquisition (RCA)	4.146	4.383	4.262	0.000	4.262
Description: Provides dynamic research and development activities to leverage funding from cyber operations requirements owners to conduct quick look assessments, solution design, rapid prototyping, testing, and quick reaction fielding of cyber capabilities.					
FY 2020 Plans:					
- Provides professional and technical subject matter expertise to deliver direction and guidance for offensive cyber operations and computer network exploitation information systems to support the Air Force's cyber mission objectives					
- Implements multidisciplinary targeting, execute-target-systems analysis, and conduct developmental planning in support of the USAF cyber mission					
- Designs cyber solutions to meet specific combatant command, AF major command, and other agency requirements					
- Utilizes a highly skilled rapid reaction team to prototype and deliver cyber capability and perform quick look operational and technical assessments					
- Provides a secure lab capability to support research, prototyping, development, and testing of cyber warfare capabilities					
FY 2021 Base Plans:					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305881F / <i>Rapid Cyber Acquisition</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<ul style="list-style-type: none"> - Will continue to provide professional and technical subject matter expertise to deliver direction and guidance for offensive cyber operations and computer network exploitation information systems to support the Air Force's cyber mission objectives - Will maintain multidisciplinary targeting, conduct target systems analysis, and execute developmental planning in support of the USAF cyber mission - Will design cyber solutions to meet specific combatant command, AF major command, and other agency requirements - Will continue to utilize a highly skilled rapid reaction team to prototype and deliver cyber capability and perform quick look operational and technical assessments - Will provide an enhanced secure lab capability to support research, prototyping, development, and testing of cyber warfare capabilities <p>FY 2021 OCO Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: - Funding decreased to address other USAF priorities.</p>					
Accomplishments/Planned Programs Subtotals	4.146	4.383	4.262	0.000	4.262

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
The Rapid Cyber Acquisition (RCA) initiative utilizes a tailorable acquisition strategy that facilitates rapid delivery of material and nonmaterial solutions to solve operational cyber operations requirements. This approach allows flexibility for solutions to enter the acquisitions process at any phase of the acquisition life cycle. All plans contain sufficient information for the Milestone Decision Authority to determine readiness to enter into the applicable phase of the acquisition process.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305881F / <i>Rapid Cyber Acquisition</i>	Project (Number/Name) 670374 / <i>Electronic Combat Spt, C3 Protection/Multi-Mission, Technology and Spt</i>
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Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Cyber Capabilities Support Office (CCSO) Interagency Personnel Agreement (IPA)	SS/FFP	MIT Lincoln Laboratory : Lexington, MA	-	0.389	Dec 2018	0.389	Dec 2019	0.301	Nov 2020	0.000		0.301	Continuing	Continuing	0.389
Due Diligence Research & Analysis	SS/CPFF	Novetta solutions : Mclean, VA	-	0.157	Mar 2019	0.157	Mar 2020	0.000		0.000		0.000	0.000	0.314	-
Cyber Capability Design	C/FFP	X8 Solutions, Inc : Oak Hill, VA	-	1.670	Nov 2018	1.750	Nov 2019	1.331	Mar 2021	0.000		1.331	Continuing	Continuing	1.750
Internal Development	SS/CPFF	JHU Applied Physics Lab : Baltimore, MD	-	1.571	Apr 2019	1.728	Apr 2020	1.530	Feb 2021	0.000		1.530	Continuing	Continuing	1.728
Subtotal			-	3.787		4.024		3.162		0.000		3.162	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Joint Information Range Development Environment (CCSO Lab Environment)	SS/CPFF	Novetta Solutions : Mclean, VA	-	0.359	May 2019	0.359	May 2020	1.100	May 2021	0.000		1.100	Continuing	Continuing	0.359
Subtotal			-	0.359		0.359		1.100		0.000		1.100	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		-	4.146	4.383	4.262	0.000	4.262	Continuing	Continuing	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305881F / <i>Rapid Cyber Acquisition</i>	Project (Number/Name) 670374 / <i>Electronic Combat Spt, C3 Protection/Multi-Mission, Technology and Spt</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Cyber Capability Support Office (CCSO)</i>				
CCSO Technical Direction	1	2019	4	2025
Due Diligence Research and Analysis	1	2019	4	2020
Cyber Capability Design	1	2019	4	2025
Internal Development	1	2019	4	2025
JIOR Development Environment (CCSO Lab Environment)	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305984F / <i>Personnel Recovery Command & Ctrl (PRC2)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	2.385	2.133	2.207	0.000	2.207	2.605	2.651	2.699	2.749	Continuing	Continuing
675221: <i>Personnel Recovery Command and Control (PRC2)</i>	-	2.385	2.133	2.207	0.000	2.207	2.605	2.651	2.699	2.749	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project funds operational development necessary to acquire, modify, and sustain a segment of Air Force's C2 capabilities and services associated with Personnel Recovery (PR). The Personnel Recovery Command and Control (PRC2) program develops and delivers tools and services for planning, collaborating and managing search and rescue efforts, as well as disseminating related information to all personnel recovery mission coordinators across the PR network. PRC2 provides an adaptive and networked system, delivering timely situational awareness information supporting personnel accountability and recovery mission management worldwide. PRC2 delivers a globally accessible, collaborative, inter-operable and integrated set of capabilities to prevent, prepare for and respond to joint/coalition military personnel recovery activities, and civilian rescue missions. The Joint Personnel Recovery (JPR) Initial Capability Document (ICD) (2012) articulates capabilities needed for PRC2. Annex A to the Personnel Recovery Mission Version 3.0 is the requirement document for initial and full operational capability (IOC/FOC) criteria.

The system collects, stores and delivers personnel/identity biometric data, emergency locator beacon registrations, Isolated Personnel (IP) reports, evasion plans of action, incident reports and other information management capabilities. The information is used for predictive, preventive and personnel vulnerability analysis and assessment in support of PR across the Department of Defense and other national and international entities. Activities also include studies and analysis to support both current program planning and execution, as well as future program planning.

In FY 2021, Personnel Recover Mission Manager (PRMM) modifications will continue to use an Agile Development Security Operations (DevSecOps) strategy to develop, test and have field-ready PRMM versions in two week increments (sprints) with capability to field by individual story. The modifications will improve/validate IP events/alerts and enable case files for Defense Prisoner of War/Missing Personnel Office (DPMO) and Joint Personnel Recovery Agency (JPRA). PRMM modifications will reflect the requirements and priorities identified by Air Combat Command (ACC) as the personnel recovery environment evolves to meet the needs of the warfighter and personnel recovery efforts.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver PRC2 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

The FY 2021 funding request was reduced by \$0.345 million to account for the availability of prior year execution balances.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305984F / <i>Personnel Recovery Command & Ctrl (PRC2)</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	2.466	2.133	2.556	0.000	2.556
Current President's Budget	2.385	2.133	2.207	0.000	2.207
Total Adjustments	-0.081	0.000	-0.349	0.000	-0.349
• 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	-0.081	0.000			
• Other Adjustments	0.000	0.000	-0.349	0.000	-0.349

Change Summary Explanation

The FY 2021 funding request was reduced by \$0.345 million to account for the availability of prior year execution balances and \$0.004M for other reprogrammings.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: PRC2 - PRMM Development	2.185	1.933	2.007	0.000	2.007
Description: PRC2 will use an Agile Development Security Operations (DevSecOps) strategy to test and field tools and services for planning and managing search and rescue efforts, and disseminate the related information for personnel recovery.					
FY 2020 Plans: - Develop, test and have field-ready PRMM versions X.X.X through X.X.X.B in two-week increments with capability to field by individual story; development effort will encompass changes to a more Map Centric and user intuitive design, and an interface with Common Distress Reporting System (CDRS) to provide various user interface upgrades and application improvements for Personnel Recovery Coordination					
FY 2021 Base Plans: - Will develop, test and have field-ready PRMM versions X.X.X through X.X.X.C in two-week increments with capability to field by individual story; development effort will encompass changes to a more Map Centric and					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305984F / <i>Personnel Recovery Command & Ctrl (PRC2)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
user intuitive design, and an interface with Common Distress Reporting System (CDRS) to provide various user interface upgrades and application improvements for Personnel Recovery Coordination FY 2021 OCO Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to sprints.					
Title: PRC2 - PRMM Test and Evaluation Description: Test and Evaluation FY 2020 Plans: - Test and field PRMM Versions X.X.X through X.X.X.B FY 2021 Base Plans: - Will test and field PRMM Versions X.X.X through X.X.X.C FY 2021 OCO Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: N/A	0.200	0.200	0.200	0.000	0.200
Accomplishments/Planned Programs Subtotals	2.385	2.133	2.207	0.000	2.207

D. Other Program Funding Summary (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPAF 03 834520: <i>Theater Battle Mgt C2 System</i>	1.301	0.323	0.347	-	0.347	0.372	0.396	0.421	0.429	Continuing	Continuing

Remarks

E. Acquisition Strategy

PRC2 product support is provided to the program office by the 517th Software Engineering Squadron (517 SWES), Hill AFB Utah, in accordance with a memorandum of agreement and on a fee for service basis. This strategy to utilize the 517 SWES for agile product development and sustainment was reviewed and approved by

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0305984F / <i>Personnel Recovery Command & Ctrl (PRC2)</i>
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the Air Force Program Executive Officer for Digital, and implemented in mid-FY 2014. The work done by the 517 SWES includes, but is not limited to, modernization development, sustainment support services, and software maintenance of the PRC2 system.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305984F / <i>Personnel Recovery Command & Ctrl (PRC2)</i>	Project (Number/Name) 675221 / <i>Personnel Recovery Command and Control (PRC2)</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PRC2 - PRMM Agile Software Development	PO	Ogden ALC : Hill AFB, UT	-	2.175	Dec 2018	1.923	Dec 2019	1.997	Dec 2020	-		1.997	Continuing	Continuing	-
Subtotal			-	2.175		1.923		1.997		-		1.997	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PRC2 - PRMM Test and Evaluation	PO	45th Test Squadron : Eglin AFB, FL	-	0.200	Dec 2018	0.200	Dec 2019	0.200	Dec 2020	-		0.200	Continuing	Continuing	-
Subtotal			-	0.200		0.200		0.200		-		0.200	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
PRC2 - PRMM Program Support	TBD	Various : Hill AFB, UT	-	0.010	Mar 2019	0.010	Mar 2020	0.010	Mar 2021	-		0.010	Continuing	Continuing	-
Subtotal			-	0.010		0.010		0.010		-		0.010	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	2.385	2.133	2.207	-	2.207	Continuing	Continuing	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0305984F / <i>Personnel Recovery Command & Ctrl (PRC2)</i>	Project (Number/Name) 675221 / <i>Personnel Recovery Command and Control (PRC2)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Personnel Recovery Command & Control (PRC2)</i>				
PRMM Ver X.X.X - X.X.X.A Development, Testing and Fielding	2	2019	1	2020
PRMM Ver X.X.X - X.X.X.B Development, Testing and Fielding	2	2020	1	2021
PRMM Ver X.X.X - X.X.X.C Development, Testing and Fielding	2	2021	1	2022
PRMM Ver X.X.X - X.X.X.D Development, Testing and Fielding	2	2022	1	2023
PRMM Ver X.X.X - X.X.X.E Development, Testing and Fielding	2	2023	1	2024
PRMM Ver X.X.X - X.X.X.F Development, Testing and Fielding	2	2024	1	2025
PRMM Ver X.X.X - X.X.X.G Development, Testing and Fielding	2	2025	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0307577F / <i>Intelligence Mission Data (IMD)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	5.717	8.614	6.277	0.000	6.277	6.591	6.467	6.939	3.571	Continuing	Continuing
675306: <i>Analysis Enterprise</i>	-	1.337	7.820	6.277	0.000	6.277	6.591	6.467	6.939	3.571	Continuing	Continuing
675307: <i>TARGETING ENTERPRISE RESEARCH</i>	-	4.380	0.794	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Intelligence Mission Data (IMD) encompasses several key intelligence data efforts used to support IMD-dependent programs, including the fifth generation aircraft capabilities. The term IMD encompasses Red (adversary military systems), White (commercial systems), Blue (U.S. military systems), and Grey (neutral military systems) Characteristics & Performance; Signatures; Geospatial Intelligence; Electronic Warfare systems and Operational Order of Battle mission data. Supports fighter/ bomber operational reconnaissance and integration, focusing on leveraging fifth generation aircraft capabilities to augment the entire Combat Air Force. The PE funds: Planning & direction, collection, processing & exploitation, analysis & production, and dissemination & Evaluation (PCPAD-E) to support IMD-dependent programs.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	4.117	8.614	7.768	0.000	7.768
Current President's Budget	5.717	8.614	6.277	0.000	6.277
Total Adjustments	1.600	0.000	-1.491	0.000	-1.491
• 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	1.600	0.000	-1.491	0.000	-1.491

Change Summary Explanation

The FY 2021 funding request was reduced by \$1.491 million to account for the availability of prior year execution balances

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0307577F / <i>Intelligence Mission Data (IMD)</i>				Project (Number/Name) 675306 / <i>Analysis Enterprise</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675306: <i>Analysis Enterprise</i>	-	1.337	7.820	6.277	0.000	6.277	6.591	6.467	6.939	3.571	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2018, PE 0207431F, Combat Air Intelligence Systems, Intelligence Mission Data efforts were transferred to new for 2018 PE 0307577F, Intelligence Mission Data (IMD), in order to provide better oversight of IMD research and development. (+\$5.074M)

Intelligence Mission Data efforts in BPAC 675306 fund RDT&E to enable Advanced Non-cooperative Target Recognition (NCTR) collection, Operational Reconnaissance and traditional ELINT capabilities, advanced all-source analysis and production of IMD across EWIR, C&P, and Signatures to enable combat ID and ensure survivability for air superiority and global strike platforms.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: NCTR Collection and IMD Production Tools	1.337	7.820	6.277
Description: Development of MASINT collection systems, creation of automated tools to process ELINT data, and development of improved analysis, production, and dissemination tools to create IMD used for combat ID.			
FY 2020 Plans: Continue development of automated tools to disseminate measurement and signatures information, EWIR, C&P including developing and integrating automation machine learning to develop, document, and deliver models of advanced threat systems.			
FY 2021 Plans: Continue development of automated tools.			
FY 2020 to FY 2021 Increase/Decrease Statement: Increased contract costs.			
Accomplishments/Planned Programs Subtotals	1.337	7.820	6.277

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• 030577F: <i>Intelligence Mission Data</i>	0.606	0.000	0.476	-	0.476	0.000	0.000	-	-	Continuing	Continuing

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0307577F / <i>Intelligence Mission Data (IMD)</i>	Project (Number/Name) 675306 / <i>Analysis Enterprise</i>

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

D. Acquisition Strategy

N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0307577F / <i>Intelligence Mission Data (IMD)</i>	Project (Number/Name) 675306 / <i>Analysis Enterprise</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
NCTR Collection and IMD Production Tools Development	Various	NASIC : WPAFB, OH	-	1.337	Mar 2019	7.820	Feb 2020	6.277	Feb 2021	-		6.277	Continuing	Continuing	-
Subtotal			-	1.337		7.820		6.277		-		6.277	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		-	1.337	7.820	6.277	-	6.277	Continuing	Continuing	N/A

Remarks
Contract award is expected 90 days after budget authority for FY18. FY19 will be one year after FY18.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0307577F / <i>Intelligence Mission Data (IMD)</i>	Project (Number/Name) 675306 / <i>Analysis Enterprise</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
<i>NCTR and IMD Tool Development</i>																												
NCTR sensor dev start																												
SIGINT/EWIR Tools Development																												
SIGNATURE Tool Development																												
C&P Tool Development																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0307577F / <i>Intelligence Mission Data (IMD)</i>	Project (Number/Name) 675306 / <i>Analysis Enterprise</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>NCTR and IMD Tool Development</i>				
NCTR sensor dev start	1	2019	3	2020
SIGINT/EWIR Tools Development	3	2019	3	2023
SIGNATURE Tool Development	1	2019	3	2023
C&P Tool Development	3	2019	3	2023

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0307577F / <i>Intelligence Mission Data (IMD)</i>				Project (Number/Name) 675307 / <i>TARGETING ENTERPRISE RESEARCH</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675307: <i>TARGETING ENTERPRISE RESEARCH</i>	-	4.380	0.794	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2018, PE 0207431F, Combat Air Intelligence Systems, Intelligence Mission Data efforts were transferred to the new PE 37577F for 2018, Intelligence Mission Data (IMD), in order to provide better oversight of IMD research and development.

A. Mission Description and Budget Item Justification

In FY 2018, PE 0207431F, Combat Air Intelligence Systems, Intelligence Mission Data efforts were transferred to new for 2018 PE 0307577F, Intelligence Mission Data (IMD), in order to provide better oversight of IMD research and development. (+\$5.074M)

Intelligence Mission Data efforts in BPAC 675307, Targeting Enterprise Research, fund RDT&E for Operational Reconnaissance Capabilities; Tactical Data Recorder; Advanced Non-cooperative Target Recognition (NCTR) Collection.

These tools enable the collection, storage, and dissemination of Ops Recce data gathered during operational missions by currently fielded air platforms.

In addition, the Advanced NCTR collection sensor supports CAF-wide requirements for improved ID capabilities.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Operational Reconnaissance Electronic Warfare Capabilities	4.380	0.794	0.000
Description: RDT&E efforts to develop recording, storage, and dissemination systems for Ops Recce data gathered during operational missions.			
FY 2020 Plans: Will continue RDT&E efforts to develop recording, storage, and dissemination systems for Ops Recce data gathered during non-ISR operational missions. These include but are not limited to data off-boarding and radar warning receiver performance assessment.			
FY 2021 Plans: Will continue RDT&E efforts to develop recording, storage, and dissemination systems for Ops Recce data gathered during non-ISR operational missions. These include but are not limited to data off-boarding and radar warning receiver performance assessment.			
FY 2020 to FY 2021 Increase/Decrease Statement:			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0307577F / <i>Intelligence Mission Data (IMD)</i>	Project (Number/Name) 675307 / <i>TARGETING ENTERPRISE RESEARCH</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Funding decrease to 0 in FY21 due to higher Air Force priorities.			
Accomplishments/Planned Programs Subtotals	4.380	0.794	0.000

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPAF 03 Line Item 832070: <i>Intelligence Comm Equipment</i>	0.606	0.000	0.514	-	0.514	0.000	0.000	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

Capabilities will be developed and integrated onto various platforms using an incremental acquisition approach. The projects will be executed, contracting with appropriate vendor(s) to deliver capability while encouraging competition where possible.

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0307577F / <i>Intelligence Mission Data (IMD)</i>	Project (Number/Name) 675307 / <i>TARGETING ENTERPRISE RESEARCH</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Ops Recce Projects</i>				
Ops Recce Projects	2	2019	4	2020
Data Offboarding	2	2019	4	2020
Data Offboarding - Analysis	2	2019	4	2020
Data Offboarding Demo	4	2019	4	2020
Sensor Development	2	2019	4	2020
Sensor Development - SW Development	2	2019	2	2020
Sensor Development - Demo and Analysis	2	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	58.408	101.425	41.973	0.000	41.973	24.370	0.399	0.405	9.957	0.000	236.937
672030: <i>C-130H MUOS/SATURN Radio</i>	-	0.000	15.800	0.000	0.000	0.000	0.399	0.399	0.399	9.951	0.000	26.948
675248: <i>C-130H Avionics Modernization Program (AMP) Increment 1</i>	-	4.660	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.660
675250: <i>C-130H Avionics Modernization Program (AMP) Increment 2</i>	-	53.748	85.625	41.973	0.000	41.973	23.971	0.000	0.006	0.006	0.000	205.329

A. Mission Description and Budget Item Justification

The C-130H is a medium sized tactical transport aircraft providing multi-purpose theater support throughout the globe. The C-130H fleet supports several diverse Air Force roles, including but not limited to tactical and inter-theater airlift and airdrop support, Arctic resupply, special operations support, aeromedical evacuation, aerial spraying, firefighting duties, and natural disaster and humanitarian relief missions.

C-130H AMP Increment 1 addresses modifications to meet airspace compliance mandates and safety requirements. RDT&E efforts cover design, integration, developmental and operational test, studies and risk reduction efforts, trial kit buy and installation, spares and peculiar support equipment in support of trial kit installs, type 1 training and C-130H aircrew and maintenance training systems and course ware development efforts, program office support and other efforts necessary to fulfill program requirements.

C-130H AMP Increment 2 includes digital avionics upgrades (e.g. Flight Management System, improved navigation), cockpit modernization (e.g. glass/engine flight displays) and resolves select obsolescence and Diminishing Manufacturing Source (DMS) issues. RDT&E efforts will cover software development, design, integration, developmental and operational test, studies and risk reduction efforts, trial kit buy and installation, technical order development validation and verification, spares and peculiar support equipment in support of trial kit installs, Systems Integration Laboratory (SIL) development, type 1 training and C-130H aircrew and maintenance training systems and course ware development efforts, program office support and other efforts necessary to fulfill program requirements.

The development and fielding of the MUOS/SATURN Radio program (Project 672030) will be executed under the AMP Increment 2 program (Project 675250). The MUOS/Saturn Radio program updates radios due to future DMS/integration issues and the incorporation of MUOS/SATURN capabilities. The funding is required for the Non-Recurring Effort associated with integration, testing, Technical Orders, Engineering drawing's, Trial Kit Installations, Verification Kit Installations, and spectrum authorization.

This funding includes Rapid Global Mobility (RGM) platform related activities including but not limited to prototyping, capability development, process activities, planning

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron
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analysis and systems engineering activities.

Project 672030, C-130H MUOS/SATURN Radio changed from C-130H MUOS Radio.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver C-130H weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	105.988	140.425	113.473	0.000	113.473
Current President's Budget	58.408	101.425	41.973	0.000	41.973
Total Adjustments	-47.580	-39.000	-71.500	0.000	-71.500
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-39.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-44.205	0.000			
• SBIR/STTR Transfer	-3.375	0.000			
• Other Adjustments	0.000	0.000	-71.500	0.000	-71.500

Change Summary Explanation

FY19 funding reduced by -\$44.205M for below threshold reprogramming actions and -\$3.375M for Small Business Innovation Research (SBIR).

FY20 Congressionally directed reduction due to "Contract award savings".

FY21 funding request reduced due to Contract award savings.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron				Project (Number/Name) 672030 / C-130H MUOS/SATURN Radio			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672030: C-130H MUOS/SATURN Radio	-	0.000	15.800	0.000	0.000	0.000	0.399	0.399	0.399	9.951	0.000	26.948
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The development and fielding of the MUOS/SATURN Radio program will be executed under the AMP Increment 2 program. The MUOS/Saturn Radio program updates radios due to future Diminishing Manufacturing Source (DMS)/integration issues and the incorporation of MUOS/SATURN capabilities. The funding is required for the Non-Recurring Effort associated with integration, testing, TO's, Engineering drawing's, TKI, VKI, and spectrum authorization.

The C-130H MUOS/SATURN Radio program modifies up to 176 C-130H USAF-owned aircraft consisting of H3s, H2.5s, H2s, H1s and LC-130H aircraft. The modification effort will have up to four prototype aircraft representative of variations in the mission designs and required for accomplishment of the Engineering and Manufacturing Development (EMD) phase with the remaining aircraft modified in the production phase.

This funding includes Rapid Global Mobility (RGM) platform related activities including but not limited to prototyping, capability development, process activities, planning analysis and systems engineering activities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver C-130H weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. The program may also include any Contractor Manpower Equivalent (CME)/A&AS support deemed necessary to support the program objectives.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: C-130H MUOS/SATURN Radio	0.000	15.800	-	-	-
Description: The program is currently executing the Engineering and Manufacturing Development (EMD) phase activities.					
FY 2020 Plans: Continuation of EMD activities to include but are not limited to software development, design, integration, development and operational test, program office support, studies and risk reduction efforts, trial kit buy and installation, technical order development validation and verification, peculiar support equipment and spares in support of trial kit installs, SIL development, Type 1 training, C-130H aircrew and maintenance training systems, and courseware development efforts and other efforts required to fulfill program requirements.					
FY 2020 to FY 2021 Increase/Decrease Statement:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron	Project (Number/Name) 672030 / C-130H MUOS/SATURN Radio
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Funding decreased due to transfer of MUOS/SATURN Radio program and associated efforts to C-130H AMP Increment 2.					
Accomplishments/Planned Programs Subtotals	0.000	15.800	-	-	-

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

The MUOS/Saturn radios will be included in the C-130 AMP Increment 2 production funding to begin in FY21.

D. Acquisition Strategy

The MUOS/SATURN Radio effort will be added to the C-130H AMP Increment 2 contract through an Undefined Contract Action (UCA) 2nd quarter of 2020 and a definitive contract modification 1st quarter of 2021. Current efforts are primarily focused on the Engineering and Manufacturing Development (EMD). The C-130H AMP Increment 2 contract was awarded 3rd quarter of 2019.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron	Project (Number/Name) 672030 / C-130H MUOS/SATURN Radio
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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-130H MUOS/SATURN Radio	
MUOS/SATURN RADIO transfer to AMP Increment 2	■

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron	Project (Number/Name) 672030 / C-130H MUOS/SATURN Radio

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
C-130H MUOS/SATURN Radio				
MUOS/SATURN RADIO transfer to AMP Increment 2	2	2020	2	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron				Project (Number/Name) 675248 / C-130H Avionics Modernization Program (AMP) Increment 1			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675248: C-130H Avionics Modernization Program (AMP) Increment 1	-	4.660	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4.660
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The C-130H AMP Increment 1 program performs modifications to meet airspace compliance and safety mandates; the mod includes Automatic Dependent Surveillance-Broadcast (ADS-B) Out, Enhanced Mode S, 8.33 kHz radios, and Cockpit Voice Recorder/Digital Flight Data Recorder (CVR/DFDR).

RDT&E efforts include but are not limited to, design, integration, development and operational test, studies and risk reduction efforts, trial kit buy and installation, spares and peculiar support equipment in support of trial kit installs, Type 1 training and C-130H aircrew and maintenance training systems and courseware development efforts (including Mode 5 effort for the trainers), program office support and other efforts necessary to fulfill program mandates and requirements. Obsolescence and Diminishing Manufacturing Sources (DMS) issues will be resolved with solutions that may include life of type buys or bridge buys. DMS efforts to include removal of end-of-life software/hardware within simulator 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.

The C-130H AMP Increment 1 program currently modifies up to 176 C-130H USAF-owned aircraft consisting of H3s, H2.5s, H2s, H1s and LC-130H aircraft. The modification effort consists of four prototype aircraft representative of variations in the mission designs and required for accomplishment of the Engineering and Manufacturing Development (EMD) phase with the remaining aircraft modified in the production phase.

This funding includes Rapid Global Mobility (RGM) platform related activities including but not limited to prototyping, capability development, process activities, planning analysis and systems engineering activities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver AMP Increment 1 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. The program may also include any Contractor Manpower Equivalent (CME)/A&AS support deemed necessary to support the program objectives.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: C-130H AMP Increment 1	4.660	0.000	0.000	0.000	0.000
Description: Completion of EMD phase activities.					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron	Project (Number/Name) 675248 / C-130H Avionics Modernization Program (AMP) Increment 1

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<i>FY 2020 Plans:</i> N/A					
<i>FY 2021 Base Plans:</i> N/A					
<i>FY 2021 OCO Plans:</i> N/A					
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> N/A					
Accomplishments/Planned Programs Subtotals	4.660	0.000	0.000	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• APAF 05 Line Item C13000: C-130	6.101	7.338	3.841	-	3.841	-	-	-	-	0.000	17.280
• APAF 06 Line Item 000999: <i>Initial Spares/Repair Parts</i>	0.034	-	-	-	-	-	-	-	-	0.000	0.034

Remarks

D. Acquisition Strategy

C-130H AMP Increment 1 acquisition strategy (30 Sept 2015) was to conduct a competitive small business set aside source selection for ADS-B Out and Enhanced Mode S followed by a Federal Acquisition Regulation (FAR) Part 15 contract award. The EMD contract was awarded in 2nd quarter FY17. Preliminary Design Review (PDR) completed 3rd quarter FY17 and Critical Design Review (CDR) completed 4th quarter FY17. Milestone C approved 4th quarter FY18 (23 Jul 2018). Current efforts continue to focus on the completion of Engineering and Manufacturing Development (EMD) to include Weapon Systems Trainer (WST).

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron	Project (Number/Name) 675248 / C-130H Avionics Modernization Program (AMP) Increment 1

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
C-130H AMP Increment 1				
EMD Contract Awards	3	2020	3	2020
Design/Integration	3	2020	2	2021
Trainers & Training	2	2019	1	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron				Project (Number/Name) 675250 / C-130H Avionics Modernization Program (AMP) Increment 2			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675250: C-130H Avionics Modernization Program (AMP) Increment 2	-	53.748	85.625	41.973	0.000	41.973	23.971	0.000	0.006	0.006	0.000	205.329
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The C-130H AMP Increment 2 upgrades the C-130H fleet with comprehensive avionics and cockpit modernization which replaces aging unreliable equipment and adds combat capability enhancements. It also updates radios due to future Diminishing Manufacturing Sources (DMS)/integration issues and incorporation of MUOS/SATURN radio capabilities. It also addresses select obsolescence and DMS issues with solutions that may include life of type buys or bridge buys. 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.

RDT&E efforts include but are not limited to software development, design, integration, development and operational test, studies and risk reduction efforts, trial kit buy and installation, technical order development validation and verification, peculiar support equipment and spares in support of trial kit installs, SIL development, type 1 training, and C-130H aircrew and maintenance training systems and courseware development efforts, program office support and other efforts required to fulfill requirements.

The C-130H AMP Increment 2 program modifies up to 176 C-130H USAF owned aircraft consisting of H3s, H2.5s, H2s, H1s and LC-130H aircraft. The modification effort will have up to four prototype aircraft representative of variations in the mission designs and required for accomplishment of the Engineering and Manufacturing Development (EMD) phase with the remaining aircraft modified in the production phase.

The development and fielding of the MUOS/SATURN program will be executed under the AMP Increment 2 program. The MUOS radio funding is required for the Non-Recurring Effort associated with integration, testing, Technical Order's, Engineering drawings, Trial Kit Installations, Verification Kit Installations, and spectrum authorization.

This funding includes Rapid Global Mobility (RGM) platform related activities including but not limited to prototyping, capability development, process activities, planning analysis and systems engineering activities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver AMP Increment 1 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F. The program may also include any Contractor Manpower Equivalent (CME)/A&AS support deemed necessary to support the program objectives.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron	Project (Number/Name) 675250 / C-130H Avionics Modernization Program (AMP) Increment 2

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Title: C-130H Avionics Modernization Program (AMP) Increment 2</p> <p>Description: The program is currently executing the Engineering and Manufacturing Development (EMD) phase activities.</p> <p>FY 2020 Plans: Continuation of EMD activities to include but are not limited to software development, design, integration, development and operational test, program office support, studies and risk reduction efforts, trial kit buy and installation, technical order development validation and verification, peculiar support equipment and spares in support of trial kit installs, SIL development, type 1 training, and C-130H aircrew and maintenance training systems and courseware development efforts and other efforts required to fulfill program requirements.</p> <p>FY 2021 Base Plans: Continuation of EMD activities to include but are not limited to software development, design, integration, development and operational test, program office support, studies and risk reduction efforts, trial kit buy and installation, technical order development validation and verification, peculiar support equipment and spares in support of trial kit installs, SIL development, type 1 training, and C-130H aircrew and maintenance training systems and courseware development efforts and other efforts required to fulfill program requirements.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to the majority of EMD development and integration activity occurring in FY19 and FY20.</p>	53.748	85.625	41.973	-	41.973
Accomplishments/Planned Programs Subtotals	53.748	85.625	41.973	-	41.973

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• APAF 05 Line Item C13000: C-130	-	-	0.050	0.000	0.050	20.403	106.691	77.575	74.573	Continuing	Continuing
• APAF 06 Line Item 000999: Initial Spares/Repair Parts	-	-	0.000	0.000	0.000	0.427	1.789	0.862	15.630	Continuing	Continuing
Remarks The C-130H Avionics Modernization Program (AMP) Increment 2 procurement funding begins in FY21.											

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron	Project (Number/Name) 675250 / C-130H Avionics Modernization Program (AMP) Increment 2

D. Acquisition Strategy

C-130H AMP Increment 2 contract was awarded 3rd quarter of 2019. Current efforts are primarily focused on the Engineering and Manufacturing Development (EMD) activities under a Fixed-Price Incentive (Firm) contract structure.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron	Project (Number/Name) 675250 / C-130H Avionics Modernization Program (AMP) Increment 2
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C-130H AMP Increment 2 EMD Contract	C/FPIF	L3Harris : Waco, TX	-	49.600	Jun 2019	68.215	Nov 2019	27.926	Nov 2020	-		27.926	Continuing	Continuing	162.941
Joint Mission Planning System	C/FPIF	TBD : TBD	-	-		5.000	Jun 2020	3.000		-		3.000	Continuing	Continuing	8.000
Subtotal				-	49.600	73.215		30.926		-		30.926	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Other Government Costs	TBD	Not specified. : TBD	-	-		4.000	Apr 2020	-		-		-	Continuing	Continuing	4.000
Subtotal				-	-	4.000		-		-		-	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C-130H AMP Increment 2 Development Testing	PO	TBD : TBD	-	0.300	Oct 2019	1.400	Dec 2019	3.900	Nov 2020	-		3.900	Continuing	Continuing	5.600
Subtotal				-	0.300	1.400		3.900		-		3.900	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C-130H AMP Increment 2 PMA Contractor Services	Various	Not Specified : TBD	-	3.748	Apr 2019	6.860	Jan 2020	6.997	Feb 2021	-		6.997	Continuing	Continuing	21.835
C-130H AMP Increment 2 PMA - Government Cost	Various	Not Specified : TBD	-	0.100	Oct 2018	0.150	Oct 2019	0.150	Oct 2020	-		0.150	Continuing	Continuing	0.500
Subtotal				-	3.848	7.010		7.147		-		7.147	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force							Date: February 2020				
Appropriation/Budget Activity 3600 / 7			R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron				Project (Number/Name) 675250 / C-130H Avionics Modernization Program (AMP) Increment 2				
	Prior Years	FY 2019	FY 2020		FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals	-	53.748	85.625		41.973	-	41.973	Continuing	Continuing	N/A	

Remarks

Remarks
 FINANCIAL PERFORMANCE: AMP Increment 2 is evaluated against traditional Research and Development (R&D) program expenditure benchmarks. Unlike many traditional R&D programs, however, the AMP Increment 2 EMD phase contract is an 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.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron	Project (Number/Name) 675250 / C-130H Avionics Modernization Program (AMP) Increment 2

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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-130H AMP Increment 2																																
Milestone B			■																													
EMD Contract Award			■																													
Design/Integration			■																													
Preliminary Design Review						■																										
Critical Design Review							■																									
Design/Integration Training Development			■																													
Development Testing																																
Functional Configuration Audit																																
Milestone C																																

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401115F / C-130 Airlift Squadron	Project (Number/Name) 675250 / C-130H Avionics Modernization Program (AMP) Increment 2

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
C-130H AMP Increment 2				
Milestone B	3	2019	3	2019
EMD Contract Award	3	2019	3	2019
Design/Integration	3	2019	1	2022
Preliminary Design Review	2	2020	2	2020
Critical Design Review	4	2020	4	2020
Design/Integration Training Development	4	2019	4	2022
Development Testing	4	2021	4	2022
Functional Configuration Audit	4	2022	4	2022
Milestone C	4	2022	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401119F / <i>C-5 Airlift Squadrons (IF)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	28.245	10.223	32.560	0.000	32.560	22.600	0.671	0.000	80.502	0.000	174.801
671307: <i>C-5 REPLACE MULTIFUNCT CONTROL AND DISPLAY (RMCD)</i>	-	0.000	10.223	32.560	0.000	32.560	22.600	0.671	0.000	80.502	0.000	146.556
675359: <i>C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)</i>	-	28.245	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28.245

A. Mission Description and Budget Item Justification

The C-5M operates across the entire range of military operations. It is the only aircraft capable of carrying 100% of certified air-transportable cargo and includes a dedicated passenger compartment enabling commanders to have troops and their equipment arrive in an area of operation simultaneously when national security concerns demand fast force closure. C-5M missions include strategic airlift of cargo and passengers as well as emergency aeromedical evacuation (AE). The aircraft must perform these missions throughout the worldwide air traffic control environment with the proper equipment to operate in FAA/ICAO controlled airspace. Additionally, C-5M aircraft must operate at night, in adverse weather conditions, and in Chemical, Biological, Radiological, Nuclear (excluding electromagnetic pulse in accordance with Joint Requirements Oversight Council (JROC) approved/validated the C-5 RERP ORD 14 Aug 01, see Appendix B, Ref YY, page 11, para 4.3.1), and High Explosive (CBRNE) environments.

C-5M communication, navigation, surveillance/air traffic management (CNS/ATM) program is a comprehensive effort to ensure appropriate CNS/ATM system design architectures are developed and equipment is installed on the C-5M to allow aircraft operation in accordance with civil airspace access mandates for both the US national airspace system (NAS) and international civil airspace. Also, the program will add equipment to meet outstanding National Security Agency mandates for encryption of voice communications. The C-5M CNS/ATM program ensures system standardization and interoperability with other DoD systems to the maximum extent possible and directly supports airworthiness certification of the C-5M. CNS/ATM requirements include, but are not limited to, capabilities such as automatic dependence surveillance-broadcast out (ADS-B Out), identification friend or foe (IFF) mode 5, satellite communication equipment replacement, and beyond line-of-sight voice radio replacement. It is anticipated equipment will be predominately commercial off-the-shelf or non-developmental items.

C-5M Replace Multi-function Controls and Displays (RMCD) program helps to maintain aircraft availability and increased situational awareness through a new Multi Function Display Unit (MFDU) replace the current 20+ year MFDU design; current equipment is experiencing severe diminishing manufacturing source (DMS) issues. Additionally, there is a requirement to reduce Operational Flight Program (OFP) load times and improve load reliability and provide outlets for Mission Planning Equipment (MPE) to enhance operational mission support. The current generation of displays and controls supporting services used on the C-5M will no longer be repairable beginning in 4th Quarter, FY24 for MFDU. Without this modification, the C-5M will be unable to support the National Defense Strategy, AF Strategic Master Plan, Geographical Combatant Command Operational Plans.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401119F / <i>C-5 Airlift Squadrons (IF)</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver C-5 weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

Funding to provide for program management & administration, studies and analysis, risk reduction efforts, Advisory and Assistance Services, change orders, and other government costs such as travel, directorate support, government furnished equipment (GFE), and over and above costs. Funding may also be used to address Diminishing Manufacturing Sources (DMS) through studies and analysis, bridge buys, life-of-type buys, etc.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	25.071	10.223	36.288	0.000	36.288
Current President's Budget	28.245	10.223	32.560	0.000	32.560
Total Adjustments	3.174	0.000	-3.728	0.000	-3.728
• 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	4.000	0.000			
• SBIR/STTR Transfer	-0.826	0.000			
• Other Adjustments	0.000	0.000	-3.728	0.000	-3.728

Change Summary Explanation

FY 2019 funding increased by \$4.0M for a below threshold reprogramming action.

FY 2021 funding request reduced by \$3.728M due to availability of prior year execution balance.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)				Project (Number/Name) 671307 / C-5 REPLACE MULTIFUNCT CONTROL AND DISPLAY (RMCD)			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
671307: C-5 REPLACE MULTIFUNCT CONTROL AND DISPLAY (RMCD)	-	0.000	10.223	32.560	0.000	32.560	22.600	0.671	0.000	80.502	0.000	146.556
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

C-5M Replace multi-function controls and display (RMCD) program is a comprehensive effort to ensure appropriate RMCD Line Replaceable Units (LRU) are developed and installed on the C-5M allowing aircraft operation in accordance with civil airspace access mandates for both US national airspace system (NAS) and international civil airspace. The C-5M RMCD program ensures system standardization and interoperability with other DoD systems to the maximum extent possible and directly supports airworthiness certification. The purpose of the program is to find a suitable replacement for the current multi-function display unit (MFDU) LRUs while maintaining existing interfaces to legacy equipment and providing for future growth opportunities. Additionally, the replacement LRUs must have the Ethernet load capability to reduce Operational Flight Programs (OFF) load times, and the program will implement a power solution for Mission Planning Equipment (MPE). Operational Flight Programs (OFF) updates/aggregation are required to support the latest aircraft display technologies and will be designed to ensure seamless integration into the platform. Aircraft wiring will be replaced/upgraded as required. Use of mixed displays (current and new) is not permissible due to human factors considerations. It is anticipated equipment will be predominately commercial off-the-shelf or non-developmental items.

The RMCD program is a comprehensive sustainment modification to mitigate the obsolescence of the current control and display units. This effort centers around modifying the current display units to obtain sufficient capacity/capability to support integration of new system capabilities with margin for growth by upgrading displays and correcting any mission essential deficiencies identified during development, including additions of an Ethernet loading capability and a power solution for the MPE. This modification may include software non-recurring engineering (NRE), data, cyber security, testing, installation, spares, systems integration lab (SIL), Interim Contractor Support (ICS), program support, etc.

The modification helps to maintain aircraft availability as the new multifunctional controls and displays replaces the current controls and displays, which are experiencing severe diminishing manufacturing source (DMS) issues. Failure to upgrade the displays to support aircraft availability will create a significant operational impact to the support of Geographic Combatant Command (GCCs) and maintaining U.S. National objectives. Further, Diminishing Manufacturing Source (DMS) issues will be resolved to support continued operations through studies and analysis, risk reduction efforts, bridge buys, life-of-type buys, development, and redesign efforts.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver C-5M weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

Available funds may be used for program management administration, studies and analysis, risk reduction efforts, Advisory and Assistance Services, change orders, and other government costs such as travel, directorate support, government furnished equipment (GFE), and over and above costs. Funding may also be used to address Diminishing Manufacturing Sources (DMS) through studies and analysis, bridge buys, life-of-type buys, etc.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)	Project (Number/Name) 671307 / C-5 REPLACE MULTIFUNCT CONTROL AND DISPLAY (RMCD)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: C-5 Replace Multi-Functional Controls and Displays</p> <p>Description: Description: Replace Multi-Functional Controls and Displays replacement will enable the C-5M to achieve wartime mission requirements by maintaining fleet availability (mission capable rate) and program management administration (PMA).</p> <p>FY 2020 Plans: Award EMD Contract for hardware and software design, development, integration, data management, systems engineering, program management, and spares.</p> <p>FY 2021 Plans: RMCD system design supports replacement of multi-functional controls and displays. Efforts include hardware and software design, development, integration, systems engineering and program management for compatibility with C-5 existing systems.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increase due to full year of development efforts to include but not limited to hardware and software design, development, integration, systems engineering and program management for compatibility with C-5 existing systems.</p>	-	10.223	32.560
Accomplishments/Planned Programs Subtotals	-	10.223	32.560

C. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 C00500: C-5	-	0.000	0.000	-	0.000	0.000	17.879	19.266	0.000	0.000	37.145
• APAF 06 0401119F: C-5 Airlift Squadrons	-	-	-	-	-	-	1.971	-	-	0.000	1.971

Remarks

D. Acquisition Strategy

The Program Office completed an Early Strategy & Issues Session (ESIS) in September 2019, with the Acquisition Strategy Plan (ASP) anticipated at the end of January 2020. The Program Office received approval to pursue an Other Transaction Authority to procure prototype hardware in December 2019. The overall strategy is to procure the display units and graphics processors, integrate and test those components, and install on two (2) EMD aircraft. The Acquisition Strategy (AS) for the RMCD has not been determined/approved as of Jan 2020.

Program Office anticipates that the primary contract type will be that of Cost Plus Incentive Fee (CPIF) with some Firm Fixed Price (FFP) elements. The Other Transaction for Prototype is anticipated to be FFP.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401119F / <i>C-5 Airlift Squadrons (IF)</i>	Project (Number/Name) 671307 / <i>C-5 REPLACE MULTIFUNCT CONTROL AND DISPLAY (RMCD)</i>
<p>The integration of hardware, displays and graphics processors, and the software may be required to be Sole Source (SS) to Lockheed Martin, who holds the Data Rights to critical software and software documentation. Access to these items may be required to acquire the platform certifications necessary to put the final system onto test aircraft.</p> <p>Program office will consider the use of commercial components.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)	Project (Number/Name) 671307 / C-5 REPLACE MULTIFUNCT CONTROL AND DISPLAY (RMCD)
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
RMCD hardware/software design, development, integration, data management, technical data rights, systems engineering, program management, and spares	SS/CPIF	TBD : TBD	-	-		8.613	May 2020	26.840	Oct 2020	-		26.840	0.000	35.453	56.255
Subtotal			-	-		8.613		26.840		-		26.840	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Other Govt Test and SIL	Various	TBD : TBD	-	-		0.805	Jul 2020	2.609	May 2021	-		2.609	0.000	3.414	-
PMA	Various	Not specified. : TBD	-	-		0.805	Jul 2020	3.111	May 2021	-		3.111	Continuing	Continuing	-
Subtotal			-	-		1.610		5.720		-		5.720	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		-	-	10.223	32.560	-	32.560	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)	Project (Number/Name) 671307 / C-5 REPLACE MULTIFUNCT CONTROL AND DISPLAY (RMCD)

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Replacement Multifunctional Control and Display	
Program start	█
ASP	█
MS B	█
HW Contract Award	█
Prototyping with Hardware	██████████
HW and SW Integration	██████████████████
Integration Contract	██████████████████████████████
MS C	█
Cyber Prototype Contract	██████████
Cyber Integration Contract	██████████
SIL Testing	██████████████████████████
Test Planning	██████████████
Production Begins	██████████████████████████████████████

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)	Project (Number/Name) 671307 / C-5 REPLACE MULTIFUNCT CONTROL AND DISPLAY (RMCD)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Replacement Multifunctional Control and Display</i>				
Program start	3	2020	3	2020
ASP	2	2020	2	2020
MS B	1	2022	1	2022
HW Contract Award	1	2022	1	2022
Prototyping with Hardware	4	2020	4	2021
HW and SW Integration	4	2021	2	2023
Integration Contract	2	2021	2	2024
MS C	1	2024	1	2024
Cyber Prototype Contract	2	2021	4	2021
Cyber Integration Contract	2	2021	4	2021
SIL Testing	4	2021	1	2024
Test Planning	2	2022	2	2023
Production Begins	3	2024	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)					Project (Number/Name) 675359 / C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)		
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675359: C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)	-	28.245	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	28.245
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

C-5M communication, navigation, surveillance/air traffic management (CNS/ATM) program is a comprehensive effort to ensure appropriate CNS/ATM system design architectures are developed and equipment is installed on the C-5M to allow aircraft operation in accordance with civil airspace access mandates for both the US national airspace system (NAS) and international civil airspace. Also, the program will add equipment to meet outstanding National Security Agency mandates for encryption of voice communications. The C-5M CNS/ATM program ensures system standardization and interoperability with other DoD systems to the maximum extent possible and directly supports airworthiness certification of the C-5M. CNS/ATM requirements include, but are not limited to, capabilities such as automatic dependence surveillance-broadcast out (ADS-B Out), identification friend or foe (IFF) mode 5, satellite communication equipment replacement, and beyond line-of-sight voice radio replacement. It is anticipated equipment will be predominately commercial off-the-shelf or non-developmental items.

The current ARC-210 radio for VHF voice communications is facing diminishing manufacturing source (DMS) supply issues and additionally will no longer be capable of providing secure voice communications due to the development of new crypto algorithms. Addition of next generation ARC-210 radios with embedded Integrated Waveform (IW) and Second-generation Anti-jam Tactical UHF Radio for NATO (SATURN) and associated cryptologic equipment will enable the C-5M to meet NSA mandates for secure communications and allow aircrews to continue to communicate securely over VHF, UHF, HF, or MILSATCOM.

The current generation of satellites that support services used on the C-5M to provide oceanic controller/pilot data link communications (CPDLCs) to air traffic control and aircraft communications addressing and reporting system (ACARS) beyond-line-of-sight command and control messages is no longer functional post 2016. The next generation of satellites will accommodate legacy C-5M SATCOM equipment for an interim period of time to allow for integration of upgraded SATCOM equipment compatible with this satellite constellation. Without this modification, the C-5M will be unable to fly oceanic tracks and will not be able to meet aircraft separation distance requirements for civil airspace access.

Automatic Dependent Surveillance-Broadcast Out (ADS-B Out) is a next generation surveillance technology that transitions key aspects of air traffic control from terrestrial based technologies to satellite enabled technologies to provide controllers a more accurate picture of aircraft positioning. ADS-B Out will allow aircraft to provide continuous broadcast of aircraft position to both controllers and other aircraft equipped with ADS-B In capable avionics. International mandates for ADS-B Out for civil airspace access call for equipage by 2020.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)	Project (Number/Name) 675359 / C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)
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Available funds will be used for program management administration, studies and analysis, risk reduction efforts, Advisory and Assistance Services, change orders, and other government costs such as travel, directorate support, government furnished equipment (GFE), and over and above costs. Funding may also be used to address Diminishing Manufacturing Sources (DMS) through studies and analysis, bridge buys, life-of-type buys, etc.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver C-5M weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: C-5M CNS/ATM	28.245	0.000	0.000
Description: C-5M CNS/ATM program will install multiple aircraft avionic equipment pieces to enable the C-5M to meet multiple NSA encryption and international/national airspace access mandates while mitigating diminishing manufacturing source issues.			
FY 2020 Plans: C-5M CNS/ATM program will install multiple aircraft avionic equipment pieces to enable the C-5M to meet multiple NSA encryption and international/national airspace access mandates while mitigating diminishing manufacturing source issues.			
FY 2021 Plans: No funding Requested			
Accomplishments/Planned Programs Subtotals	28.245	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item C00500: C-5	20.483	32.386	33.877	-	33.877	14.911	7.661	0.000	-	0.000	109.318
• APAF 06 Line Item 000999: <i>Initial Spares</i>	4.386	2.053	0.409	-	0.409	0.000	0.000	0.000	-	0.000	6.848
• APAF 07 Line Item 000075: <i>Other Production</i>	0.000	0.585	9.304	-	9.304	7.655	0.000	0.000	-	0.000	17.544

Remarks

D. Acquisition Strategy

CNS/ATM program: Engineering and Manufacturing Development (EMD) for incorporation of the ARC-210 Gen V radio, SATCOM replacement equipment, ADS-B Out, and IFF mode 5 into the C-5M began in Dec 2016. The acquisition strategy for this program will consider every opportunity to use commercial components to modernize the C-5M CNS/ATM equipment to meet CY2020 mandates for global civil airspace access. The strategy is for the prime contractor, Lockheed Martin Aero

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401119F / <i>C-5 Airlift Squadrons (IF)</i>	Project (Number/Name) 675359 / <i>C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)</i>

(LMA), to procure CNS/ATM equipment, develop software, test and integrate those components, and install on two (2) EMD aircraft. The equipment integration will require RDT&E funding for commercial off-the-shelf and non-developmental item proofing.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)	Project (Number/Name) 675359 / C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
CNS/ATM hardware/ software design, development, integration, data management, technical data rights, systems engineering, program management, and spares	Various	Lockheed Martin Aero : Marietta, GA	-	19.325	Nov 2018	-		-		-		-	0.000	19.325	86.532
Subtotal			-	19.325		-		-		-		-	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
CNS/ATM Other Government Cost	Various	AFLCMC/WLS : Dayton, OH	-	1.318	Nov 2018	-		-		-		-	0.000	1.318	4.078
CNS/ATM Training	Various	Lockheed Martin Aero : Marietta, GA	-	0.000	Nov 2018	-		-		-		-	0.000	0.000	0.300
CNS/ATM Peculiar Support Equipment	Various	Lockheed Martin Aero : Marietta, GA	-	0.000	Feb 2019	-		-		-		-	0.000	0.000	0.018
CNS/ATM Trainers & Simulators	Various	Various : Various	-	2.120	Nov 2018	-		-		-		-	0.000	2.120	3.221
Subtotal			-	3.438		-		-		-		-	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020				
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)				Project (Number/Name) 675359 / C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)							

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total		Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete			
CNS/ATM System Test/Qual/SIL	Various	Lockheed Martin Aero : Marietta, GA	-	2.024	Nov 2018	-		-		-		-	0.000	2.024	8.662	
CNS/ATM System Test - Government	Various	Edwards AFB : CA	-	3.123	Oct 2018	-		-		-		-	0.000	3.123	4.250	
Subtotal			-	5.147		-		-		-		-	Continuing	Continuing	N/A	

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total		Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-	
CNS/ATM Program Management Administration	Various	AFLCMC/WLS : Dayton, OH	-	0.189	Jun 2019	-		-		-		-	0.000	0.189	0.949	
CNS/ATM Travel	Various	AFLCMC/WLS : Dayton, OH	-	0.146	Oct 2018	-		-		-		-	0.000	0.146	1.213	
Subtotal			-	0.335		-		-		-		-	Continuing	Continuing	N/A	

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	28.245	0.000	-	-	-	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)	Project (Number/Name) 675359 / C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

675359 / C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)

Operational Test and Evaluation

Milestone C

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401119F / C-5 Airlift Squadrons (IF)	Project (Number/Name) 675359 / C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
675359 / C-5M Communication, Navigation, Surveillance/Air Traffic Management (CNS/ATM)				
Operational Test and Evaluation	1	2020	2	2020
Milestone C	4	2019	4	2019

Note

CNS/ATM will support completion of formal qualification testing, installation and functional check of hardware, design and development of aircrew and maintenance training system modification, and developmental test and evaluation.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401130F / <i>C-17 Aircraft (IF)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	43.288	21.101	9.991	0.000	9.991	9.616	25.585	0.000	0.000	0.000	109.581
672569: <i>C-17A Aircraft</i>	-	43.288	21.101	9.991	0.000	9.991	9.616	25.585	0.000	0.000	0.000	109.581
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The C-17 can perform the entire spectrum of airlift missions and is specifically designed to operate effectively and efficiently in both strategic and theater environments. Airlift provides essential flexibility when responding to contingencies on short notice anywhere in the world. It is a major element of America's national security strategy and constitutes the most responsive means of meeting mobility requirements. Specific tasks associated with the airlift mission include deployment, employment, sustaining support, retrograde, and combat redeployment. Not only can the C-17 deliver outsize cargo to austere tactical environments, but it also reduces ground time during air/land operations. The C-17 will perform its airlift mission well into this century.

C-17 Research, Development, Test & Evaluation (RDT&E) funding efforts support, but are not limited to: Aircraft performance improvements, aircraft mission execution and airspace access mandates (i.e., Communications/Navigation Improvements); flight test activities and facilities; development of solutions for obsolescence and safety of flight issues; systems engineering/program management administration support; support for avionics laboratories; software development, test and integration; block development/change management; proposal preparation for new projects; cost estimating and engineering/acquisition studies not related to requirements generation.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver C-17 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

In FY21 the efforts are: Roll-On Conference Capsule (ROCC) and Beyond Line of Sight (BLOS) which will be covered in more detail on subsequent pages.

This funding includes Rapid Global Mobility (RGM) platform-related rapid capability development process activities including early planning, analysis and systems engineering activities which provide linkages between operational needs, system performance requirements, technology needs and opportunities, potential lifecycle costs and enabling the technical foundation for material development.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401130F / C-17 Aircraft (IF)
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	48.299	25.101	10.009	0.000	10.009
Current President's Budget	43.288	21.101	9.991	0.000	9.991
Total Adjustments	-5.011	-4.000	-0.018	0.000	-0.018
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-4.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-3.296	0.000			
• SBIR/STTR Transfer	-1.715	0.000			
• Other Adjustments	0.000	0.000	-0.018	0.000	-0.018

Change Summary Explanation

FY19 funding reduced by \$3.296M for a below threshold reprogramming action and a \$1.715M reduction for Small Business Innovation Research (SBIR).

FY20 funding reduced by \$4.0M due to a congressional mark as "excess to need".

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
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Title: Filter Fire Mitigation (formerly referred to as Onboard Inert Gas Generation System II Filter Fire)	1.098	0.000	0.000
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Description: Filter Fire Mitigation is a program that redesigns the OBIGGS II shutoff valve and makes software changes to the Warning and Caution Computer (WCC). It includes support for on-going flight test, software labs, system engineering, program management and engineering/acquisition studies not related to requirements generation.

FY 2020 Plans:

N/A

FY 2021 Plans:

N/A

Title: Beyond Line of Sight (BLOS)	29.968	15.600	8.775
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Description: Beyond Line-Of-Sight (BLOS) modernization modification is a development, integration, and retrofit program for C-17 communications. BLOS modifies and improves hardware and software for voice and data communications on the C-17. The program will modify both integrated aircraft avionics as well as back-end mission communications and could utilize both military and commercial satellite systems to extend communication ranges. The current efforts include but are not limited to Aero-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401130F / <i>C-17 Aircraft (IF)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>I/Aero-H modernizations and Comm Mod. It includes support for on-going flight test, software labs, system engineering, program management and engineering/acquisition studies not related to requirements generation.</p> <p>FY 2020 Plans: BLOS effort continues with major design milestones occurring and continued development activities.</p> <p>FY 2021 Plans: BLOS effort continues with major design milestones occurring and completes development and test activities.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to the level of effort for BLOS development efforts and test activities.</p>			
<p>Title: Roll-On Conference Capsule (ROCC)</p> <p>Description: ROCC is a program to replace current Silver Bullet Capsules and includes development/design. Effort will allow US Government senior leaders and staff to work, communicate, and rest in airworthy capsules during long range missions into threat areas, with the protection of the C-17A Globemaster III's defensive systems capability. Specifically, the development phase of the ROCC, (formerly referred to as the Silver Bullet Replacement (SBR) program) will require non-recurring engineering, manufacture of the first article and testing. Support for flight test, software labs, system engineering, program management and engineering/ acquisition studies not related to requirements generation are included in the overall cost.</p> <p>FY 2020 Plans: Development activities continue with design reviews and development testing.</p> <p>FY 2021 Plans: ROCC development effort completes in FY21. Funding of civilian manpower positions continue.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to completion of ROCC development efforts in FY 2021; funding request to support other government costs to complete development process.</p>	12.222	5.501	1.216
Accomplishments/Planned Programs Subtotals	43.288	21.101	9.991

D. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To	Total Cost
			Base	OCO	Total					Complete	
• APAF 05 Line Item C01700: C-17A	70.679	46.874	59.663	-	59.663	85.441	73.783	48.254	102.612	0.000	487.306
• APAF 07 Line Item C01700: C-17A	10.114	124.805	0.000	-	0.000	0.000	0.000	-	-	0.000	134.919

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401130F / <i>C-17 Aircraft (IF)</i>
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D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 06 Line Item 000999: <i>Initial Spares/Repair Parts</i>	11.175	12.103	47.774	-	47.774	21.479	9.731	7.361	30.760	0.000	140.383
• OPAF 03 Line Item 834070: <i>Mobility Command and Control</i>	-	10.817	-	-	-	-	-	-	-	0.000	10.817

Remarks

E. Acquisition Strategy

The C-17 Acquisition Strategy is based on several separate contracts to support the entire scope of the C-17 weapon system. Globemaster Operational Enhancement (GLOBE) is an indefinite delivery, indefinite quantity (IDIQ) contract used to purchase services and research articles (through delivery orders) to support all RDT&E with our prime contractor. In addition, purchase orders are used to support flight test activities within the projects at Edwards AFB. Additional contract vehicles could be utilized as required.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401130F / C-17 Aircraft (IF)	Project (Number/Name) 672569 / C-17A Aircraft
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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-17	
Beyond Line of Sight (BLOS) (ACAT III)	
Filter Fire Mitigation (ACAT III) (formerly referred to a OBIGGS II Filter Fire-HW Fix)	
Roll-On Conference Capsules (ROCC) (ACAT III)	
Studies and Prototyping	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401130F / C-17 Aircraft (IF)	Project (Number/Name) 672569 / C-17A Aircraft
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
C-17				
Beyond Line of Sight (BLOS) (ACAT III)	1	2019	4	2023
Filter Fire Mitigation (ACAT III) (formerly referred to a OBIGGS II Filter Fire-HW Fix)	2	2019	3	2020
Roll-On Conference Capsules (ROCC) (ACAT III)	3	2019	4	2021
Studies and Prototyping	1	2019	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	187.081	9.924	8.640	10.674	0.000	10.674	14.324	14.262	13.806	14.058	Continuing	Continuing
675061: C-130J	187.081	9.894	8.640	10.674	0.000	10.674	14.324	14.262	13.806	14.058	Continuing	Continuing
675062: C-130J TRAINERS	0.000	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030

Program MDAP/MAIS Code: 220

A. Mission Description and Budget Item Justification

The C-130J is a medium-sized transport aircraft capable of performing a variety of combat delivery (tactical airlift) operations across a broad range of mission environments. The C-130J aircraft, with its extended (by 15 feet) fuselage, provides additional cargo carrying capacity for the USAF combat delivery mission compared with legacy C-130E/H and the C-130J (short). Special mission variants of the C-130J conduct airborne psychological operations (EC-130J), weather reconnaissance (WC-130J), search and rescue (HC-130J), and special operations (MC-130J and AC-130J). All aircraft variants must be capable of worldwide operations.

This project provides RDT&E funding for required capabilities that are grouped as "Block" upgrades or "Capability" updates. Content/requirements for block modifications is documented in International Program Directives (IPDs) as determined in the Cooperative Systems and Software Upgrade Requirements Management (COSSURM) process. This project will integrate the common-core capabilities developed under this program into the C-130J.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver C-130J weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	15.409	8.640	13.058	0.000	13.058
Current President's Budget	9.924	8.640	10.674	0.000	10.674
Total Adjustments	-5.485	0.000	-2.384	0.000	-2.384
• 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	-5.000	0.000			
• SBIR/STTR Transfer	-0.485	0.000			
• Other Adjustments	0.000	0.000	-2.384	0.000	-2.384

Change Summary Explanation

FY 2019 funding was reduced by \$5.0M for below threshold reprogramming actions.

FY 2021 funding request was reduced by \$2.384M to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0401132F / C-130J Program				Project (Number/Name) 675061 / C-130J			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675061: C-130J	187.081	9.894	8.640	10.674	0.000	10.674	14.324	14.262	13.806	14.058	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The C-130J is a medium-sized transport aircraft capable of performing a variety of combat delivery (tactical airlift) operations across a broad range of mission environments. The C-130J aircraft, with its extended (by 15 feet) fuselage, provides additional cargo carrying capacity for the USAF combat delivery mission compared with legacy C-130E/H and the C-130J (short). Special mission variants of the C-130J conduct airborne psychological operations (EC-130J), weather reconnaissance (WC-130J), search and rescue (HC-130J), and special operations (MC-130J and AC-130J). All aircraft variants must be capable of worldwide operations.

This project also provides RDT&E funding for required capabilities that are grouped as "Block" upgrades or "Capability" updates. Content/requirements for these efforts is documented in International Program Directives (IPDs) as determined through the Cooperative Systems and Software Upgrade Requirements Management (COSSURM) process or other approved C-130J Joint User Group (JUG) processes. Activities required to complete development and integration of the common-core capabilities for all United States' variants are included in this project.

This project also provides RDT&E funding for requirements that are outside of the "Block" upgrades, "Capability" updates, or COSSURM process. These efforts may include, but are not limited to, communication, data link, Global Positioning Systems (GPS), electronic warfare, and mission support system updates. The requirements are identified and concurred between the C-130J Program Office and Air Mobility Command (AMC). Requirements are documented through the C-130J Program Office approval process.

This project provides RDT&E funding for studies and risk reduction activities and Program Management Administration (PMA).

This project includes RDT&E funding for the following C-130J aircraft variants: C-130J stretch aircraft, C-130J short aircraft, EC-130J aircraft, WC-130J aircraft, HC-130J aircraft, MC-130J aircraft, and AC-130J aircraft.

This project included RDT&E funding for Rapid Global Mobility (RGM) platform related activities including, but not limited to, prototyping, capability development, process activities, planning analysis, and systems engineering activities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver C-130J weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Block 8.1	6.802	3.985	3.174	-	3.174

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program	Project (Number/Name) 675061 / C-130J
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Description: BLOCK 8.1 Adds Identification Friend or Foe (IFF) Mode 5, Civil Data Link, Automatic Dependent Surveillance - Broadcast (ADS-B), Air Traffic Services (ATS)/Airline Operational Control (AOC) Data Link for Line of Sight (LOS) and Beyond Line of Sight (BLOS) communication, enhanced covert lighting, improved Public Address(PA) System, and Approach Procedure with Vertical guidance (APV)/ Localizer Performance with Vertical guidance (LPV) approach capability. Major avionics platforms impacted include, but are not limited to, Flight Management System (FMS)Software, Mission Computer (MC) Software, Bus Interface Unit (BIU) software, special mission processing, and Maintenance Management System (MMS).</p> <p>FY 2020 Plans: Complete development of Block 8.1 ADS-B Out for FY2020 FAA Mandate and begin de-confliction of Dynamic Retasking Capability (DRC) Group A components.</p> <p>FY 2021 Base Plans: Continue de-confliction of Block 8.1 Dynamic Retasking Capability (DRC) and begin Block 8.1 TKI for WC variant.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease due to conclusion of Block 8.1 DRC effort.</p>					
<p>Title: Test & Evaluation</p> <p>Description: Test and evaluation planning, conduct and support for developmental and operational testing of Block 8.1.</p> <p>FY 2020 Plans: Continuation of test planning and support for integration efforts.</p> <p>FY 2021 Base Plans: Continuation of test planning and support for integration efforts.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increase due to additional testing required for (DRC) updates.</p>	0.189	0.450	0.750	-	0.750
<p>Title: Capability Management Update (CMU)</p> <p>Description: CMU 1 and 2 refine and build on Block upgrade modifications that improve operational effectiveness, satisfy emerging operational needs, and enhance human machine interface (HMI) to allow a</p>	2.053	2.405	1.600	-	1.600

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program	Project (Number/Name) 675061 / C-130J

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
workload that meets human factors standards and maintains the present crew complement. Major systems software impacted includes, but not limited to, FMS Software, MC Software, BIU software, and MMS. FY 2020 Plans: Continuation of Common Core Development, correcting deficiencies and developing enhancements. FY 2021 Base Plans: Continuation of software development for Capability Management Update (CMU) 1 and CMU 2 efforts which will be fielded as Block 8.1.1 and 8.1.2 respectively. FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease due to reduced CMU 1 (Block 8.1.1) efforts.					
Title: Other AMC Initiatives Description: C-130J initiatives/studies. FY 2020 Plans: Mission Planning software and updates continue. Pod study will be performed. FY 2021 Base Plans: Mission Planning software and updates continue. FY 2020 to FY 2021 Increase/Decrease Statement: Funding decrease due to completion of Pod Study.	0.850	1.500	0.450	-	0.450
Title: Communication Modernization Description: Starting in FY21 the name of this Major Thrust changed to Communication Modernization from Mobile User Objective System (MUOS), which began in FY 2020. Development of the new radio and communication systems including, but not limited to, Mobile User Objective System (MUOS), Second-generation Anti-jam Tactical UHF Radio for NATO (SATURN), Joint Range Extension Application Protocols (JREAP) to modernize Military Satellite Communication System (MILSATCOM), Ultra High Frequency (UHF), High Frequency (HF), special mission processing, and data link messaging. These systems will provide secure, global Line of Sight (LOS) and Beyond Line of Sight (BLOS) satellite voice and data connectivity utilizing modern satellite constellations and waveforms. FY 2020 Plans:	0.000	0.300	4.700	-	4.700

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program	Project (Number/Name) 675061 / C-130J

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Development effort of new MUOS radio systems to begin 4Q FY20					
<i>FY 2021 Base Plans:</i> Development of new radio systems to modernize MILSATCOM.					
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding increase due to development and ramp-up of new radio systems to modernize MILSATCOM.					
Accomplishments/Planned Programs Subtotals	9.894	8.640	10.674	-	10.674

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item C1300J: C-130J Mods	101.080	128.399	134.090	-	134.090	113.127	176.751	77.076	44.270	967.212	1,742.005
• APAF 02 Line Item C130J0: C-130J	674.100	742.156	8.412	-	8.412	8.585	8.737	8.895	0.000	1,612.013	3,062.898

Remarks

D. Acquisition Strategy

The C-130J aircraft will be modified using a "block upgrade" strategy. The CNS/ATM, navigation safety requirement will initially be met in three block upgrades. Block 6.0 development was funded from FY03-07. Block 7.0 started in FY07, and Block 8.1 began in FY12. Subsequently, C-130J modifications will be grouped into smaller updates known as Capability Management Updates (CMU). Other AMC initiatives are upgrades to hardware and software that have arisen after the formation of the block upgrades and CMUs.

In order to better manage the fleet and to avoid having to simultaneously support three separate aircraft configurations (Block 6, Block 7 and Block 8.1) the USAF has decided to combine the Block 7 and Block 8.1 mods. This will allow aircraft and trainers to only have to be modified one time.

The proportion of CNS/ATM and navigation safety requirements allocated to Blocks 6.0 through 8.1 was determined via a design trade study conducted by Lockheed Martin (the C-130J prime contractor) and verified by the C-130J system program office and AMC. The development costs are being shared via a global Project Arrangement (PA) by the United States (USAF, USMC, USCG), the United Kingdom, Italy, Australia, Denmark, Canada, and Norway. An international program office (IPO), with USAF lead (Wright Patterson AFB, OH), manages the block upgrades development and CMU efforts. Retrofit of a Block on the aircraft is the responsibility of each nation.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
3600 / 7	PE 0401132F / C-130J Program	675061 / C-130J

To meet the Federal Aviation Administration 2020 mandate, the USAF installed the Block 8.1 ADS-B Out/Mode V IFF solution on all C-130J variants not scheduled to receive Block 8.1 by January 2020. This is Mod #8649, ADS-B Out Acceleration. All C-130Js will still require Block 8.1.

In order to meet four DoD technology refresh mandates before end of year 2024, the communications modernization program will develop and field a federated and integrated communications system to Blocks 6.0 and 8.1 C-130J variants.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program	Project (Number/Name) 675061 / C-130J
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C-130J Block 8.1, Air Force Life Cycle Mgmt Ctr (AFMC), WPAFB, OH	SS/CPAF	Lockheed Martin Information Sytems : Marietta, GA	101.722	4.481	Feb 2019	1.685	Nov 2019	2.674	Dec 2020	0.000		2.674	18.070	128.632	180.030
C-130J Capability Management Upgrades (CMU), Air Force Life Cycle Mgmt Ctr (AFMC), WPAFB, OH	SS/CPFF	Lockheed Martin Aero : Marietta, GA	0.888	2.053	Jun 2019	2.405	Nov 2019	0.600	May 2021	0.000		0.600	10.706	16.652	20.480
C-130J AMC-Initiatives, Air Force Life Cycle Mgmt Ctr (AFMC), WPAFB, OH	SS/CPAF	Lockheed Martin Aero : Marietta, GA	51.935	0.450	Feb 2019	1.500	Nov 2019	0.450	Dec 2020	0.000		0.450	4.629	58.964	14.730
C-130J Communication Modernization, Air Force Life Cycle Mgmt Ctr (AFMC), WPAFB, OH	SS/CPAF	Lockheed Martin Aero : Marietta, GA	0.000	0.000		0.000		4.218		0.000		4.218	7.900	12.118	-
Subtotal			154.545	6.984		5.590		7.942		0.000		7.942	41.305	216.366	N/A

Remarks
C-130J Block 8.1 Total Cost is below Target Value of Contract to account for the expected cost reduction initiatives on this Cost Plus Award Fee Contract.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	1.625	-		-		-		-		-	0.000	1.625	-
C-130J Block 8.1 testing	PO	EGLIN AFB : Eglin, FL	0.697	0.435	Sep 2019	0.450	Nov 2019	0.750	Jan 2021	0.000		0.750	0.000	2.332	7.490
Subtotal			2.322	0.435		0.450		0.750		0.000		0.750	0.000	3.957	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program	Project (Number/Name) 675061 / C-130J
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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
C-130J IPO Support	TBD	N/A : NV	10.246	1.301	Mar 2019	1.233	Mar 2020	1.079	Mar 2021	0.000		1.079	0.000	13.859	15.014
C-130J COSSURM	TBD	RAF : NV	16.548	0.000		0.000		0.000		0.000		0.000	0.000	16.548	16.548
C-130J Support	TBD	N/A : OH	3.420	1.174	Mar 2019	1.367	Mar 2020	0.903	Mar 2021	0.000		0.903	0.000	6.864	15.014
Subtotal			30.214	2.475		2.600		1.982		0.000		1.982	0.000	37.271	N/A

Remarks
The COSSURM contract is managed by the United Kingdom Royal Air Force (RAF).

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	187.081	9.894	8.640	10.674	0.000	10.674	41.305	257.594	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program	Project (Number/Name) 675061 / C-130J
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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-130J	
Block 8.1 Development	
Block 7.0/ 8.1 Trial Kit Installation (TKI) WC	
CMU	
Communication Modernization	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program	Project (Number/Name) 675061 / C-130J
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
C-130J				
Block 8.1 Development	1	2019	4	2022
Block 7.0/ 8.1 Trial Kit Installation (TKI) WC	1	2021	4	2025
CMU	1	2019	4	2024
Communication Modernization	1	2021	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0401132F / C-130J Program				Project (Number/Name) 675062 / C-130J TRAINERS			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675062: C-130J TRAINERS	0.000	0.030	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.030
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project will enhance aircrew simulator fidelity utilizing aircraft flight tests to gather data to accurately emulate ground effect, nose wheel and engine-out data points. Currently the simulator is approved to accomplish only 50% of annual assault landings. This added capability will allow more training to be accomplished in the simulator so the aircraft will be available for more real world missions. The ability to accomplish more training in the simulator also reduces the annual aircraft O&M requirement.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Aero Data Collection - Documentation	0.030	0.000	0.000	0.000	0.000
Description: Utilize aircraft flight tests, gather data for simulator to accurately emulate ground effect, nose wheel and single engine data points to make simulator land like the aircraft. Simulator is currently approved to accomplish only 50% of assault landings. Effort includes aircraft modification to collect all data points and de-modification after data collection to return aircraft to previous status.					
FY 2020 Plans: N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
Accomplishments/Planned Programs Subtotals					
	0.030	0.000	0.000	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

One C-130J will be instrumented to collect data during takeoff, approach and landing phases of flight. This data will be used to enable the C-130J Weapon System Trainers to more accurately emulate ground effect, nose wheel, and engine out data points so the simulator will land more like the aircraft. The ability to accomplish more training in the simulator also reduces the annual aircraft O&M requirement.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program	Project (Number/Name) 675062 / C-130J TRAINERS
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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-130J Trainers	
Aero Data Collection Documentation	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401132F / C-130J Program	Project (Number/Name) 675062 / C-130J TRAINERS
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
C-130J Trainers				
Aero Data Collection Documentation	1	2019	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0401134F / Large Aircraft IR Countermeasures (LAIRCM)
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	4.182	5.424	5.507	0.000	5.507	5.624	0.000	0.000	0.000	Continuing	Continuing
674942: Large Aircraft Infrared Counter Measures (LAIRCM)	-	4.182	5.424	5.507	0.000	5.507	5.624	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Large Aircraft Infrared Countermeasures (LAIRCM) system is an evolutionary acquisition program that provides significantly improved defensive systems capability for DoD aircraft to counter the infrared (IR) man-portable air-defense systems (MANPADS) missile threat. The current LAIRCM system configuration [AN/AAQ-24V] consists of missile warning sensors (MWS), a laser transmitter assembly, control interface unit and processors to detect, track, jam and counter incoming IR missiles. The number of sensors and transmitter assemblies per aircraft is determined by the size and signature of the aircraft. The system is fully automatic following system power-up. LAIRCM requirements are documented in the multi-command Operational Requirements Document (ORD) LAIRCM ORD 314-92, validated on 03 Aug 98. The system is currently installed on 54+ aircraft types and over 1200 aircraft.

The baseline program development is complete. Follow-on efforts are addressing integration onto new aircraft types and existing LAIRCM platforms, design changes to address Reliability Maintainability & Availability and system improvements to counter new and emerging threats.

LAIRCM upgrades include, but are not limited to, hardware and software upgrades and testing of the LAIRCM system to maintain defensive capability against new and emerging threats.

Current and future efforts include Threat Analysis; Modeling, Simulation and Emulation Testing; Virtual System Integration Lab (SIL) Development; and Studies and Analysis.

Threat Analysis: Threat analysis encompasses the activities to support threat exploitation analysis of a variety of threats (both known and emerging) against the current LAIRCM jam code with the intent of determining if jam code updates are required. Typical threat analysis activities include: threat seeker characterization; model development for advanced threat IR seekers; development and testing of new infrared countermeasures concepts, techniques, and hardware; new technology assessment for potential incorporation into the LAIRCM system, and the evaluation/exploitation of new threats and threat characteristics relative to infrared countermeasures (IRCM).

Modeling, Simulation, and Emulation Testing: Modeling, Simulation, and Emulation activities verify and validate the information obtained from the threat analysis activities. These activities include: evaluation of (IRCM) techniques used in defeating real threat hardware; developing and evaluating jam code; validating and verifying integration of LAIRCM system components to newly developed jam codes, software or hardware; evaluating system effectiveness; performing platform integration support tests; and conducting predictive risk reduction tests prior to Live Missile Fire Test (LMFT) or on aircraft flight testing.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401134F / <i>Large Aircraft IR Countermeasures (LAIRCM)</i>
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Virtual SIL Development: Incrementally design, develop, integrate, and test software code and purchase associated infrastructure (i.e., computers, servers, commercial off-the-shelf (COTS) software, etc.) necessary to develop and implement a virtual SIL providing a critical capability for testing the LAIRCM system to ensure continued effectiveness against current and emerging threats.

Studies and Analysis: Includes logistics, programmatic, and engineering studies and analysis activities to ensure continued system viability and sustainability and compliance with acquisition directives. These activities may include the evaluation of low cost/high payback opportunities to reduce software development/implementation cost, enhance production efficiency, and improve life cycle costs through increased reliability and reduced repair and return cost.

Program management and administration efforts consist of, but are not limited to, contract services and government costs. This program element may include necessary civilian pay expenses required to manage, execute, and deliver LAIRCM weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	4.334	5.424	5.518	0.000	5.518
Current President's Budget	4.182	5.424	5.507	0.000	5.507
Total Adjustments	-0.152	0.000	-0.011	0.000	-0.011
• 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	-0.152	0.000			
• Other Adjustments	0.000	0.000	-0.011	0.000	-0.011

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: LAIRCM Threat Analysis	3.203	2.760	4.700	0.000	4.700
Description: Encompasses the activities to support threat exploitation analysis of a variety of threats against the current LAIRCM jam code with the intent of determining if jam code updates are required.					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401134F / <i>Large Aircraft IR Countermeasures (LAIRCM)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p><i>FY 2020 Plans:</i> Continue to work on Threat Analysis in the Guided Weapons Evaluation Facility (GWEF), to include purchase of assets, and efforts with Air Force Research Laboratory (AFRL).</p> <p><i>FY 2021 Base Plans:</i> Continue to work on Threat Analysis in the Guided Weapons Evaluation Facility (GWEF), to include purchase of assets, and efforts with Air Force Research Laboratory (AFRL).</p> <p><i>FY 2021 OCO Plans:</i> N/A</p> <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding increase due to increased analysis planned in FY 2021 for Jam Code Optimization efforts.</p>					
<p><i>Title:</i> LAIRCM Modeling, Simulation and Emulation Testing</p> <p><i>Description:</i> Activities that verify and validate the information obtained from threat analysis activities.</p> <p><i>FY 2020 Plans:</i> Will continue to work in Modeling, Simulation and Emulation Tests. This is a continued effort from LAIRCM Development in previous years.</p> <p><i>FY 2021 Base Plans:</i> Will continue to work in Modeling, Simulation and Emulation Tests. This is a continued effort from LAIRCM Development in previous years.</p> <p><i>FY 2021 OCO Plans:</i> N/A</p> <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding increase due to an increase in FY 2021 testing requirements.</p>	0.629	0.654	0.807	0.000	0.807
<p><i>Title:</i> LAIRCM Virtual SIL Development</p> <p><i>Description:</i> VSIL incrementally designs, develops, integrates, and tests software code and purchases associated infrastructure (i.e., computers, servers, COTS software, etc.) necessary to develop and implement a virtual SIL providing a critical capability for testing the LAIRCM system to ensure continued effectiveness against current and emerging threats.</p>	0.350	0.000	0.000	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force				Date: February 2020	
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0401134F / <i>Large Aircraft IR Countermeasures (LAIRCM)</i>			
C. Accomplishments/Planned Programs (\$ in Millions)					
	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY 2020 Plans: N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: N/A					
Title: LAIRCM Studies and Analysis					
Description: Includes logistics, programmatic, and engineering studies and analysis activities to ensure continued system viability and sustainability and compliance with acquisition directives. These activities may include the evaluation of low cost/high payback opportunities to reduce software development/implementation cost, enhance production efficiency, and improve life cycle costs through increased reliability and reduced repair and return cost. Includes all Operational Data Collections including the purchase of required collection hardware, wiring to interface with the LAIRCM system on aircraft, and threat/system analysis on collected data.					
FY 2020 Plans: Will initiate studies to address and/or assess various efforts and projects that enhance and/or update LAIRCM effectiveness, including Operational Data Collection activities.					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to reduction in studies and analysis in order to fund additional efforts in Threat Analysis.					
Accomplishments/Planned Programs Subtotals					
	4.182	5.424	5.507	0.000	5.507

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401134F / <i>Large Aircraft IR Countermeasures (LAIRCM)</i>
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D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item LAIRCM: <i>Large Aircraft Infrared Countermeasures</i>	143.225	97.093	9.999	57.521	67.520	59.310	66.526	0.000	30.003	0.000	463.677

Remarks

E. Acquisition Strategy

Efforts awarded on an annual basis, exercising existing contract options, support threat analysis and system effectiveness. The LAIRCM program office partners with the Air Force Research Laboratory (AFRL), the 46th Test Squadron, and the Guided Weapon Evaluation Facility (GWEF) to conduct threat analysis research and Modeling, Simulation, and Emulation Testing. AFRL provides hardware-in-the-loop developmental test simulation capability on a level-of-effort (LOE) basis. The current LAIRCM contract may be used to award the various study efforts.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401134F / Large Aircraft IR Countermeasures (LAIRCM)	Project (Number/Name) 674942 / Large Aircraft Infrared Counter Measures (LAIRCM)
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LAIRCM ETA Virtual SIL Development	SS/TBD	NGC : Rolling Meadows, IL	-	0.350	Apr 2019	-		-		-		-	Continuing	Continuing	-
LAIRCM ETA Studies and Analysis	Various	Various : Various, NV	-	-		2.010	Mar 2020	-		-		-	Continuing	Continuing	-
Subtotal			-	0.350		2.010		-		-		-	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LAIRCM ETA Threat Analysis/ Guided Weapon Evaluation Facility	PO	GWEF : Eglin AFB, FL	-	0.765	Jan 2019	0.200	Mar 2020	2.300	Apr 2021	-		2.300	Continuing	Continuing	-
LAIRCM ETA Modeling, Simulation and Emulation Test	MIPR	AFRL/RYP-Omni Sentinel : WPAFB, OH	-	0.554	Oct 2018	0.434	Dec 2019	0.565	Dec 2020	-		0.565	Continuing	Continuing	-
LAIRCM ETA Threat Analysis/Air Force Research Laboratory (AFRL)	MIPR	AFRL/RYP-DIME : WPAFB, OH	-	1.550	Nov 2018	2.000	Nov 2019	1.350	Nov 2020	-		1.350	Continuing	Continuing	-
LAIRCM ETA Threat Analysis/ Asset Buys	MIPR	United States Army : Huntsville, AL	-	0.758	Jun 2019	0.560	May 2020	0.550	Apr 2021	-		0.550	Continuing	Continuing	-
LAIRCM ETA NG Live Fire	SS/TBD	NGC : Rolling Meadows, IL	-	-		-		0.500	Apr 2021	-		0.500	Continuing	Continuing	-
Subtotal			-	3.627		3.194		5.265		-		5.265	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401134F / Large Aircraft IR Countermeasures (LAIRCM)	Project (Number/Name) 674942 / Large Aircraft Infrared Counter Measures (LAIRCM)
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Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
LAIRCM ETA Government Travel	Various	Government Employees : WPAFB, OH	-	0.205		0.220		0.242		-		0.242	Continuing	Continuing	-
Subtotal			-	0.205		0.220		0.242		-		0.242	Continuing	Continuing	N/A

Remarks
N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	4.182	5.424	5.507	-	5.507	Continuing	Continuing	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401134F / <i>Large Aircraft IR Countermeasures (LAIRCM)</i>	Project (Number/Name) 674942 / <i>Large Aircraft Infrared Counter Measures (LAIRCM)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
LAIRCM				
Threat Analysis	1	2019	4	2022
Modeling , Simulation, and Emulation Testing	1	2019	4	2022
Virtual SIL Development	1	2019	3	2019
Studies and Analysis	1	2020	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401218F / KC-135s
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	2.692	0.000	4.591	0.000	4.591	0.249	0.249	0.000	0.000	Continuing	Continuing
675261: <i>KC-135 Upgrades</i>	-	2.692	0.000	4.591	0.000	4.591	0.249	0.249	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
 This program, BA 7, PE 0401218F, project 675261, KC-135 MUOS radio, is a new start.

A. Mission Description and Budget Item Justification

The Mobile User Objective System (MUOS) radios is a new start and is a major thrust in FY21. The KC-135 currently utilizes the legacy V/UHF satellite system, UHF Follow-On (UFO), to communicate with their controlling Command & Control (C2) agencies and other warfighters. This program adds to the current system by providing Beyond Line Of Sight (BLOS) and Line Of Sight (LOS) capability for secure voice and C2 data communications exchange between MAF aircraft and C2 agencies and is capable of operating with new crypto algorithms being developed under the VINSON/ANDVT Crypto Modernization (VACM) Program by National Security Agency.

KC-135 funding also supports Program Management Administration (PMA), various studies, analyses, and KC-135 requirements definition and demonstrations in support of Air Force Advanced Battle Management Systems (ABMS) initiative.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver KC-135 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force				Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0401218F / KC-135s				
B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	
Previous President's Budget	3.493	0.000	4.600	0.000	4.600	
Current President's Budget	2.692	0.000	4.591	0.000	4.591	
Total Adjustments	-0.801	0.000	-0.009	0.000	-0.009	
• 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	-0.673	0.000				
• SBIR/STTR Transfer	-0.128	0.000				
• Other Adjustments	0.000	0.000	-0.009	0.000	-0.009	
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2019	FY 2020	FY 2021
Title: KC-135 Aero-I SATCOM				2.692	0.000	0.000
Description: Prototype integration and validation of Iridium Aero-I. Aero-I services are used to provide oceanic Controller/Pilot Data Link Communications (CPDLC) to Air Traffic Control and Aircraft Communications Addressing and Reporting System (ACARS) Beyond Line of Sight (BLOS) Command and Control (C2) messages to 618th Tactical Air Control Center (TACC) Global Decision Support System.						
FY 2020 Plans: N/A						
FY 2021 Plans: N/A						
Title: KC-135 MUOS radio				-	0.000	4.591
Description: The KC-135 utilizes the legacy V/UHF satellite system, UHF Follow-On (UFO), to communicate with their controlling Command & Control (C2) agencies and other warfighters. This program adds to the current system by providing Beyond Line Of Sight (BLOS) and Line Of Sight (LOS) capability for secure voice and C2 data communications exchange between MAF aircraft and C2 agencies and is capable of operating with new crypto algorithms being developed under the VINSON/ANDVT Crypto Modernization (VACM) Program by National Security Agency.						
FY 2020 Plans:						

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401218F / KC-135s
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
N/A			
<i>FY 2021 Plans:</i> Prototype and integration efforts for first articles.			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Program funding increased to begin prototype and integration efforts for MUOS on KC-135.			
Accomplishments/Planned Programs Subtotals	2.692	0.000	4.591

D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 05 Line Item C13500: C-135	0.000	28.581	16.274	-	16.274	23.682	24.580	1.330	26.744	Continuing	Continuing

Remarks

E. Acquisition Strategy

Conducting MUOS Industry Day on 22 Jan 2020 to finish up market research. Full and open competition with request for proposals scheduled to be released at end of FY20 of single award contract for prototype and integration of first articles.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401218F / KC-135s	Project (Number/Name) 675261 / KC-135 Upgrades
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

KC-135 MUOS Radio	
Original strategy Contract Award, EMD, and Test	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401218F / KC-135s	Project (Number/Name) 675261 / KC-135 Upgrades

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
KC-135 MUOS Radio				
Original strategy Contract Award, EMD, and Test	1	2021	2	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401219F / KC-10s
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	5.084	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.104
675195: <i>Aircraft Modernization Program (AMP)</i>	-	5.084	0.020	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.104
Quantity of RDT&E Articles	-	1	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The KC-10 is an aerial refueling asset built on the commercial DC-10 airframe. This aircraft creates an air bridge enabling rapid global mobility and global strike missions. There are 59 KC-10 aircraft in the USAF tanker fleet. KC-10 has a divestiture strategy that will follow Fiscal Year 2019 National Defense Authorization Act and Air Force requirements.

Mode 5 program is a Department of Defense mandated upgrade to the Identification Friend or Foe (IFF) system, the primary means of command and control aircraft identification. Mode 5 increases anti-spoofing capabilities and lowers the possibility of aircraft/aircrew loss due to misidentification of friendly aircraft. The KC-10 modification program includes a Mode 5 capable APX-119 transponder, a new KIV-77 crypto applique and integration/control through the CDU-7000F flight management computer.

A Federal Aviation Administration (FAA) mandated Automatic Dependent Surveillance-Broadcast (ADS-B) Out upgrade to the KC-10 is also included as part of Mode 5 to meet DO-260B requirements set by the FAA. Both IFF Mode 5 and ADS-B Out are mandated programs (Joint Requirements Oversight Council Memorandum 047-07 and FAA Advisory Circular 20-165B) that have a required incorporation no later than 1 January 2020 (ADS-B) and 1 July 2020 (Mode 5). Both modifications are accomplished by modification of the APX-119 Line Replaceable Unit (LRU) and can easily be accomplished at the same time and at a significant cost savings to the Air Force.

The program completed formal Engineering and Manufacturing Development (EMD) and will procure kits for installation on all KC-10 aircraft.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver KC-10 weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 0401219F / KC-10s
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B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	6.569	0.020	0.000	0.000	0.000
Current President's Budget	5.084	0.020	0.000	0.000	0.000
Total Adjustments	-1.485	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	-1.271	0.000			
• SBIR/STTR Transfer	-0.214	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

FY 2019 Funding decreased by \$1.271M for below threshold reprogramming action.

C. Accomplishments/Planned Programs (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>
Title: KC-10 Mode 5 IFF	5.084	0.020	0.000
Description: FAA mandated upgrade to the IFF system to increase anti-spoofing and exploitation capabilities and lower the possibility of aircraft/aircrew loss due to misidentification of friendly aircraft.			
FY 2020 Plans: Continuation of engineering design and analysis effort (EMD).			
FY 2021 Plans: N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: Effort complete in FY20, no FY21 funding required.			
Accomplishments/Planned Programs Subtotals			
	5.084	0.020	0.000

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• APAF 05 C01000: KC-10A (ATCA)	11.004	0.000	0.000	-	0.000	0.000	0.000	-	-	0.000	11.004

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force</i> / BA 7: <i>Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401219F / KC-10s
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D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
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Remarks

E. Acquisition Strategy

The acquisition strategy will be a sole source RDT&E effort followed by procurement of kits and modification of KC-10 aircraft.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401219F / KC-10s	Project (Number/Name) 675195 / Aircraft Modernization Program (AMP)
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
KC-10 Mode 5: EMD	SS/CPFF	Rockwell Collins : Cedar Rapids, IA	-	4.805	Oct 2018	-		-		-		-	0.000	4.805	-
Subtotal			-	4.805		-		-		-		-	0.000	4.805	N/A

Remarks
11 Nov 17: EMD Contract awarded to Rockwell Collins Inc.

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
KC-10 Mode 5: LCMP Document Support	MIPR	VC-25, GSA Contract - BAH : TBD	-	0.053	Oct 2018	-		-		-		-	0.000	0.053	-
Subtotal			-	0.053		-		-		-		-	0.000	0.053	N/A

Remarks
Funds ground, AIMS and flight testing, test range support, post test reports.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
KC-10 Mode 5: Mgmt Support	C/FFP	EPASS : Dayton, OH	-	0.143	Apr 2019	-		-		-		-	0.000	0.143	-
KC-10 Mode 5: Govt Travel	Reqn	Not specified. : TBD	-	0.083	Oct 2018	0.020	Oct 2019	-		-		-	0.000	0.103	-
Subtotal			-	0.226		0.020		-		-		-	0.000	0.246	N/A

Remarks
Funding for A&AS support contractors.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401219F / KC-10s	Project (Number/Name) 675195 / Aircraft Modernization Program (AMP)

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

KC-10 Mode 5	
KC-10 Mode 5: EMD	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401219F / KC-10s	Project (Number/Name) 675195 / Aircraft Modernization Program (AMP)

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
KC-10 Mode 5				
KC-10 Mode 5: EMD	1	2019	1	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401314F / <i>Operational Support Airlift</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	0.000	3.059	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
676024: <i>VC-25 Avionics Modernization Program</i>	0.000	3.059	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	2	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

October 2017, VC-25A Avionics Modernization Program (AMP) was de-scoped from upgrading the flight deck avionics to compliance with the mandates for civil Automatic Dependent Surveillance-Broadcast (ADS-B) Out and DoD Identification Friend or Foe (IFF) Mode 5 capability supporting the President of the United States as Head of State, Chief Executive, and Commander in Chief.

Installations are aligned with the aircraft heavy maintenance (HM) schedule. The de-scoped AMP requirements to ADS-B Out and IFF Mode 5 must integrate the 2020 mandate capability in HM18-8 and HM20-9 utilizing the remaining FY 2018 funds for test, tech data integration, System Integration Lab (SIL), field team and other government costs. The National Security Waiver signed by Secretary of the Air Force 11 Dec 18 included the capability for ADS-B Out and IFF Mode 5 full FAA compliance 2025, which would utilize procurement funds but has not been funded.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver VC-25A weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	3.172	0.000	0.000	0.000	0.000
Current President's Budget	3.059	0.000	0.000	0.000	0.000
Total Adjustments	-0.113	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	-0.113	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 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401314F / <i>Operational Support Airlift</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Design and Test	3.059	-	-
Description: Design and Test efforts included a Systems Integration Laboratory (SIL), material buys for the SIL, non-recurring engineering and test and evaluation.			
Accomplishments/Planned Programs Subtotals	3.059	-	-

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

VC-25A AMP, ADS-B Out and IFF Mode 5 is being accomplished by developmental integration of commercial off-the-shelf systems, hardware procurement and installation aligns with HM depot schedules. A Cost Plus Incentive Fee (CPIF) contract was awarded Sep 17 to complete non-recurring engineering, kit, tech data and SIL development. RDT&E efforts included the second kit, install, corrected wiring diagrams in the Wiring Information Retrieval System (WIRS), finalized tech data development, tech data integration into maintenance manuals, SE/PM, Other Government Cost (OGC) and PMA. Air Force took delivery of the first aircraft in FY19 and second kit configuration in FY20.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401314F / <i>Operational Support Airlift</i>	Project (Number/Name) 676024 / <i>VC-25 Avionics Modernization Program</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
AMP																												
OGC/PMA				■																								
ADS-B Out NRE				■																								
Test and Evaluation 1				■	■	■	■																					
NRE				■	■	■	■																					
Test and Evaluation 2				■	■	■	■																					

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401314F / <i>Operational Support Airlift</i>	Project (Number/Name) 676024 / <i>VC-25 Avionics Modernization Program</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
AMP				
OGC/PMA	4	2019	4	2019
ADS-B Out NRE	4	2019	4	2019
Test and Evaluation 1	2	2019	4	2019
NRE	2	2019	3	2019
Test and Evaluation 2	2	2019	4	2019

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401318F / CV-22
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	109.967	15.981	17.906	18.419	0.000	18.419	17.447	17.427	17.703	15.997	41.970	272.817
676033: <i>CV-22 RDT&E POST PRODUCTION</i>	109.967	15.981	17.906	18.419	0.000	18.419	17.447	17.427	17.703	15.997	41.970	272.817
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Program MDAP/MAIS Code: 212
Project MDAP/MAIS Code(s): N42

A. Mission Description and Budget Item Justification

The CV-22 is the Air Force Special Operations Forces (SOF) variant of the joint multi-mission V-22 tilt rotor aircraft. The CV-22 provides long-range, high-speed infiltration, exfiltration, and resupply to Special Forces teams in hostile, denied, and politically sensitive areas. The Navy is the lead service for the Joint V-22 program. The Joint Program Manager is responsible for managing all variants of the V-22. Department of the Navy (DoN) funds the development of the MV-22 and CMV-22. The Air Force funds the service common portion of the CV-22 while United States Special Operations Command (USSOCOM) funds the development and procurement of SOF peculiar systems. CV-22 RDT&E funding provides for the development, integration, and testing of service-common, mission critical aircraft modifications to improve operational effectiveness, platform survivability, and aircraft availability.

Nacelle Improvements: Funds the design and development of the CV-22 nacelle to increase engine time on wing by reducing ingestion of sand/dust and other particulate matter into the engine, improving reliability and maintainability and reducing operations and support costs. This is Air Force Special Operations Command's #1 priority for the CV-22 weapon system.

Enhanced Self-Deployment: RDT&E funding provides for the design, development, and testing of aircraft modifications to improve aircraft self-deployment capabilities (e.g., operating range, global response time) to mitigate emerging threats to the aircraft and mission accomplishment, and to identify and assess emerging air vehicle, propulsion system, avionics architecture, electronic warfare, situational awareness, and other weapon system solutions in meeting CV-22 Block C/20 capability requirements.

Future Capabilities/Affordable Sustainability: Funding provides for future modification planning, and for aircraft engineering changes/upgrades to address diminishing manufacturing source (DMS) and component obsolescence issues adversely affecting aircraft readiness and operational availability rates, as well as improved operational safety, suitability, cyber security, and mission effectiveness.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CV-22 weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401318F / CV-22
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This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	16.502	17.906	18.453	0.000	18.453
Current President's Budget	15.981	17.906	18.419	0.000	18.419
Total Adjustments	-0.521	0.000	-0.034	0.000	-0.034
• 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	-0.013	0.000			
• SBIR/STTR Transfer	-0.507	0.000			
• Other Adjustments	-0.001	0.000	-0.034	0.000	-0.034

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Nacelle Improvements	8.141	10.303	10.586	-	10.586
Description: Funds design, development, and testing of V-22 Nacelle Improvements- Infrared Suppressor (IRS), Generator Control Unit (GCU) upgrade, heat exchanger improvements, engine health monitoring, and upgrade other nacelle systems and components. Common nacelle improvements for both the CV-22 and MV-22 fleets will increase overall aircraft readiness/availability, reduce platform operating life cycle costs, and mitigate impacts to aircraft performance and survivability. These improvements will be integrated, tested, and fielded as block modifications to minimize cost and impact on fleet operations and readiness.					
FY 2020 Plans: Design, develop, and test Nacelle Improvements; IRS redesign, IIS (EAPS 2.0), GCU, and engine health monitoring.					
FY 2021 Base Plans: Continue design, development, and testing of Nacelle Improvements; IRS redesign, IIS (EAPS 2.0), GCU, and engine health monitoring.					
FY 2020 to FY 2021 Increase/Decrease Statement:					

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401318F / CV-22
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Funding increased due to inflation adjustment.					
Title: Enhanced Self-Deployment Capabilities Description: Develops capabilities to enhance self-deployment, such as improved ice protection, engine performance, performance buyback, navigation, communications, and battle space awareness/networking capabilities/multi domain command and control (MDC2); situational awareness; electronic warfare; weapons systems; defensive avionics systems and architecture; weight reduction initiatives; modular avionics/cyber security implementation and other changes to the underlying aircraft systems necessary to enable these capabilities. FY 2020 Plans: Continued design and development activities to enhance situational awareness, modular avionics architecture (MAA)/cyber security, and begin integration and develop flight control computer (FCC) obsolescence effort. FY 2021 Base Plans: Continue design and development activities to enhance situational awareness, MAA/cyber security, and integration and develop FCC obsolescence effort. FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to inflation adjustment.	7.840	7.603	7.833	-	7.833
Accomplishments/Planned Programs Subtotals	15.981	17.906	18.419	-	18.419

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTE 07 PE 1160403BB: <i>Special Operations, Aviation Systems</i>	27.344	28.081	16.773	-	16.773	9.634	17.942	18.360	18.727	Continuing	Continuing
• APAF 02 Line Item Special Operation: <i>CV-22 Modification</i>	34.029	17.256	14.829	-	14.829	38.770	45.569	70.188	71.591	Continuing	Continuing
• APAF 05 Line Item V02200: <i>CV-22 Mods</i>	60.072	65.348	122.306	6.290	128.596	164.063	151.353	146.678	61.207	Continuing	Continuing
• APAF 06 Line Item 000999: <i>CV-22 Initial Spares/Repair Parts</i>	0.000	0.000	6.574	-	6.574	10.935	3.496	0.000	0.000	0.000	21.005

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401318F / CV-22
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D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• APAF 07 Line Item C0V220: <i>CV-22 Post-Production Support</i>	0.000	0.000	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000
• RDTE 05 PE 0604262N: <i>V-22A Navy</i>	102.712	191.235	132.624	-	132.624	139.786	168.248	147.536	119.275	Continuing	Continuing

Remarks

In addition to the funding identified in the table above, prior year funding includes \$520.411 in RDT&E, DW, BA07, PE 1160421BB: Special Operations, CV-22 Development, and \$413.235M in RDT&E, AF, BA05, PE 0401318F: CV-22

E. Acquisition Strategy

The V-22 Joint Program Office (Naval Air Systems Command (NAVAIRSYSCOM), PMA-275) is developing new capabilities for the V-22 in block increments.

--Nacelle Improvements: IIS, IRS and GCU will utilize a combination of sole source and competitive contracts.

--Enhanced Self-Deployment Capabilities: Modular Avionics, FCC, and performance buyback will utilize a combination of sole source and competitive contracts.

Development activities for the V-22 program to date have been primarily performed by the prime contractor, Bell-Boeing, on a sole-source basis. Bell-Boeing is a strategic partnership between Bell Helicopter and Boeing Integrated Defense Systems. Efforts are underway to continue increasing competition where feasible, depending primarily on the level of platform integration required and Government rights to needed technical data.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401318F / CV-22	Project (Number/Name) 676033 / CV-22 RDT&E POST PRODUCTION
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CV-22 Osprey Block 20 Development	SS/CPFF	Bell Boeing : Amarillo, TX	8.047	-		-		-		-		-	0.000	8.047	163.825
V-22 Nacelle Improvements	Various	Various : Various	53.898	6.945	Feb 2019	8.703	Mar 2020	8.906		-		8.906	0.000	78.452	-
CV-22 Osprey Enhanced Self-deployment Capability	Various	Various : Various	32.877	6.840	Mar 2019	6.133	Jun 2020	6.443		-		6.443	60.160	112.453	0.000
Subtotal			94.822	13.785		14.836		15.349		-		15.349	60.160	198.952	N/A

Remarks
 Block 20 Development Target Value of Contract differs from total cost because most of the Block 20 development cost was funded in PE 0401318F, BA05. In addition, the SOF peculiar development efforts were funded by USSOCOM MFP-11 funding.

 Nacelle Improvements Development Target Value of Contract differs from total cost because this is a joint development funded by Navy and Air Force.

 Prior Years funding (\$322.656M) was executed in PE 0401318F, BA05.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CV-22 Osprey Engineering Technical Support and Studies	Various	Various : Various	5.599	1.000	Mar 2019	1.370	Mar 2020	1.370		-		1.370	9.721	19.060	0.000
Subtotal			5.599	1.000		1.370		1.370		-		1.370	9.721	19.060	N/A

Remarks
 Prior Years Funding \$40.454M was executed in PE 0401318F (BA05).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401318F / CV-22	Project (Number/Name) 676033 / CV-22 RDT&E POST PRODUCTION
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CV-22 Osprey Test & Evaluation Technical Support	Various	Various : Various	8.709	1.000	Dec 2018	1.500	Dec 2019	1.500	Dec 2020	-		1.500	7.323	20.032	0.000
Subtotal			8.709	1.000		1.500		1.500		-		1.500	7.323	20.032	N/A

Remarks
Prior Years Funding \$46.764M was executed in PE 0401318F (BA05).

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
CV-22 Osprey Mission Support	Allot	AFLCMC/WIV : Patuxent River, MD	0.837	0.196	Nov 2018	0.200	Nov 2019	0.200	Nov 2020	-		0.200	1.896	3.329	-
Subtotal			0.837	0.196		0.200		0.200		-		0.200	1.896	3.329	N/A

Remarks
Prior Years Funding \$3.361M was executed in PE 0401318F (BA05).

Project Cost Totals	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
	109.967	15.981	17.906	18.419	-	18.419	79.100	241.373	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401318F / CV-22	Project (Number/Name) 676033 / CV-22 RDT&E POST PRODUCTION

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

CV-22	
Nacelle Improvements	[REDACTED]
-- IIS Development and Test (EAPS 2.0)	[REDACTED]
--- Generator Control Unit (GCU)	[REDACTED]
-- Infrared Suppressor (IRS) Redesign	[REDACTED]
-- Engine Health Monitoring	[REDACTED]
Enhanced Self-Deployment	[REDACTED]
-- Performance Buyback Studies	[REDACTED]
-- Risk Reduction Analysis (multiple current and future development initiatives)	[REDACTED]
-- Modular Avionics Architecture (MAA)	[REDACTED]
-- Flight Control Computer (FCC)	[REDACTED]
-- Multi Domain Command and Control (MDC2)	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401318F / CV-22	Project (Number/Name) 676033 / CV-22 RDT&E POST PRODUCTION

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CV-22				
Nacelle Improvements	1	2019	4	2023
-- IIS Development and Test (EAPS 2.0)	1	2019	4	2023
--- Generator Control Unit (GCU)	2	2019	4	2023
-- Infrared Supressor (IRS) Redesign	2	2019	4	2021
-- Engine Health Monitoring	2	2019	4	2021
Enhanced Self-Deployment	1	2019	4	2024
-- Performance Buyback Studies	2	2019	1	2024
-- Risk Reduction Analysis (multiple current and future development initiatives)	1	2019	4	2024
-- Modular Avionics Architecture (MAA)	1	2019	4	2024
-- Flight Control Computer (FCC)	2	2020	4	2024
-- Multi Domain Command and Control (MDC2)	2	2022	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401840F / <i>AMC Command and Control System</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	1.626	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
674879: <i>Camps</i>	-	1.626	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
 In CY 18 Consolidated Air Mobility Planning System (CAMPS) Increment 1 was a new start. SPARTA prototype has been delivered and will be transitioned into CAMPS. No RDT&E funds will be required past FY19.

A. Mission Description and Budget Item Justification

A. Mission Description and Budget Item Justification

Consolidated Air Mobility Planning System (CAMPS) Increment 1.

The CAMPS Increment I program is the primary critical joint requirements management system for Special Assignment Air Mission (SAAM), Air Refueling (AR) scheduling, and Intra-theater air movement requests. It is also the primary USTRANSCOM and Air Mobility Command Command and Control (AMC C2) planning and scheduling tool enabling Mobility Air Force (MAF) resources to support peacetime, contingency, humanitarian, and wartime operations. In the Air Refueling Management System (ARMS), CAMPS provides the ability to request, manage and validate requests for air refueling. Force-level CAMPS users include the USTRANSCOM Fusion Center, 618th Air Operations Center (AOC) Tanker Airlift Control Center (TACC), and other AOC Air Mobility Divisions (AMDs). Several web-based applications also support movement and air refueling requests for globally distributed Joint, Service, and Wing/Unit level users.

The 618 AOC (TACC) is a global air operations center responsible for planning and executing airlift and air refueling missions in support of the Joint Deployment and Distribution Enterprise (JDDE). Although primarily used by the 618 AOC (TACC), CAMPS also supports validation, planning, and scheduling activities found at AMD and USTRANSCOM. CAMPS airlift and air refueling requirement management applications are available for all globally distributed Joint, Service, and Wing/Unit level users that need to request airlift or air refueling.

The current CAMPS AR scheduling capability does not have access to all data sources necessary to maintain visibility of and support for all potential re-planning requirements and therefore can have 'blind spots' which hinder its ability to provide robust support for planning and re-planning across the entire "initial through final" planning phase. This CAMPS Increment I (modernization) effort will build on the existing technology transitioned from RDT&E initiatives.

FY19 continued funding for Air Refueling scheduling capability development and testing to provide planners an integrated human-in-the-loop and machine-based cooperative system which provides the ability to rapidly generate and evaluate multiple potential solution candidates to satisfy requirements. This increases the effectiveness and efficiency with which Air Refueling assets are employed and support increased operational agility through rapid, effective and efficient re-planning while minimizing the impact on currently planned mission sets. The AR scheduling metrics component enables on-going improvement of the AR scheduling system and can be developed after extensive analysis and iterations with the constituent user sets and command authorities. Funding for this exhibit contained in PE 0401840F.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401840F / <i>AMC Command and Control System</i>
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Funding obligated in FY19 was \$538K, remaining \$1.1M will be obligated in FY20. ARST continues into FY20 as SPARTA capabilities are integrated by the end of the FY. No additional funding will requested or required. Further development of Air Refueling capabilities past FY20 will be funded by TWCF.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CAMPS Inc 1 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 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	1.688	0.000	0.000	0.000	0.000
Current President's Budget	1.626	0.000	0.000	0.000	0.000
Total Adjustments	-0.062	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	-0.062	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: CAMPS Increment 1 Dvelopment	1.626	0.000	0.000
Description: Complete funding obligation of Consolidated Air Mobility Planning System (CAMPS) Increment one, Air Refueling scheduling planning capability during FY20 with FY19 funding. Funds will be fully expended by 23 Mar 2021 (end of MAFC2SDS contract base year (24 Mar 2020 - 23 Mar 2021)).			
No FY21 funding required.			
FY 2020 Plans: No funding required.			
FY 2021 Plans:			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0401840F / <i>AMC Command and Control System</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
No FY21 funding required.			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	1.626	0.000	0.000

D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 834070: <i>AMC Command and Control System</i>	10.192	10.369	10.553	-	10.553	10.745	10.933	11.130	11.133	Continuing	Continuing

Remarks

E. Acquisition Strategy

The selected acquisition strategy of this project is focused on rapid, low cost development and sustainment.

CAMPS Increment 1 is being executed under USTRANSCOM Acquisition Authority and shall be acquired using the DODI 5000.02 Model 3 approach for Incrementally Deployed Software Intensive Program.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401840F / AMC Command and Control System	Project (Number/Name) 674879 / Camps

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

CAMPS	
CAMPS Air Refueling Development	[REDACTED]
CAMPS Air Refueling Integration	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0401840F / <i>AMC Command and Control System</i>	Project (Number/Name) 674879 / <i>Camps</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CAMPS				
CAMPS Air Refueling Development	3	2019	2	2020
CAMPS Air Refueling Integration	3	2020	2	2021

Note

- 3Q/FY19 Begin CAMPS Air Refueling Development
- 3Q/FY20 Begin CAMPS Air Refueling Integration
- 2Q/FY20 Complete CAMPS Air Refueling Development
- 2Q/FY21 Complete CAMPS Air Refueling Integration

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0408011F / <i>Special Tactics / Combat Control</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	2.322	3.629	7.673	0.000	7.673	6.740	6.180	8.983	9.148	Continuing	Continuing
675138: <i>ST System Development</i>	-	2.322	3.629	7.673	0.000	7.673	6.740	6.180	8.983	9.148	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Special Tactics (ST) System Development project focuses on modernization development for the Battlefield Air Operations (BAO) Kit. BAO Kit will develop, test, train, and modernize the existing and future Family of Systems (FoS) that provide a state-of-the-art Command, Control, Communications, Computer, Intelligence, Surveillance, and Reconnaissance (C4ISR) capability. It also provides a suite of systems for all Air Force Specialty Codes supporting the ST community within the Air Force Special Operations Command's (AFSOC's) Special Warfare operators. ST System Development focus on reducing the risk of fratricide and substantially reducing size and weight of the equipment carried through various core capabilities, which include but are not limited to: Human Machine Interface (HMI), Line of Sight (LOS) targeting, medical monitoring, and Machine-to-Machine (M2M) C4ISR System and all other ST capability needs.

This program will develop and enhance technologies for Special Warfare ST operators to recognize, identify, range, nominate, and designate targets during both day and night operations. BAO Kit will also significantly reduce the time required to find, track, fix targets, and engage the enemy by providing highly accurate target grid coordinates in three dimensions, generating target imagery both pre- and post-strike, and transmitting target data to Command and Control centers. BAO Kit systems are light, compact, and portable for use by dismounted Special Warfare ST operators. FY21 BAO Kit funding will provide significant improvements in operational capability, situational awareness, and precision lethality in the battle space while continuing to build and enhance the BAO Kit family of systems. This may be conducted through industry technology demonstrations, prototypes, and associated engineering support to posture the BAO Kit for technology insertion. These efforts will deliver enhanced capability for the dismounted soldier in terms of dramatic weight reduction and increase mission effectiveness across the conflict spectrum. BAO also supports AFSOC Tactical Command and Control (TAC C2) programs to develop and enhance communications systems and equipment essential for ST combat controllers, pararescue, combat weather operators, and tactical air controller parties within AFSOC to perform their mission. The ST operators use this equipment to gather and transmit assault zone suitability and weather data and to perform tactical airfield/assault landing/drop zone operations. Due to the rapidly changing threat environment, the acquisition program manager has the authority to redirect funding as necessary to meet current slated and emerging requirements. The above efforts may change based on the need to support current Air Force mission requirements.

Program changes in progress. This applies to both PE 0207227F and 0408011F.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver special tactic weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0408011F / <i>Special Tactics / Combat Control</i>
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The Special Tactics (ST) System Development activities also include studies, analysis, and risk-reduction activities to support both current and future program planning and execution.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	2.433	3.629	7.687	0.000	7.687
Current President's Budget	2.322	3.629	7.673	0.000	7.673
Total Adjustments	-0.111	0.000	-0.014	0.000	-0.014
• 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	-0.111	0.000			
• Other Adjustments	0.000	0.000	-0.014	0.000	-0.014

Change Summary Explanation

Required funding profile in FY20 has been rephased due to higher DoD priorities and low expenditure rates. FY21 funding profile covers known requirements in the BAO KIT FoS CDD.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: Human Machine Interface (HMI)</p> <p>Description: HMI is a system of systems that provides integrated operator interface between all the machine components by using unified visual and auditory displays and controls, such as head-mounted displays, tactical earplug connectivity with man pack or handheld communications, integrated tactical computing solution, and power generation and management systems.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Capability support digitally aided combat close air support operations. Plan to develop and operate tests or full spectrum certification (Joint Interoperable Test Command (JITC), Air Force System Interoperability Test (AFSIT), and Authority to Operate (ATO)). - Continue to explore and define requirements for implementation of the Iridium waveform granting DoD dedicated airtime. 	0.569	0.848	1.799

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0408011F / <i>Special Tactics / Combat Control</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>- Continue communications development: will upgrade HMI efforts which reduced the Size, Weight, and Power (SWAP) required to be carried by the Special Tactics Community. Specifically includes wireless technology.</p> <p>- Continue maturation of available technology for future dismounted communication contract in order to meet the requirements of the user.</p> <p>FY 2021 Plans:</p> <p>- Will continue to support digitally aided combat close air support operations. Plan to develop and operate tests or full spectrum certification (Joint Interoperable Test Command (JITC), Air Force System Interoperability Test (AFSIT), and Authority to Operate (ATO)).</p> <p>- Will continue to explore and define requirements for implementation of the Iridium waveform granting DoD dedicated airtime.</p> <p>- Will continue communications development: will upgrade HMI efforts which reduced the Size, Weight, and Power (SWAP) required to be carried by the Special Tactics Community. Specifically includes wireless technology.</p> <p>- Will require maturation of available technology for future dismounted communication contract in order to meet the requirements of the user.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Rephased funds in FY21 allows for increased development capabilities for Machine -to-Machine Interface (M2M). Current FY21 funding allows for the increased development of the Special Tactics Capability Development Document (CDD).</p>				
<p>Title: Line of Sight</p> <p>Description: Line of Sight (LOS) targeting enables the Special Warfare ST operators to find, fix, track, target and, engage the enemy at close range during day or night operations by providing highly accurate target coordinates in three dimensions. LOS generates vital imagery both pre and post-strike at a fraction of the weight and is more efficient than legacy equipment carried by the operator. Non Line of sight (XLOS) targeting device exploration and development will help capture future capabilities to the Special Tactics community. XLOS devices allow for a remote expendable reporting environmental sensor that enhances AFSOC Special Operation Weather Team's (SOWT) ability to provide timely, accurate, and critical deep battle space weather reconnaissance and intelligence.</p> <p>FY 2020 Plans:</p> <p>- Continue to explore and develop future Non Line of sight (XLOS) targeting device capabilities for Special Tactics community.</p> <p>FY 2021 Plans:</p> <p>- Will continue to explore and develop future Non Line of sight (XLOS) targeting device capabilities for Special Tactics community.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p>		0.082	0.122	0.259

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0408011F / <i>Special Tactics / Combat Control</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Rephased funds in FY21 allows for increased development capabilities for Line of Sight. Current FY21 funding allows for the increased development of the Special Tactics CDD.			
Title: Machine-to-Machine (M2M) Software Development Description: A suite of map-centric software applications that enables M2M transfer of precision targeting, information management, C4ISR (Command, Control Communications, Computers, Intelligence, Surveillance, and Reconnaissance), and Situational Awareness (SA) information. Provides the Special Warfare ST operators the ability to find, fix, track, target, and engage the enemy which greatly reduces the kill chain and drastically decreases the possibility of fratricide by enhancing the operator's SA on the battlefield. FY 2020 Plans: - Continue to explore requirements to address future FoS capability gaps. - Continue research and developmental efforts to support requirements in BAO FoS CDD, which includes but is not limited to Assault Zones, Fires, Weather, Personnel Recovery, and Enabling Capabilities. FY 2021 Plans: - Will continue to explore requirements to address future FoS capability gaps. - Will continue research and developmental efforts to support requirements in BAO FoS CDD, which includes but is not limited to Assault Zones, Fires, Weather, Personnel Recovery, and Enabling Capabilities. FY 2020 to FY 2021 Increase/Decrease Statement: Rephased funds in FY21 allows for increased development capabilities for Machine-to-Machine (M2M. Current FY21 funding allows for the increased development of the Special Tactics CDD.	1.671	2.659	5.615
Accomplishments/Planned Programs Subtotals	2.322	3.629	7.673

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 837100: <i>Tactical C-E Equipment</i>	52.656	52.094	29.094	-	29.094	66.266	19.290	25.631	26.160	Continuing	Continuing
• OPAF 04 Line Item 842990: <i>Personal Safety and Rescue Equipment</i>	18.809	6.299	2.505	-	2.505	2.328	2.368	2.411	2.456	Continuing	Continuing

Remarks

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0408011F / <i>Special Tactics / Combat Control</i>
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E. Acquisition Strategy

BAO Kit awarded a contract in FY16 to complete M2M software development. This effort will include system engineering, design, integration, and fielding support for M2M software. Due to the rapidly changing threat environment, the acquisition program manager has the authority to redirect funding as necessary to meet current slated and emerging requirements. The above efforts may change based on the need to support current Air Force mission requirements. Wright Patterson AFB, OH manages the contract effort.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0408011F / <i>Special Tactics / Combat Control</i>	Project (Number/Name) 675138 / <i>ST System Development</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Human Machine Interface (HMI)	C/Various	Various : Various	-	0.303	Oct 2018	0.303	Oct 2019	1.745	Oct 2020	-		1.745	Continuing	Continuing	-
Line of Sight	SS/ Various	Physical Optics Corporation : Torrance, CA	-	0.001	Nov 2018	0.001	Nov 2019	0.002	Nov 2020	-		0.002	Continuing	Continuing	-
Machine-To-Machine (M2M) Software Development	C/CPFF	Systems Research & Applications Corp : Dayton, OH	-	1.612	Feb 2019	2.919	Feb 2020	4.535	Feb 2021	-		4.535	Continuing	Continuing	-
Subtotal			-	1.916		3.223		6.282		-		6.282	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Test Agency Support	Various	46 TS : Eglin AFB, FL	-	0.205	Oct 2018	0.205	Oct 2019	0.582	Oct 2020	-		0.582	Continuing	Continuing	-
Subtotal			-	0.205		0.205		0.582		-		0.582	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Program Management Administration	Various	Various : Various, NV	-	0.201	Oct 2018	0.201	Oct 2019	0.809	Oct 2020	-		0.809	Continuing	Continuing	-
Subtotal			-	0.201		0.201		0.809		-		0.809	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force								Date: February 2020			
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0408011F / <i>Special Tactics / Combat Control</i>				Project (Number/Name) 675138 / <i>ST System Development</i>			
	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract		
Project Cost Totals	-	2.322	3.629	7.673	-	7.673	Continuing	Continuing	N/A		

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0408011F / <i>Special Tactics / Combat Control</i>	Project (Number/Name) 675138 / <i>ST System Development</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>ST System Development</i>	
Human Machine Interface (HMI)	
Line of Sight	
Machine-To-Machine Software Development	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0408011F / <i>Special Tactics / Combat Control</i>	Project (Number/Name) 675138 / <i>ST System Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>ST System Development</i>				
Human Machine Interface (HMI)	1	2019	4	2025
Line of Sight	1	2019	4	2025
Machine-To-Machine Software Development	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0702207F / <i>Depot Maintenance (Non-IF)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	1.880	1.890	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
673326: <i>Precision Measurement & Calibration</i>	-	1.880	1.890	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 develops, tests, and evaluates national and Air Force measurement standards (hardware) and calibration equipment in support of all Air Force programs and activities, including Precision Measurement Equipment Laboratories (PMELs) worldwide. Metrology research and development provides technology to support systems in all phases of development and acquisition, as well as Air Force R&D laboratories, test ranges, ground test facilities, and operational weapons systems support. Rapidly changing technology requires continuing research and development of measurement standards and calibration equipment to ensure modern weapon systems meet Air Force readiness objectives. This program addresses all metrology disciplines and includes the technology areas of laser, infrared, microwave, millimeter wave, optical, physical, mechanical, electrical, electronic, and ionizing radiation measurements. Metrology is a technical discipline devoted to the science of measurements and to the study and improvement of measurement technology. Measurements are the foundation of military system development, quality assurance, hardware conformance testing and system readiness tests. The integrity of these tests is assured through calibration and traceability assurance schemes. The capability to measure and calibrate must parallel the emergence of new technology, new ranges, and new capabilities of military systems. Lack of new measurement capability impedes or blocks the successful exploitation of new technologies, especially in the movement from development laboratory to production to deployment. R&D efforts are essential within the DoD to pace these requirements, otherwise, these same new systems will suffer time delays, excessive cost, and increased risk due to unreliable test results in all phases of development, production, deployment and operation.

This program element may include necessary civilian pay expenses required to manage, execute and deliver 0702207F. 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.

Program is managed by Air Force Materiel Command, Agile Combat Support Directorate, Air Force Metrology Division (WNM).

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0702207F / <i>Depot Maintenance (Non-IF)</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	1.897	1.890	1.974	0.000	1.974
Current President's Budget	1.880	1.890	0.000	0.000	0.000
Total Adjustments	-0.017	0.000	-1.974	0.000	-1.974
• 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	-0.017	0.000	-1.974	0.000	-1.974

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: Weapons Systems Measurement Standards</p> <p>Description: Develop national measurement standards to support Air Force infrared / laser / electro-optical weapon systems and support equipment.</p> <p>FY 2020 Plans: Continue development of national measurement standards to support Air Force infrared / laser / electro-optical weapon systems and support equipment.</p> <p>FY 2021 Plans: Continue development of national measurement standards to support Air Force infrared / laser / electro-optical weapon systems and support equipment.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Increased cost based on estimated workload for the Weapons System Measurement standards area for FY21.</p>	0.568	0.298	0.000
<p>Title: Electrical Measurements</p> <p>Description: Develop standards for electrical measurements to support high accuracy electronic test equipment.</p> <p>FY 2020 Plans: Continue development of standards for electrical measurements to support high accuracy electronic test equipment.</p> <p>FY 2021 Plans:</p>	0.000	0.368	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0702207F / <i>Depot Maintenance (Non-IF)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
Continue development of standards for electrical measurements to support high accuracy electronic test equipment. FY 2020 to FY 2021 Increase/Decrease Statement: Increased FY21 funding based on estimated cost for planned workload in the Electrical Measurement Area.				
Title: Radar Support/Communications Description: Develop standards for radar support, RF communication systems, and radar cross section range measurements. FY 2020 Plans: Continue development of standards for radar support, RF communication systems, and radar cross section range measurements. FY 2021 Plans: Continue development of standards for radar support, RF communication systems, and radar cross section range measurements. FY 2020 to FY 2021 Increase/Decrease Statement: Increased FY21 funding based on estimated cost for planned workload in the Radar/Support/Communications Measurement Area.		0.702	0.596	0.000
Title: Calibration Description: Develop improved calibration standards to support physical, mechanical, and electro-mechanical support equipment. FY 2020 Plans: Continue development of improved calibration standards to support physical, mechanical, and electro-mechanical support equipment. FY 2021 Plans: Continue development of improved calibration standards to support physical, mechanical, and electro-mechanical support equipment. FY 2020 to FY 2021 Increase/Decrease Statement: Increased FY21 funding based on estimated cost for planned workload in the Calibrations Area.		0.560	0.628	0.000
Title: Analytical Metrology Description: Develop standards, models, and procedures to support analytical metrology applications. FY 2020 Plans:		0.050	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0702207F / <i>Depot Maintenance (Non-IF)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Continue development of standards, models, and procedures to support analytical metrology applications.			
<i>FY 2021 Plans:</i> Continue development of standards, models, and procedures to support analytical metrology applications.			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Increased analytical costs.			
Accomplishments/Planned Programs Subtotals	1.880	1.890	0.000
Other Service Funding Adjustment	0.000	-	-
Air Force Subtotals	1.880	1.890	0.000

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

Primarily accomplished through intergovernmental transfer between the Department of Defense and other Federal Departments.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0702207F / <i>Depot Maintenance (Non-IF)</i>	Project (Number/Name) 673326 / <i>Precision Measurement & Calibration</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>Standards Development</i>	
Standards Development	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0702207F / <i>Depot Maintenance (Non-IF)</i>	Project (Number/Name) 673326 / <i>Precision Measurement & Calibration</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Standards Development</i>				
Standards Development	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708055F / <i>Maintenance, Repair & Overhaul System</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	0.000	49.330	10.311	24.513	0.000	24.513	21.994	0.000	0.000	0.000	60.566	166.714
675207: <i>Maintenance Repair and Overhaul</i>	0.000	49.330	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	49.330
675329: <i>MAINTENANCE REPAIR AND OVERHAUL INITIATIVE</i>	0.000	0.000	10.311	24.513	0.000	24.513	21.994	0.000	0.000	0.000	60.566	117.384

Program MDAP/MAIS Code: 523

Note

In FY2020 PE 0708055F, MROi efforts were transferred from Project 675207 to Project 675329, Maintenance, Repair & Overhaul Initiative, in order to improve transparency of this Business System Category II (BCAT II), formerly an ACAT I acquisition program.

The FY21 funding request was reduced by \$10M to account for the availability of prior year execution balances.

A. Mission Description and Budget Item Justification

MROi creates and integrates capability that plans, schedules and executes organic depot maintenance support functions, and integrates capture of auditable financial transactions at point of work critical to agile planning, optimized workload assignment, as well as resource allocation and throughput, thereby increasing depot maintenance support to the warfighter.

FY21 funding will support continued development and integration leading to planned Full Deployment Decision capabilities. The MROi implementer will continue to configure the Oracle suite for comprehensive program requirements; configure associated Commercial-Off-The-Shelf (COTS) support software; and develop Reports, Interfaces, Conversions and Extensions (RICE) software.

Collaborative and combined development and operational testing is being performed iteratively throughout the development, configuration, integration, and deployment. Funds will be used to perform logistics system risk reduction as well as studies and innovative integration efforts for common technology capabilities such as cloud migration, technology development, and mobile applications.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MROi business system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F.

This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, Sec 240-D.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708055F / <i>Maintenance, Repair & Overhaul System</i>
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This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	50.933	10.311	34.561	0.000	34.561
Current President's Budget	49.330	10.311	24.513	0.000	24.513
Total Adjustments	-1.603	0.000	-10.048	0.000	-10.048
• 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	-1.603	0.000			
• Other Adjustments	0.000	0.000	-10.048	0.000	-10.048

Change Summary Explanation

The FY2021 funding request was reduced by \$10.048M to account for the availability of prior year execution balances.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0708055F / <i>Maintenance, Repair & Overhaul System</i>				Project (Number/Name) 675207 / <i>Maintenance Repair and Overhaul</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675207: <i>Maintenance Repair and Overhaul</i>	0.000	49.330	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	49.330
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2018 PE 0708610F, Project 675207, MROi efforts were transferred to PE 0708055F, Project 675207, Maintenance Repair & Overhaul, in order to improve transparency of this Business System Category II (BCAT II), formerly an ACAT I acquisition program.

Prior Years Funding \$23.126M was executed in PE 0708610F.

As a result of the transition of Defense Business Systems from DoDI 5000.02 to DoDI 5000.75, MROi was reclassified to a BCAT II program as reflected in the 11 APR 2018 MROi Milestone B ADM.

A. Mission Description and Budget Item Justification

Maintenance, Repair and Overhaul (MROi) is an enterprise resource planning IT system that provides an integrated capability for planning, scheduling, and executing organic depot maintenance to support agile planning, optimized workload assignment and resource allocation and throughput, thereby increasing depot maintenance support to the warfighter. Funds will be used to perform logistics system risk reduction as well as studies and innovative integration efforts for common technology capabilities such as cloud migration, technology development and mobile application.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MROi business system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Product Development	49.330	0.000	0.000
Description: The MROi transformation effort will create an integrated capability for planning, scheduling, executing organic depot maintenance to support agile planning, optimizing workload assignment and resource allocation.			
FY 2020 Plans: Funding has been moved to a different BPAC 675329			
FY 2021 Plans: Funding has moved to a different BPAC 675239			
FY 2020 to FY 2021 Increase/Decrease Statement:			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / <i>Maintenance, Repair & Overhaul System</i>	Project (Number/Name) 675207 / <i>Maintenance Repair and Overhaul</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Funding has moved to a different BPAC 675239			
Accomplishments/Planned Programs Subtotals	49.330	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPAF 03 Line Item 834480: <i>Maintenance, Repair and Overhaul Initiative</i>	12.207	1.912	0.000	-	0.000	0.000	-	-	-	0.000	14.119

Remarks

D. Acquisition Strategy

MROi will use an incremental build-release acquisition strategy to deliver capability. The program used a competitive, best value strategy to select a system implementer utilizing the existing NETCENTS-2 Small Business Application Services contract. The task order for increment 1 was awarded 11 Jul 2018. Hosting Infrastructure will be provided through the Enterprise Resource Planning - Common Services (ERP-CS) program funded PE 0308602F.

- Development Contract Strategy
- Directed use of NETCENTS II Application Services IDIQ
- Work for first minimally viable product performed via small business.
- Competitive, Best Value Full Trade-off procedures -CPIF (Labor), CPFF (Training, Sustainment); CR (Travel, ODCs); FFP (Level 2 & 3 Support)
- CPIF contract type with cost, schedule, and performance incentives
- Own technical baseline
- Follow-on increments with financial interfaces to be performed by large business.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / Maintenance, Repair & Overhaul System	Project (Number/Name) 675207 / Maintenance Repair and Overhaul
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maintenance, Repair and Overhaul Initiative: Configuration System Implementer	C/Variou	NETCENTS-2 : WPAFB, OH	0.000	13.488	Jul 2019	-		-		-		-	0.000	13.488	32.099
Maintenance, Repair and Overhaul Initiative: Software Development	Variou	Various : WPAFB, OH	0.000	0.101	Jan 2019	-		-		-		-	0.000	0.101	-
Maintenance, Repair and Overhaul Initiative: Hosting Environment Support	MIPR	DISA : Oklahoma City, OK	0.000	0.012	Jan 2019	-		-		-		-	0.000	0.012	-
Maintenance, Repair and Overhaul Initiative: Capabilities Integration Environment (CIE)	MIPR	AFLCMC/HNII : Gunter Annex, AL	0.000	0.089	Feb 2019	-		-		-		-	0.000	0.089	-
Maintenance, Repair and Overhaul Initiative: Legacy Systems Interface Development	C/CPAF	Various : WPAFB, OH	0.000	5.586	Jan 2019	-		-		-		-	0.000	5.586	-
Subtotal			0.000	19.276		-		-		-		-	0.000	19.276	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maintenance, Repair and Overhaul Initiative: ISP Support	C/CPFF	Copper River : Gunter Annex, AL	0.000	0.307	Mar 2019	-		-		-		-	0.000	0.307	-
Maintenance, Repair and Overhaul Initiative: FFRDC Support	SS/FFP	MITRE : WPAFB, OH	0.000	1.207	Mar 2019	-		-		-		-	0.000	1.207	-
Maintenance, Repair and Overhaul Initiative: Oracle Support	C/Variou	Oracle : WPAFB, OH	0.000	1.045	Jan 2019	-		-		-		-	0.000	1.045	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / Maintenance, Repair & Overhaul System	Project (Number/Name) 675207 / Maintenance Repair and Overhaul
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Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maintenance, Repair and Overhaul Initiative: Common Computing Environment	C/Various	Leidos : WPAFB, OH	0.000	17.769	Jan 2019	-		-		-		-	0.000	17.769	-
Maintenance, Repair and Overhaul Initiative: PMO Oracle Support - DDC	SS/CPAF	Oracle : WPAFB, OH	0.000	1.648	Jan 2019	-		-		-		-	0.000	1.648	-
Maintenance, Repair and Overhaul Initiative: Field Assistance Service (FAS)	TBD	Not specified. : WPAFB, OH	0.000	0.179	Feb 2019	-		-		-		-	0.000	0.179	-
Subtotal			0.000	22.155		-		-		-		-	0.000	22.155	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maintenance, Repair and Overhaul Initiative: Test Support	MIPR	DISA : Oklahoma City, OK	0.000	1.370	Dec 2018	-		-		-		-	0.000	1.370	-
Maintenance, Repair and Overhaul Initiative: Joint Interoperability Test Command (JITC) Support	MIPR	GSA : WPAFB, OH	0.000	0.023	Mar 2019	-		-		-		-	0.000	0.023	-
Maintenance, Repair and Overhaul Initiative: LDTO Test Support (Cybersecurity)	MIPR	DISA : Oklahoma City, OK	0.000	0.356	Jan 2019	-		-		-		-	0.000	0.356	-
Maintenance, Repair and Overhaul Initiative: Test Support Hosting Environment	MIPR	DISA : Oklahoma City, OK	0.000	2.750	Mar 2019	-		-		-		-	0.000	2.750	-
Subtotal			0.000	4.499		-		-		-		-	0.000	4.499	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / <i>Maintenance, Repair & Overhaul System</i>	Project (Number/Name) 675207 / <i>Maintenance Repair and Overhaul</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

Maintenance, Repair and Overhaul Initiative																												
MILESTONE B (Apr 2018)		■																										
Contract Award (July 2018)				■																								
Release 1 Development and Deployment					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Release 2 Development and Deployment					■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Release 3 Development and Deployment						■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■
Release 4 Development and Deployment							■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■	■

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / <i>Maintenance, Repair & Overhaul System</i>	Project (Number/Name) 675207 / <i>Maintenance Repair and Overhaul</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Maintenance, Repair and Overhaul Initiative</i>				
MILESTONE B (Apr 2018)	2	2019	2	2019
Contract Award (July 2018)	4	2019	4	2019
Release 1 Development and Deployment	4	2019	4	2020
Release 2 Development and Deployment	4	2019	4	2020
Release 3 Development and Deployment	1	2020	4	2020
Release 4 Development and Deployment	1	2020	2	2020

Note
MROi BPAC for FY2019 and prior years is 675207; BPAC for FY2020 and out years is 675329

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / Maintenance, Repair & Overhaul System	Project (Number/Name) 675329 / MAINTENANCE REPAIR AND OVERHAUL INTIATIVE
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675329: MAINTENANCE REPAIR AND OVERHAUL INTIATIVE	0.000	0.000	10.311	24.513	0.000	24.513	21.994	0.000	0.000	0.000	60.566	117.384
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2020 PE 0708055, Project 675207, MROi efforts transferred to PE 0708055F, Project 675329, Maintenance, Repair & Overhaul System, in order to improve transparency of this Business System Category II (BCAT II), formerly an ACAT I acquisition program.

FY18/19 funds of \$82.610M were executed from PE 0708055F, Project 675207. Prior Year Funding \$23.126M was executed in PE 0708610F.

As a result of the transition from DoDI 5000.02 to DoDI 5000.75, MROi was reclassified to a BCAT II program as reflected in the 11 Apr 2018 MROi Milestone B ADM.

A. Mission Description and Budget Item Justification

Maintenance, Repair and Overhaul Initiative (MROi) is an enterprise resource planning IT system that provides an integrated capability for planning, scheduling, and executing organic depot maintenance and as well as integrating capture of auditable financial transactions at point of work to support agile planning, optimized workload assignment and resource allocation and throughput, thereby increasing depot maintenance support to the warfighter.

FY 2021 funding will support the development and integration of MROi, leading to a planned Full Deployment Decision/Full Deployment Authority to Proceed (ATP). Additionally, funding will support advisory and assistance services necessary to assist in the planning, development, execution, and reporting of system program office duties and responsibilities and other program office costs. The MROi implementer will continue to configure the Oracle suite for comprehensive program requirements; configure associated Commercial-Off-The-Shelf (COTS) support software; develop Reports, Interfaces, Conversions and Extensions (RICE) software; and develop training materials. Collaborative and combined development and operational testing is being performed iteratively throughout the development, configuration, integration, and deployment using agile software methodology. Funds will also be used to perform logistics system risk reduction as well as studies and innovative integration efforts for common technology capabilities such as cloud migration, technology development and mobile applications.

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

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Product Development	0.000	10.311	24.513

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / <i>Maintenance, Repair & Overhaul System</i>	Project (Number/Name) 675329 / <i>MAINTENANCE REPAIR AND OVERHAUL INTIATIVE</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Description: The MROi transformation effort will create an integrated capability for planning, scheduling, executing organic depot maintenance to support agile planning, optimizing workload assignment and resource allocation.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Support the continued development and integration of MROi planned releases, leading to a planned Full Deployment Decision/ Full Deployment ATP. - Continue to configure the Oracle suite; configure associated Commercial-Off-The-Shelf (COTS) support software; develop Reports, Interfaces, Conversions and Extensions (RICE) software; and develop training materials. - Continue Development Testing (DT) activities. <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Will support the development and integration of MROi, leading to a planned Full Deployment Decision/Full Deployment Authority to Proceed (ATP) - Will continue to configure the Oracle suite; configure associated Commercial-Off-The-Shelf (COTS) support software; develop Reports, Interfaces, Conversions and Extensions (RICE) software; and develop training materials - Will perform collaborative and combined development and operational testing iteratively throughout the development, configuration, integration, and deployment <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increase to continue development of program</p>			
Accomplishments/Planned Programs Subtotals	0.000	10.311	24.513

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPAF 03 834480: <i>Maintenance Repair & Overhaul Initiative</i>	12.207	1.912	-	-	-	-	-	-	-	-	Continuing Continuing

Remarks

D. Acquisition Strategy
MROi uses an incremental build-release acquisition strategy to deliver capability. The program used a competitive, best value strategy to select a system implementer utilizing the existing NETCENTS-2 Small Business Application Services contract. The task order for increment 1 was awarded 11 Jul 2018. Hosting Infrastructure will be provided through the Enterprise Resource Planning - Common Services (ERP-CS).

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / <i>Maintenance, Repair & Overhaul System</i>	Project (Number/Name) 675329 / <i>MAINTENANCE REPAIR AND OVERHAUL INTIATIVE</i>
<ul style="list-style-type: none">•Development Contract Strategy-Directed use of NETCENTS II Application Services IDIQ--Competitive, Best Value Full Trade-off procedures -CPIF (Labor), CPFF (Training, Sustainment); CR (Travel, ODCs); FFP (Level 2 & 3 Support)--Own technical baseline--Tech Stack Licenses--Work for first minimally viable product performed via small business--Follow-on increments with financial interfaces to be performed by large business		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / <i>Maintenance, Repair & Overhaul System</i>	Project (Number/Name) 675329 / <i>MAINTENANCE REPAIR AND OVERHAUL INTIATIVE</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maintenance, Repair and Overhaul Initiative: Configuration System Implementer	C/Variou	NETCENTS-2 : WPAFB, OH	0.000	-		5.127	Jul 2020	11.213	Jul 2021	-		11.213	0.000	16.340	-
Maintenance, Repair and Overhaul Initiative: Software Development	C/Variou	Various : WPAFB, OH	0.000	-		0.060	May 2020	0.293	May 2021	-		0.293	0.000	0.353	-
Maintenance, Repair and Overhaul Initiative: Infrastructure and Cloud development test and hosting environment	TBD	TBD : WPAFB, OH	0.000	-		-		0.200	Mar 2021	-		0.200	0.000	0.200	-
Maintenance, Repair and Overhaul Initiative: Hosting and Environment Support	MIPR	DISA : Oklahoma City, OK	0.000	-		0.004	Mar 2020	0.008	Feb 2021	-		0.008	0.000	0.012	-
Maintenance, Repair and Overhaul Initiative: common technologies capabilities	Various	Various : TBD	0.000	-		0.000		0.200	Mar 2021	-		0.200	0.000	0.200	-
Maintenance, Repair and Overhaul Initiative: Capabilities Integration Environment (CIE)	MIPR	AFLCMC/HNII : Gunter Annex, AL	0.000	-		0.030	Feb 2020	0.092	Feb 2021	-		0.092	0.000	0.122	-
Maintenance, Repair and Overhaul Initiative: Legacy System Interface Development	C/CPAF	Various : WPAFB, OH	0.000	-		0.132	Aug 2020	0.200	Aug 2021	-		0.200	0.000	0.332	-
Subtotal			0.000	-		5.353		12.206		-		12.206	0.000	17.559	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / Maintenance, Repair & Overhaul System	Project (Number/Name) 675329 / MAINTENANCE REPAIR AND OVERHAUL INTIATIVE
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Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maintenance, Repair and Overhaul Initiative: ISP Support	C/CPFF	Bowhead : Alexandria, VA	0.000	-		0.282	Mar 2020	0.288	Mar 2021	-		0.288	0.000	0.570	-
Maintenance, Repair and Overhaul Initiative: Studies	C/TBD	Various : WPAFB, OH	0.000	-		0.200	Mar 2020	0.200	Feb 2021	-		0.200	0.000	0.400	-
Maintenance, Repair and Overhaul Initiative: FFRDC Support	C/CPFF	MITRE : WPAFB, OH	0.000	-		1.436	Mar 2020	1.474	Mar 2021	-		1.474	0.000	2.910	-
Maintenance, Repair and Overhaul Initiative: Oracle Support	C/Various	Oracle : WPAFB, OH	0.000	-		0.687	Jan 2020	0.577	Jan 2021	-		0.577	0.000	1.264	-
Maintenance, Repair and Overhaul Initiative: PMO Oracle Support - DDC	C/CPAF	Oracle : WPAFB, OH	0.000	-		0.600	Jan 2020	1.002	Jan 2021	-		1.002	0.000	1.602	-
Maintenance, Repair and Overhaul Initiative: Data platforms, services, integration, transformation and curation	C/Various	Various : Various, OH	0.000	-		-		0.200	Nov 2020	-		0.200	0.000	0.200	-
Maintenance, Repair and Overhaul Initiative: Field Assistance Service (FAS)	TBD	TBD : WPAFB, OH	0.000	-		0.050	Feb 2020	0.107	Feb 2021	-		0.107	0.000	0.157	-
Subtotal			0.000	-		3.255		3.848		-		3.848	0.000	7.103	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maintenance, Repair and Overhaul Initiative: Test Support	MIPR	DISA : Oklahoma City, OK	0.000	-		0.200	Oct 2019	0.300	Oct 2020	-		0.300	0.000	0.500	-
Maintenance, Repair and Overhaul Initiative:	MIPR	GSA : WPAFB, OH	0.000	-		0.094	Mar 2020	0.051	Mar 2021	-		0.051	0.000	0.145	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / Maintenance, Repair & Overhaul System	Project (Number/Name) 675329 / MAINTENANCE REPAIR AND OVERHAUL INTIATIVE
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Joint Interoperability Test Command (JITC) Support															
Maintenance, Repair and Overhaul Initiative: LDTO Test Support (Cybersecurity)	MIPR	DISA : Oklahoma City, OK	0.000	-		0.132	Jan 2020	0.543	Jan 2021	-		0.543	0.000	0.675	-
Maintenance, Repair and Overhaul Initiative: Test Support Hosting Environment	MIPR	DISA : Oklahoma City, OK	0.000	-		0.200	Mar 2020	0.200	Mar 2021	-		0.200	0.000	0.400	-
Subtotal			0.000	-		0.626		1.094		-		1.094	0.000	1.720	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Maintenance, Repair, and Overhaul Initiative: EPASS	C/CPFF	Various: WPAFB, OH : TBD	0.000	-		0.369	Sep 2020	5.135	Jun 2021	-		5.135	0.000	5.504	-
Maintenance, Repair, and Overhaul Initiative: PMA	C/CPAF	Various: WPAFB, OH : TBD	0.000	-		0.708	Sep 2020	2.230	Jun 2021	-		2.230	0.000	2.938	-
Subtotal			0.000	-		1.077		7.365		-		7.365	0.000	8.442	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-	10.311	24.513	-	24.513	0.000	34.824	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708055F / <i>Maintenance, Repair & Overhaul System</i>	Project (Number/Name) 675329 / <i>MAINTENANCE REPAIR AND OVERHAUL INTIATIVE</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Maintenance, Repair and Overhaul Initiative</i>				
MVP 1	3	2019	3	2020
MVP 1 Government Integrated Test 1.1	3	2020	4	2020
MVP 2	4	2020	2	2022
MVP 2 Government Integrated Test 2.1	2	2021	3	2021
MVP 2 Government Integrated Test 2.2	3	2021	4	2021
MVP 2 Government Integrated Test 2.3	1	2022	2	2022
MVP 3	1	2022	3	2022
MVP 3 Government Integrated Test 3.1	3	2022	4	2022
MVP 4	3	2022	2	2023
MVP 4 Government Integrated Test 4.1	1	2023	3	2023
MVP 5	1	2023	3	2023
MVP 6	1	2023	3	2023
MVP 5-6 Government Integrated Test 5-6.1	3	2023	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	0.000	13.065	16.065	35.225	0.000	35.225	45.735	69.561	53.773	48.460	Continuing	Continuing
675207: <i>Logistics IT System Modernization</i>	0.000	13.065	16.065	35.225	0.000	35.225	45.735	69.561	53.773	48.460	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The AF requires an integrated logistics capability that provides timely, accurate and reliable information to decision makers at all levels of command and across the full range of military operations.

FIAR and Software Upgrades:

- The remediation and modification of core logistics systems is necessary for the AF to meet statutory Financial Improvement Audit Readiness (FIAR) requirements and align with the Joint Chiefs of Staff J-4 Concept for Logistics, and the AF Portfolio Board's approved Logistics Flight Plan. The AF must concurrently sustain and modify identified logistics systems to achieve FIAR remediation by the statutory deadline; execute software upgrades to reduce high operating costs and meet evolving operational demands; implement statutory compliance requirements; improve system performance; and enable system consolidation efforts that lower the cyber threat space and reduce long-term portfolio costs.

- Identified systems include, but are not limited to, the Integrated Logistics System-Supply (ILS-S), Enhanced Technical Information Management System (ETIMS), Integrated Maintenance Data System (IMDS), Reliability and Maintainability Information System (REMIS). Additional logistics systems may be included as financial audits are completed and system consolidation efforts mature.

Transformation:

- The AF must transform its logistics business processes and transition away from using numerous custom stovepipe systems and processes that perform similar tasks. Eliminating process redundancies across the logistics enterprise will enable the AF to execute more secure, resilient, efficient, cost-effective and integrated logistics. The objective of transformation is to conduct Business Process Re-engineering (BPR) to identify and eliminate overlaps in business processes across core logistics systems and, where appropriate, implement new IT systems that employ best commercial practices and modern cloud-based architectures.

- The AF will take full advantage of the flexibilities provided by DoDI 5000.75, Business Systems Requirements and Acquisition guidance, as well as Agile development methodologies to identify requirements across the spectrum of Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel, Facilities and Policy (DOTMLPF-P); and to acquire and deploy approved material solutions in the most efficient and effective manner possible utilizing the 5-phased Business Capability Acquisition Cycle (BCAC). These phases are structured to optimize a joint responsibility of functional and acquisition activities, leading to the successful delivery

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force Date: February 2020

Appropriation/Budget Activity
3600: *Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development*

R-1 Program Element (Number/Name)
PE 0708610F / *Logistics Information Technology (LOGIT)*

of the business capability. There will be an emphasis placed on acquisition of business systems aligned to commercial best practices utilizing commercial off-the-shelf (COTS), government off-the-shelf (GOTS) solutions, and modern platforms that support continuous integration and continuous deployment (CI/CD) following a development, security, and operations (DevSecOps) methodology.

- The AF logistics enterprise is comprised of multiple overarching functional areas, to include base and depot-level maintenance, end-to-end supply chain management, and predictive analysis and forecasting. The AF will standardize its business processes within each major logistics functional area through Transformational Capability Initiatives (CIs). These CIs include, but are not limited to: Maintenance, Repair and Overhaul (MROi PE 0708055F), Item Master, Supply Capability Initiative, Air Force Product Lifecycle Management (AF-PLM), and Field Maintenance Capability Initiative. There may be one or more specific initiatives aligned to each of the major CI areas referenced above.

Transformation Capability Initiatives (TCI):

- TCI Item Master Logistics Capability Initiative (IMLCI) provides the capability to manage comprehensive, accurate, reliable item master data (e.g., accurate identification and authorization of owners and users of items). Item Master is a key component of the Air Force (AF) Logistics Capability Transformation Plan. It will provide Item standardization and configuration management from a single authoritative source, ensuring foundational logistics processes are executed in concert to support the A4 logistics baseline. Item Master will enable key integration and transformation capabilities, including Item Unique Identification (IUID) association to business transactions; streamlined management of part item attributes across supply, finance, engineering, technology, transportation, maintenance, and vendor communities; and provide translation capabilities between functional and technical business communities and systems.

- TCI Supply Capability Initiative is focused on enabling simplified, standardized processes to fundamentally enhance the business operations and provide total asset visibility across the supply chain. These improvements have been identified in the USAF Logistics Capabilities Transformation Plan.

- TCI Field Maintenance will improve the AF field maintenance capabilities across Mission Generation Network (MGN) and Repair Network (RN) (e.g. propulsion, avionics, command and control (C2) enabler systems, cyber systems, communications-electronics & simulation, Precision Measurement Equipment Laboratory (PMEL), etc.) including the planning, scheduling, execution and oversight of functional deficiencies incurred over the past 10 years due to lack of prioritized funding and failure of the previous enterprise-wide modernization approach.

- Funds will be used to perform innovative integration efforts for common technology capabilities such as cloud migration, technology development and mobile applications that cross and support all of the aforementioned initiatives.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>
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- This program element may include necessary civilian pay expenses required to manage, execute, and deliver Logistics Information Technology capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

- This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, Sec 240-D.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	13.479	16.065	33.247	0.000	33.247
Current President's Budget	13.065	16.065	35.225	0.000	35.225
Total Adjustments	-0.414	0.000	1.978	0.000	1.978
• 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	-0.414	0.000	1.978	0.000	1.978

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Integrated Logistics Support - Supply Enhancements (ILS-S Enhancements)	5.438	2.600	2.600
Description: Modify ILS-S to meet existing and future compliance requirements. Support Logistics Application Rationalization. Modifications may include system changes to subsume functionality of other systems in support of terminating duplicate capability and systems, as well as enhancements to meet compliance requirements such as Item Unique Identification (IUID), Defense Logistics Marking Standards (DLMS), and enhancements for information technology modernization.			
FY 2020 Plans: - Continue the Logistics directed subsumption activities and enhancements.			
FY 2021 Plans: - Will continue the Logistics directed subsumption activities and enhancements.			
FY 2020 to FY 2021 Increase/Decrease Statement:			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
N/A				
<p>Title: Enhanced Technical Information Management System Enhancements (ETIMS Enhancements)</p> <p>Description: Modify ETIMS to meet existing and future compliance requirements. Support Logistics Application Rationalization. Modifications may include system changes to subsume functionality of other systems in support of terminating duplicate capability and systems, as well as enhancements to meet compliance requirements, and enhancements for information technology modernization.</p> <p>FY 2020 Plans: - Continue the Logistics directed subsumption activities and enhancements.</p> <p>FY 2021 Plans: - Will continue the Logistics directed subsumption activities and enhancements.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		1.762	0.600	0.600
<p>Title: Enhanced Technical Information Management System Software Upgrade (ETIMS SUP)</p> <p>Description: Modify ETIMS software to integrate additional enhancements satisfying requirements contained in the Functional Requirements Document(FRD). ETIMS requires modernization to incorporate enhancements into the AF Enterprise Technical Order (TO) Management System, and the current ETIMS release that is being worked falls into this category. ETIMS is a dev/mod effort that will satisfy the Management of Computer Program Identification Number (CPINs), archive digital TOs, interface System of record Time Compliance Technical Order (TCTO) data with REMIS, manage and track to change requests, and store and distribute Interactive Electronic Technical Manuals (IETMs).</p> <p>FY 2020 Plans: - ETIMS v01.03 dev/mod for cloud migration</p> <p>FY 2021 Plans: - Effort complete in FY20.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased because effort should complete in FY20.</p>		0.059	0.622	0.000
<p>Title: Integrated Maintenance Data System Enhancements (IMDS Enhancements)</p> <p>Description: Modify IMDS to meet existing and future compliance requirements. Support Logistics Application Rationalization. Modifications may include system changes to subsume functionality of other systems in support of terminating duplicate capability</p>		0.000	0.500	0.500

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
and systems, as well as enhancements to meet compliance requirements, and enhancements for information technology modernization.				
FY 2020 Plans: - Continue the Logistics directed subsumption activities and enhancements.				
FY 2021 Plans: - Will continue the Logistics directed subsumption activities and enhancements.				
FY 2020 to FY 2021 Increase/Decrease Statement: N/A				
Title: Reliability and Maintainability Information System Enhancements (REMIS Enhancements)		3.064	0.600	0.600
Description: Modify REMIS to meet existing and future compliance requirements. Support Logistics Application Rationalization. Modifications may include system changes to subsume functionality of other systems in support of terminating duplicate capability and systems, as well as enhancements to meet compliance requirements such as Item Unique Identification (IUID), Defense Logistics Marking Standards (DLMS), and enhancements for information technology modernization.				
FY 2020 Plans: - Continue the Logistics directed subsumption activities and enhancements.				
FY 2021 Plans: - Will continue the Logistics directed subsumption activities and enhancements.				
FY 2020 to FY 2021 Increase/Decrease Statement: N/A				
Title: Transformation Capability Initiative - Item Master Logistics Capability Initiative (IMLCI)		2.742	8.993	28.775
Description: The IMLCI will provide comprehensive Item Catalog and Provisioning functions for the Logistics business systems, and will replace the Item Management Control System (IMCS) suite of legacy systems, at a minimum. IMLCI will be the central repository for the Item core business objects, providing standardization of Item cataloging processes, structure, attributes, propagation, and standardized views for all applicable Item types. Additionally, IMLCI will receive product structure input from an engineering Product Lifecycle Management (PLM) type system. Item Master Logistics Capability Initiative (IMLCI) will contain the Item data that is the core underlying information for each Capability Initiative (CI), and as such will integrate with many logistics enterprise systems. IMLCI has been nominated as a NDAA Section 873, "Agile or Iterative Development Methods to Tailor Major Software-Intensive Warfighting Systems and Defense Business Systems pilot program."				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continue product configuration to minimizing dependency on COTS products - Manage technical requirements, keeping the network and pipeline progressing toward more efficient operations. - Continue work in hosting production environment within the CCE 2.0, now known as Cloud One - Continue to support efforts to bring the production and development environments to a more secure state <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Complete installation and tuning commercial platform on Cloud-One and Dev/Test environments - Begin configuration of commercial platform to provide foundational cataloging capability - Conduct recurring cyber-security and system performance testing concurrent with configuration - Develop and test interfaces and data exchanges to other Logistics Systems - Prepare and begin fielding capability following agile methodology over multiple sprints <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased due to a significant ramp up development for enhancements/changes after contract award, along with beginning configuration of a commercial platform to provide foundational cataloging capability. Also, conducting recurring cyber-security and system performance testing concurrent with configuration, developing and testing interfaces with data exchanges in other Logistics Systems.</p>				
<p>Title: Transformation Capability Initiative - Supply Capability Initiative (SCI)</p> <p>Description: SCI is focused on enabling simplified, standardized processes to fundamentally enhance the business operations and provide total asset visibility across the supply chain. These improvements have been identified in the USAF Logistics Capabilities Transformation Plan.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Conduct pre-acquisition Authority to Proceed (ATP) activities and risk reduction efforts <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Continue pre-acquisition Authority to Proceed (ATP) activities and risk reduction efforts <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		0.000	0.500	0.500
<p>Title: Emerging Financial Improvement and Audit Readiness (Emerging FIAR)</p> <p>Description: Modify operational Logistics software systems to incorporate emerging FIAR requirements. These requirements are the result of on-going analysis of the Treasury Financial Management (TFM) Chapter 9500 as directed by OMB A-123 appendix D,</p>		0.000	0.450	0.450

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
and the DoD FMR volume 1, chapter 3. The results are identified and documented systems deficiencies that can only be satisfied via a material solution.				
<p>FY 2020 Plans: - Continue FIAR remediation efforts of those programs with deficiencies documented as a result of on-going analyses of the latest TFM Chapter 9500 review.</p> <p>FY 2021 Plans: - Continue FIAR remediation efforts of those programs with deficiencies documented as a result of on-going analyses of the latest TFM Chapter 9500 review.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: Logistics Strike Teams (Strike Teams)</p> <p>Description: Rapidly transform the Logistics IT landscape and improve operational command and control by consolidating and collapsing 359 systems; enhancing logistics data analytics and forecasting with more accurate and timely data; and reducing costs by migrating applications to modern hosting environments with shared services, all while applying Agile methodologies to reduce risk and complexity, enable technology insertion and synthesize logistics information.</p> <p>FY 2020 Plans: - Continue efforts to collapse 359 systems and enhance logistics analytics by applying more accurate methodologies that will 1) improve command and control, 2) enhance logistics data analytics and forecasting, and 3) eliminate redundancy and duplication. Enhance logistics data analytics environment with machine learning, predictive, and prognostic capabilities; incorporate automated tools for rapid consolidation of duplicative analytics capabilities.</p> <p>FY 2021 Plans: - Will continue efforts to collapse 359 systems and enhance logistics analytics by applying more accurate methodologies that will: - improve command and control - enhance logistics data analytics and forecasting - eliminate redundancy and duplication - Enhance logistics data analytics environment by: - machine learning - predictive, and prognostic capabilities</p>		0.000	1.200	1.200

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
- incorporate automated tools for rapid consolidation of duplicative analytics capabilities			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	13.065	16.065	35.225

D. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPAF 03 Line Item 834430: <i>Global Combat Support System-Air Force (GCSS-AF)</i>	0.483	11.226	0.391	-	0.391	11.206	3.922	3.637	3.704	Continuing	Continuing

Remarks

E. Acquisition Strategy
 Air Force Program Executive Office - Business Enterprise Systems (AFPEO-BES) is evaluating systems under the DoDI 5000.75 to approve authorities to proceed (ATP) for each core logistics system remediation/modification project.

Agile development practices transform IT acquisitions by incrementally delivering capabilities faster and responding more effectively to changes in operations, technology, and budgets. The four objectives of Agile software development are: 1. Focusing on small, frequent capability releases; 2. Valuing working software over comprehensive documentation; 3. Responding rapidly to changes in operations, technology, and budgets; 4. Actively involving users throughout development to ensure high operational value. In addition, exploitation of emerging cloud-native and containerized deployment on modern platforms will greatly enhance speed of delivery to users in a secure, scalable, and flexible manner.

The Logistics IT program utilizes the Agile software development methodology in the acquisition of these projects. LogIT supports multiple lines of effort and will employ multiple acquisition strategies to achieve the 3 LogIT objectives of FIAR and Software Upgrades, Transformation, and Transformation Capability Initiatives. Agile development, continuous integration and deployment are preferred methodologies that will be employed to the greatest extent possible to achieve maximum flexibility and cyber-resiliency, using an appropriate mix of contractor and government personnel.

Contract strategies will require multiple approaches with a focus on best value and rapid execution using contracts like the pre-competed Small Business Enterprise Application Solutions (SBEAS) multi-vendor indefinite delivery/indefinite quantity (ID/IQ) vehicle.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>	Project (Number/Name) 675207 / <i>Logistics IT System Modernization</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ETIMS Enhancements - LOGUX	SS/CPFF	Pivotal Labs : Atlanta, GA	0.000	1.219	Feb 2019	-		-		-		-	0.000	1.219	-
ETIMS Enhancements - Prime Integration	C/CPAF	Digital Management, Inc. : WPAFB, OH	0.000	-		0.600	Mar 2020	-		-		-	0.000	0.600	-
ILS-S Enhancements - LOGUX	SS/CPFF	Pivotal Labs : Atlanta, GA	0.000	1.219	Feb 2019	-		-		-		-	0.000	1.219	-
IMLCI - LOGUX	SS/CPFF	Pivotal Labs : Atlanta, GA	0.000	0.805	Feb 2019	-		-		-		-	0.000	0.805	-
REMIS Enhancements - LOGUX	SS/CPFF	Pivotal Labs : Atlanta, GA	0.000	1.219	Feb 2019	-		-		-		-	0.000	1.219	-
ILS-S Enhancements - FLoF Pilot	C/FFP	DATUM : MAFB-Gunter, AL	0.000	0.205	Feb 2019	-		-		-		-	0.000	0.205	-
ILS-S Enhancements - DLMS	C/FFP	DATUM : MAFB-Gunter, AL	0.000	2.759	Jul 2019	2.069	Jan 2020	2.000	Jan 2021	-		2.000	0.000	6.828	-
IMLCI - Prime Integration	C/TBD	TBD : WPAFB, OH	0.000	-		5.723	Apr 2020	26.154	Jan 2021	-		26.154	0.000	31.877	-
IMLCI - Hosting	MIPR	TBD : WPAFB, OH	0.000	0.000		1.778	Apr 2020	0.692	Jan 2021	-		0.692	0.000	2.470	-
REMIS Enhancements - CFO Reconciliation	C/FFP	NGIS : WPAFB, OH	0.000	0.800	Jul 2019	-		-		-		-	0.000	0.800	-
IMLCI - Development License	C/FFP	TBD : WPAFB, OH	0.000	-		0.308	Apr 2020	-		-		-	0.000	0.308	-
Subtotal			0.000	8.226		10.478		28.846		-		28.846	0.000	47.550	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ETIMS Enhancements - LOGUX Platform Operators	C/CPFF	Fearless : MAFB-Gunter, AL	0.000	0.276	Jul 2019	-		-		-		-	0.000	0.276	-
ETIMS Enhancements - SME	C/FFP	TBD : WPAFB, OH	0.000	0.000		0.300	Aug 2020	0.300	Jun 2021	-		0.300	0.000	0.600	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>	Project (Number/Name) 675207 / <i>Logistics IT System Modernization</i>
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Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ETIMS SUP - SME	C/CPFF	DATUM : WPAFB, OH	0.000	0.059	Jul 2019	0.022	Mar 2020	-		-		-	0.000	0.081	-
ILS-S Enhancements -LOGUX Platform Operators	C/CPFF	Fearless : MAFB-Gunter, AL	0.000	0.276	Jul 2019	-		-		-		-	0.000	0.276	-
ILS-S Enhancements SME	C/CPFF	DSD : MAFB-Gunter, AL	0.000	0.579	Jul 2019	0.300	Jul 2020	0.300	Jul 2021	-		0.300	0.000	1.179	-
IMLCI - LOGUX Platform Operators	C/CPFF	Fearless : MAFB-Gunter, AL	0.000	0.276	Jul 2019	-		-		-		-	0.000	0.276	-
SCI - SME	C/CPAF	TBD : MAFB-Gunter, AL	0.000	-		0.300	Apr 2020	0.300	Apr 2021	-		0.300	0.000	0.600	-
IMLCI - SME	C/CPFF	TACG, LLC : MAFB-Gunter, AL	0.000	0.400	Jun 2019	0.273	Jun 2020	0.580	Jun 2021	-		0.580	0.000	1.253	-
IMLCI - ISP	C/FFP	Bowhead : WPAFB, OH	0.000	-		0.191	Jan 2020	0.328	Jan 2021	-		0.328	0.000	0.519	-
REMIS Enhancements - LOGUX Platform Operators	C/CPFF	Fearless : MAFB-Gunter, AL	0.000	0.276	Jul 2019	-		-		-		-	0.000	0.276	-
REMIS Enhancements - SME	C/CPFF	DATUM : WPAFB, OH	0.000	0.353	Aug 2019	0.300	Jun 2020	0.300	Jun 2021	-		0.300	0.000	0.953	-
REMIS Enhancements - ISP	C/FFP	Bowhead : WPAFB, OH	0.000	0.145	Jul 2019	-		-		-		-	0.000	0.145	-
Subtotal			0.000	2.640		1.686		2.108		-		2.108	0.000	6.434	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ETIMS Enhancements - LOGUX CIE	MIPR	CIE : MAFB-Gunter, AL	0.000	0.020	Jul 2019	-		-		-		-	0.000	0.020	-
ILS-S enhancements - LOGUX CIE	MIPR	CIE : MAFB-Gunter, AL	0.000	0.020	Jul 2019	-		-		-		-	0.000	0.020	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>	Project (Number/Name) 675207 / <i>Logistics IT System Modernization</i>
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
IMLCI - LOGUX CIE	MIPR	CIE : MAFB-Gunter, AL	0.000	0.020	Jul 2019	-		-		-		-	0.000	0.020	-
IMLCI LDTO	MIPR	NA : WPAFB, OH	0.000	0.183	Jan 2019	0.101	Jan 2020	0.203	Jan 2021	-		0.203	0.000	0.487	-
REMIS Enhancements - LOGUX CIE	MIPR	CIE : MAFB-Gunter, AL	0.000	0.024	Jul 2019	-		-		-		-	0.000	0.024	-
Subtotal			0.000	0.267		0.101		0.203		-		0.203	0.000	0.571	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Emerging FIAR - EPASS	C/CPFF	Oasis : WPAFB, OH	0.000	-		0.450	Apr 2020	0.450	Apr 2021	-		0.450	0.000	0.900	-
ETIMS Enhancements - Division Support	C/Variou	PEO : MAFB-Gunter, AL	0.000	0.247	Oct 2018	-		-		-		-	0.000	0.247	-
ILS-S Enhancements - Division Support	C/Variou	PEO : MAFB-Gunter, AL	0.000	0.247	Oct 2018	-		-		-		-	0.000	0.247	-
ILS-S Enhancements - EPASS	C/CPFF	Oasis : MAFB-Gunter, AL	0.000	0.133	Apr 2019	0.231	Apr 2020	0.300	Apr 2021	-		0.300	0.000	0.664	-
IMLCI - Division Support	C/Variou	PEO : MAFB-Gunter, AL	0.000	0.248	Oct 2018	0.451	Feb 2020	0.529	Feb 2021	-		0.529	0.000	1.228	-
IMLCI - PMO Travel	Various	PEO : WPAFB, OH	0.000	0.077	Oct 2018	0.083	Jan 2020	0.098	Oct 2020	-		0.098	0.000	0.258	-
IMLCI - EPASS	C/CPFF	Oasis : WPAFB, OH	0.000	0.733	Apr 2019	0.085	Apr 2020	0.191	Apr 2021	-		0.191	0.000	1.009	-
REMIS Enhancements - Division Support	C/Variou	PEO : MAFB-gunter, AL	0.000	0.247	Oct 2018	-		-		-		-	0.000	0.247	-
REMIS Enhancements - EPASS	C/CPFF	Oasis : WPAFB, OH	0.000	-		0.300	Apr 2020	0.300	Apr 2021	-		0.300	0.000	0.600	-
SCI - EPASS	C/CPFF	Oasis : WPAFB, OH	0.000	-		0.200	Sep 2020	0.200	Apr 2021	-		0.200	0.000	0.400	-
Strike Teams - EPASS	C/CPFF	Oasis : WPAFB, OH	0.000	-		1.200	Apr 2020	1.200	Apr 2021	-		1.200	0.000	2.400	-
ETIMS Enhancements - EPASS	C/FFP	Oasis : WPAFB, OH	0.000	-		0.300	Apr 2020	0.300	Apr 2021	-		0.300	0.000	0.600	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>	Project (Number/Name) 675207 / <i>Logistics IT System Modernization</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

ILS-S Enhancements	
ILS-S Enhancements - Iterative & Agile Design/Development	
ILS-S Enhancements - Agile Iterative Releases	
ILS-S enhancements - Agile Iterative Testing	
ILS-S Enhancements - PDR/CDR Design Review 1	
ILS-S Enhancements - PDR/CDR Design Review 2	
ILS-S Enhancements - PDR/CDR Design Review 3	
ILS-S Enhancements - PDR/CDR Design Review 4	
ETIMS Enhancements	
ETIMS Enhancements - Inc 1 Pre-Acquisition Activities	
ETIMS Enhancements - Inc 1 Development	
ETIMS Enhancements - Inc 1 Testing	
ETIMS Enhancements - Inc 2 Pre-Acquisition Activities	
ETIMS Enhancements - Inc 2 Development	
ETIMS Enhancements - Inc 2 Testing	
ETIMS SUP	
ETIMS SUP - Development/Testing	
ETIMS SUP - Limited Deployment ATP (Feb 19)	

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>	Project (Number/Name) 675207 / <i>Logistics IT System Modernization</i>
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
ETIMS SUP - Full Deployment ATP (Aug 20)								■																				
IMDS Enhancements																												
IMDS Enhancements - Pre-Acquisition Activities								■																				
IMDS Enhancements - Development/Testing												■																
REMIS Enhancements																												
REMIS Enhancements - Development				■																								
REMIS Enhancements - Testing								■																				
REMIS Enhancements - Full Deployment												■																
IMLCI																												
IMLCI - Pre-Acquisition ATP Activities				■																								
IMLCI - Acquisition ATP				■																								
IMLCI - Contract Award								■																				
IMLCI - Development/Testing								■																				
IMLCI - Limited Deployment ATP												■																
IMLCI - Limited Deployments												■																
IMLCI - Full Deployment ATP																■												
SCI																												
SCI - Pre-Acquisition Activities								■																				
SCI - Acquisition ATP (Aug 24)																												■
SCI - Development/Testing																												■
Emerging FIAR																												
Emerging FIAR - Pre-acquisition Activities								■																				
Emerging FIAR - Development/Testing												■																
Strike Teams																												
Strike Teams - Pre-acquisition ATP Activities								■																				

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force																							Date: February 2020					
Appropriation/Budget Activity 3600 / 7										R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>								Project (Number/Name) 675207 / <i>Logistics IT System Modernization</i>										
	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
Strike Teams - Development/Testing																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>	Project (Number/Name) 675207 / <i>Logistics IT System Modernization</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>ILS-S Enhancements</i>				
ILS-S Enhancements - Iterative & Agile Design/Development	1	2019	4	2022
ILS-S Enhancements - Agile Iterative Releases	1	2019	4	2022
ILS-S enhancements - Agile Iterative Testing	1	2020	4	2022
ILS-S Enhancements - PDR/CDR Design Review 1	1	2019	1	2019
ILS-S Enhancements - PDR/CDR Design Review 2	1	2020	1	2020
ILS-S Enhancements - PDR/CDR Design Review 3	1	2021	1	2021
ILS-S Enhancements - PDR/CDR Design Review 4	1	2022	1	2022
<i>ETIMS Enhancements</i>				
ETIMS Enhancements - Inc 1 Pre-Acquisition Activities	4	2020	4	2020
ETIMS Enhancements - Inc 1 Development	1	2021	1	2021
ETIMS Enhancements - Inc 1 Testing	1	2021	2	2021
ETIMS Enhancements - Inc 2 Pre-Acquisition Activities	1	2021	1	2021
ETIMS Enhancements - Inc 2 Development	2	2021	2	2021
ETIMS Enhancements - Inc 2 Testing	2	2021	3	2021
<i>ETIMS SUP</i>				
ETIMS SUP - Development/Testing	1	2019	4	2020
ETIMS SUP - Limited Deployment ATP (Feb 19)	2	2019	2	2019
ETIMS SUP - Full Deployment ATP (Aug 20)	4	2020	4	2020
<i>IMDS Enhancements</i>				
IMDS Enhancements - Pre-Acquisition Activities	3	2020	3	2021
IMDS Enhancements - Development/Testing	3	2021	4	2022

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708610F / <i>Logistics Information Technology (LOGIT)</i>	Project (Number/Name) 675207 / <i>Logistics IT System Modernization</i>
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Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
REMIS Enhancements				
REMIS Enhancements - Development	4	2019	3	2020
REMIS Enhancements - Testing	3	2020	1	2021
REMIS Enhancements - Full Deployment	1	2021	1	2021
IMLCI				
IMLCI - Pre-Acquisition ATP Activities	1	2019	3	2020
IMLCI - Acquisition ATP	4	2019	4	2019
IMLCI - Contract Award	3	2020	3	2020
IMLCI - Development/Testing	3	2020	3	2021
IMLCI - Limited Deployment ATP	2	2021	2	2021
IMCLI - Limited Deployments	3	2021	1	2022
IMLCI - Full Deployment ATP	1	2022	1	2022
SCI				
SCI - Pre-Acquisition Activities	1	2020	1	2024
SCI - Acquisition ATP (Aug 24)	2	2024	2	2024
SCI - Development/Testing	2	2024	4	2025
Emerging FIAR				
Emerging FIAR - Pre-acquisition Activities	3	2020	1	2022
Emerging FIAR - Development/Testing	2	2021	4	2022
Strike Teams				
Strike Teams - Pre-acquisition ATP Activities	3	2020	4	2021
Strike Teams - Development/Testing	1	2022	4	2025

Note

- REMIS Enhancements, ILS-S Enhancements, Logistics Strike Teams, and Emerging FIAR Requirements will be continuing to conduct pre-acquisition ATP activities. These activities include items such as risk reduction efforts, problem statements, and Clinger-Cohen Act documentation.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708611F / <i>Support Systems Development</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	4.406	0.539	11.838	0.000	11.838	13.725	0.000	0.000	0.000	Continuing	Continuing
675042: <i>Log Application Logistics Integration (LALI)</i>	-	4.406	0.539	11.838	0.000	11.838	13.725	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Logistics, Installations and Mission Support - Enterprise View (LIMS-EV) is the A4 reporting and analytics gateway providing a single "source of truth" via aggregated logistics data from numerous authoritative logistics systems using a wide range of analytic tools from streamlined, comprehensive dashboards to intricate, tailored adhoc reporting for multiple logistics mission areas including weapon systems, engines, support equipment, financials, maintenance, repair network, vehicles, and mobile. LIMS-EV delivers 20+ Business Intelligence capabilities to various logistics business areas by integrating data from 70+ systems with world-wide access by 30K+ users including decision makers at all AF levels (Flight, Squadron, Group, Wing, MAJCOM, COCOM).

Projects currently in development include four new capabilities modernizing three views : (1) Weapon System Sustainment (WSS) Automation - 1.0, (2) Engines View 4.0 (ENG) (deployment), (3) Supply Chain Management (SCM) - 8.0 DLA iPID/Serialized Control Total Asset Visibility. These are being delivered using an Scaled Agile Framework. Using Lean and Agile methodologies to efficiently manage and execute scope, three capabilities affecting two views have been pushed out and are planned to be delivered after FY20. This includes (1) Vehicle View - 8.0 MELRAT and Virtual Parking Tool as well as (2) Support Equipment View (SEV) 2.0.

Future LIMS-EV modernization include federating/integrating LIMS-EV with the A4 enterprise Basing and Logistics Analytics Data Environment(BLADE), which will allow expansion of LOGCOP capability using LIMS-EV data. Additionally, refactoring LIMS-EV using enterprise technical solutions will increase scalability and portability of LIMS-EV views by reducing reliance on legacy software applications which currently require separate licensing which increases cost and limits portability. Asset Lifecycle Management Automation, Improved Supply Chain Visibility and End-to-End Maintenance Lifecycle Management are planned to deliver eight new capabilities to modernize six current views which targets 80% of current LIMS-EV users.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver our integrated logistics capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, Sec 240-D.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708611F / <i>Support Systems Development</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	4.497	0.539	11.860	0.000	11.860
Current President's Budget	4.406	0.539	11.838	0.000	11.838
Total Adjustments	-0.091	0.000	-0.022	0.000	-0.022
• 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	-0.091	0.000			
• Other Adjustments	0.000	0.000	-0.022	0.000	-0.022

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Title: LIMS-EV Version 3.0 Product Development</p> <p>Description: Expanded, Scalable, Portable, Enterprise Logistics Data Accessibility</p> <p>FY 2020 Plans: Complete Three Major Enhancements and 11 Minor change requests for the Supply, Maintenance, Avionics, Propulsion, Repair Network communities to build the foundation and support targeted initial offerings of the following capabilities: - Enable secure, elastic capability that automatically scales to on-demand peak needs, provides reliable response and reduces scale and time of outages. - Provide incremental improved customer user and data quality metrics. - Isolate data latency issues and provide greater stability in ETL performance between source systems, DISA and Cloud One infrastructure</p> <p>FY 2021 Base Plans: FY 2021 Base Plans: Eight Major Enhancements and 23 Minor change requests for the Vehicle Management, Supply, Maintenance, Avionics, Propulsion, Repair Network, Support Equipment and Communication Security (COMSEC) communities that build on prior development to enable advanced Predictive Enterprise Logistics Reporting and Analytics in the following areas: - Begin to implement a modeling & simulation capability</p>	4.406	0.539	11.838	0.000	11.838

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708611F / <i>Support Systems Development</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<ul style="list-style-type: none"> - Begin Big data analytics - Begin actuarial capability and reliability analysis - Begin to incorporate operational data, such as flight profile data to support deep performance analysis of weapon system components and supporting predictive modeling - Will begin to configure and simulate different logistical outcomes based on known factors - Provide greater control to functional representatives to transform data by revising reference tables and business rules without developer intervention - Provide greater functional self service provisioning capability - Implement Mobile Capability to support initiatives such as Flight line of the Future - Enable federation of data across multi-security and functional domains. - Expand ADHOC reporting capability without needing special data universes - Modernize expanded visualization capability, with greater consistency across application views. - Expand access to new data feeds as well as unstructured and semi-structured data - Provide foundation infrastructure for Logistics Data Environment - Improve Forecasting Capability - Forecast future health of weapon system and equipment with constraint analysis - Improve trend analysis - Implement Statistical Process Control with anomaly detection - Determine root cause and fault analysis - Project future data with high degree of confidence - Display OSD Re-phasing and Program reduction limits ability for new enhancements <p>FY 2021 OCO Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased to ramp up development for enhancements/changes. Significant increase in the number of major enhancements and minor changes requests are described in the plans above. FY20 funding was reduced by \$6.109M to account for the availability of prior year execution balances.</p>					
Accomplishments/Planned Programs Subtotals	4.406	0.539	11.838	0.000	11.838

D. Other Program Funding Summary (\$ in Millions) N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0708611F / <i>Support Systems Development</i>
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D. Other Program Funding Summary (\$ in Millions)

Remarks

E. Acquisition Strategy

LIMS-EV will utilize services provided by the Air Force Cloud One Government Cloud Framework. AFLCMC/HNII Data Services Program Management Office (PMO), as LIMS-EV Program Manager, is responsible to competitively acquire additional LIMS-EV capabilities using a variety of fixed price, labor hour, time and material, and cost plus contracts within the Cloud One Framework.

LIMS-EV capabilities utilize services provided by the DISA Government Cloud Data Services (GCDS)/Cloud One Framework. AFLCMC/HNII Data Services PMO, as LIMS-EV Program Manager, manages LIMS-EV development projects following the Agile/Rapid Prototyping/Rapid Fielding software development release process. LIMS-EV development projects will be implemented via the Cloud One development contract under oversight by AFLCMC/HNII Data Services Program Management Office, Wright-Patterson Air Force Base, Ohio. Future development/modification and sustainment contracts are being developed for post-GCSS-AF II contract period of performance.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708611F / <i>Support Systems Development</i>	Project (Number/Name) 675042 / <i>Log Application Logistics Integration (LALI)</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>Support Systems Developments PE 0708611F</i>	
LIMS-EV Version 3.0	
LIMS-EV alignment with A4 enterprise data environment (BLADE)	
LIMS-EV native cloud solution integration	
Asset Lifecycle Management Automation	
Improved Supply Chain Visibility	
Machine Learning Integration	
End-to-End Maintenance Lifecycle Management	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0708611F / <i>Support Systems Development</i>	Project (Number/Name) 675042 / <i>Log Application Logistics Integration (LALI)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Support Systems Developments PE 0708611F</i>				
LIMS-EV Version 3.0	3	2019	4	2022
LIMS-EV alignment with A4 enterprise data environment (BLADE)	4	2022	4	2022
LIMS-EV native cloud solution integration	2	2021	4	2022
Asset Lifecycle Management Automation	2	2021	4	2022
Improved Supply Chain Visibility	4	2022	4	2022
Machine Learning Integration	2	2021	4	2022
End-to-End Maintenance Lifecycle Management	3	2022	4	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0804743F / <i>Other Flight Training</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	1.948	2.057	1.332	0.000	1.332	2.134	2.173	2.211	2.253	Continuing	Continuing
675304: <i>Aviation Resource Management System (ARMS)</i>	-	1.948	2.057	1.332	0.000	1.332	2.134	2.173	2.211	2.253	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Aviation Resource Management System (ARMS) is the authoritative data source for all aircrew and parachutist management (including flight and jump pay) covering 65,000 Aircrew/Parachutists and used by 2,800 1C0X2 Career Field members with 2.2M transactions per week. The ARMS is a web-based on-line management information system designed to support the base level Director of Operations (DO), aircrew supervisors, and managers. ARMS provides management policies and ensures the status of the Air Force flying programs are available to flying/jump supervisors to make resource allocation decisions. ARMS ensures accurate tracking of flying and ground training programs for each weapon system at each base. ARMS provides accurate and timely aircrew/parachutist information which assists in monitoring, tracking, and scheduling military training required to meet Air Force mission requirements. Additionally, the ARMS manages flying hours for aircrew parachutists world-wide to include USAF, Air Force Reserve Command (AFRC) and the Air National Guard (ANG).

The current ARMS functionality resides at a Defense Information System Agency (DISA) DECC and consists of "5" logical modules to include: Flight and Flying Hours, Individual Training, Jumper Aircrew, Resource Tracking, Reports, and System. The sustainment of these capabilities and the introduction of new capabilities follows an agile development process, but the effectiveness of that process is severely limited by the existing production environment.

A portion of the ARMS Jumper Aircrew module capabilities are being migrated to a mandated government-approved cloud environment. The cloud environment provides the Continuous Integration and Continuous Deployment (CI/CD) pipeline required to constantly deliver software in an agile framework, following the required DevSecOps methodology. The migration to the cloud environment and the DevSecOps methodology will transform ARMS into a scalable and flexible system capable of meeting all information requirements of the Aviation Resource Management community.

Once the initial cloud ARMS Jumper Aircrew capability is established, all remaining legacy program capabilities and new program requirements will be incorporated into the ARMS product backlog and prioritized for migration/stand-up in the cloud program instance. The ARMS DISA legacy program will sunset, once all capabilities are successfully migrated to the cloud environment.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver ARMS capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This requirement supports performance of a full financial audit as required by Title 10 U.S.C. Chapter 9A, Sec 240-D.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0804743F / <i>Other Flight Training</i>
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Funds will be used to perform studies and innovative integration efforts for common technology capabilities such as cloud migration, technology development and mobile application.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	2.022	2.057	2.093	0.000	2.093
Current President's Budget	1.948	2.057	1.332	0.000	1.332
Total Adjustments	-0.074	0.000	-0.761	0.000	-0.761
• 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	-0.074	0.000			
• Other Adjustments	0.000	0.000	-0.761	0.000	-0.761

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Aviation Resource Management System (ARMS)	1.948	2.057	1.332
Description: Hardware/software development to update ARMS, adding functionality and system interfaces.			
FY 2020 Plans:			
- Field Flight and Flying Hours modules releases			
- Field Training Management module releases			
- Establish Cloud One Jump operations via Continuous Integration & Continuous Deployment pipeline			
- Obtain Risk Management Framework (RMF) continuous monitoring Authority to Operate (ATO)			
- Field sustainment legacy ARMS releases - patches, vulnerability mitigation, and configuration updates			
FY 2021 Plans:			
- Will continue migrating legacy ARMS capabilities from DISA platform to Cloud One platform			
- Will deliver patches as needed to correct system deficiencies or apply required upgrades			
- Will continue to make updates to system design, configuration, test, and training			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0804743F / <i>Other Flight Training</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
- Will continue to satisfy RMF controls needed for continuous ATO				
FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to reduced system updates and requirements.				
Accomplishments/Planned Programs Subtotals		1.948	2.057	1.332
D. Other Program Funding Summary (\$ in Millions) N/A				
Remarks				
E. Acquisition Strategy The ARMS utilizes a hybrid of the Agile and Waterfall development methodologies to incrementally develop and field enhancements to the existing system. The ARMS PMO utilizes military programmers for code development/sustainment and government civilians providing program management, engineering, and information technology support. The ARMS PMO receives development/sustainment support from the 402nd Software Engineering Group (SWEG) at Robins AFB via a Memorandum of Agreement (MOA). Additionally, the ARMS PMO has partnered with the USAF Business Enterprise Systems (BES) Directorate's Business Enterprise Systems Programming INovation (BESPIN) office to acquire contractor resources. BESPIN has acquired current contractor support via Other Transaction Authority (OTA). Follow-on acquisition support will either be accomplished via OTA or Firm-Fixed Price (FFP) contracts awarded under Section 8a as small business set aside. The updated ARMS Flight and Flying Hours modules and the Training Management module will be fielded to legacy ARMS in FY20, along with the initial ARMS cloud capability. Once the Jump module capability is established in Cloud One, migration efforts will begin to transition all legacy ARMS capabilities to the Cloud One environment. Changes to the legacy baseline will be limited to patches, vulnerability mitigation, and required capability implementations during the migration. The legacy ARMS will be linked to the Cloud One instance throughout the migration effort, ensuring users a seamless single sign-on application with underlying capabilities existing in both legacy DISA and Cloud One.				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020				
Appropriation/Budget Activity 3600 / 7						R-1 Program Element (Number/Name) PE 0804743F / Other Flight Training					Project (Number/Name) 675304 / Aviation Resource Management System (ARMS)				

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	
ARMS Increment 1, Build 1 and Build 2 contract	SS/FFP	581ST SMXS ROBINS AFB : Warner Robins, GA	-	-		-		-		-		-	Continuing	Continuing	3.400
ARMS Increment 2 Development	SS/FFP	581ST SMXS ROBINS AFB : Warner Robins, GA	-	0.810	Mar 2020	0.810	Mar 2020	0.050	Mar 2021	-		0.050	Continuing	Continuing	10.000
Subtotal			-	0.810		0.810		0.050		-		0.050	Continuing	Continuing	N/A

Remarks

ARMS INCREMENT I INCLUDES BUILDS I AND II. ARMS BUILD I AND II ARE NOW LISTED SEPARATELY.

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	
ARMS Architecture Contract Support	C/FFP	Copper River Information Technology, LLC : Anchorage, AK	-	0.065	Sep 2019	0.067	Sep 2020	0.067	Sep 2021	-		0.067	Continuing	Continuing	-
ARMS C&A SUPPORT III	C/FFP	OASIS : Lexington, MA	-	0.154	Apr 2019	0.159	Apr 2020	0.159	Apr 2021	-		0.159	Continuing	Continuing	-
ARMS CONFIGURATION MANAGER	C/FFP	OASIS : Lexington, MA	-	0.126	Apr 2019	0.130	Apr 2020	0.130	Apr 2021	-		0.130	Continuing	Continuing	-
ARMS SYSTEM ADMIN III	C/FFP	OASIS : Lexington, MA	-	0.156	Apr 2019	0.161	Apr 2020	0.161	Apr 2021	-		0.161	Continuing	Continuing	-
ARMS CIE SUPPORT	C/FFP	TBD : TBD	-	0.146	Mar 2020	0.227	Apr 2020	0.227	Apr 2021	-		0.227	Continuing	Continuing	-
ARMS INTEGRATION SUPPORT	C/FFP	Not specified. : TBD	-	0.158	Apr 2020	0.163	Apr 2020	0.163	Apr 2021	-		0.163	Continuing	Continuing	-
ARMS PLURALSIGHT	C/TBD	TBD : TBD	-	-		-		-		-		-	Continuing	Continuing	-
ARMS Financial Improvement Audit Readiness Support	SS/FFP	TM Capture : Maxwell AFB-Gunter Annex, AL	-	0.065	Feb 2020	0.065	Feb 2020	0.065	Feb 2021	-		0.065	Continuing	Continuing	0.325

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0804743F / Other Flight Training	Project (Number/Name) 675304 / Aviation Resource Management System (ARMS)
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Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Subtotal			-	0.870		0.972		0.972		-		0.972	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ARMS Test Support	C/FFP	GSA : Maxwell AFB-Gunter Annex, AL	-	0.054	Apr 2020	0.056	Apr 2020	0.056	Apr 2021	-		0.056	Continuing	Continuing	0.260
ARMS TEST MANAGER	C/CPAF	OASIS : Lexington, MA	-	0.154	Mar 2019	0.159	Apr 2020	0.159	Apr 2021	-		0.159	Continuing	Continuing	-
Subtotal			-	0.208		0.215		0.215		-		0.215	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ARMS PMA Other Govt Costs	C/TBD	TBD : TBD	-	0.060	Apr 2019	0.060	Apr 2020	0.095	Apr 2021	-		0.095	Continuing	Continuing	-
Subtotal			-	0.060		0.060		0.095		-		0.095	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	1.948	2.057	1.332	-	1.332	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0804743F / <i>Other Flight Training</i>	Project (Number/Name) 675304 / <i>Aviation Resource Management System (ARMS)</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

ARMS EXHIBIT R-4	
Advisory and Assistance Services Contract	
ARMS Financial Improvement Audit Readiness Contract	
Increment I Build 1 Contract	
Development - Increment I Build 1 Complete	
Development - Increment I Build 2 Start	
Architecture Support	
Testing - Increment I Build 2	
ARMS 7.0 Increment II Build 1 Contract	
Development - Increment II Build 1 Start	
Field - Increment I Build 2	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0804743F / <i>Other Flight Training</i>	Project (Number/Name) 675304 / <i>Aviation Resource Management System (ARMS)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
ARMS EXHIBIT R-4				
Advisory and Assistance Services Contract	1	2019	4	2025
ARMS Financial Improvement Audit Readiness Contract	1	2019	4	2025
Increment I Build 1 Contract	1	2019	4	2024
Development - Increment I Build 1 Complete	1	2019	4	2025
Development - Increment I Build 2 Start	2	2019	3	2024
Architecture Support	1	2019	4	2024
Testing - Increment I Build 2	1	2020	4	2020
ARMS 7.0 Increment II Build 1 Contract	1	2020	4	2020
Development - Increment II Build 1 Start	1	2020	1	2020
Field - Increment I Build 2	4	2020	1	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0808716F / <i>Other Personnel Activities</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.108	0.010	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
675141: <i>DEOMI Faculty Research</i>	-	0.108	0.010	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 Defense Equal Opportunity Management Institute (DEOMI) provides grants to the civilian academic community to conduct research on military and civilian equal opportunity issues using standard social science methodology and engineering analysis. The research methodology and analysis includes developing a literature review proposing hypotheses and methods of research. The grantee will then gather appropriate data, draw conclusions and present discussions, recommendations and reports based on their funding.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	0.108	0.010	0.012	0.000	0.012
Current President's Budget	0.108	0.010	0.000	0.000	0.000
Total Adjustments	0.000	0.000	-0.012	0.000	-0.012
• 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	-0.012	0.000	-0.012

C. Accomplishments/Planned Programs (\$ in Millions)

	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>
Title: Equal Opportunity Issues	0.108	0.010	-
Description: Conduct research on military and civilian equal opportunity issues.			
FY 2020 Plans:			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0808716F / <i>Other Personnel Activities</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Continue conducting research on military and civilian equal opportunity issues.			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Effort to continue for conducting research on military and civilian equal opportunity issues.			
Accomplishments/Planned Programs Subtotals	0.108	0.010	-

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
Grants will be awarded competitively.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0808716F / <i>Other Personnel Activities</i>	Project (Number/Name) 675141 / <i>DEOMI Faculty Research</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DEOMI	Various	Various : Various	-	0.108	Mar 2018	0.010	Mar 2020	-		-		-	Continuing	Continuing	-
Subtotal			-	0.108		0.010		-		-		-	Continuing	Continuing	N/A

Remarks
Contract method will be a grant

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.108	0.010	-	-	-	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0808716F / <i>Other Personnel Activities</i>	Project (Number/Name) 675141 / <i>DEOMI Faculty Research</i>
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

<i>DEOMI Faculty Research</i>	
Receive Grants	[REDACTED]
Award Grants	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0808716F / <i>Other Personnel Activities</i>	Project (Number/Name) 675141 / <i>DEOMI Faculty Research</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>DEOMI Faculty Research</i>				
Receive Grants	1	2019	2	2024
Award Grants	3	2019	4	2024

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901202F <i>Joint Personnel Recovery Agency</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	1.947	2.060	2.092	0.000	2.092	2.136	2.174	2.212	2.254	Continuing	Continuing
675196: <i>Joint Technology Exploitation</i>	-	1.947	2.060	2.092	0.000	2.092	2.136	2.174	2.212	2.254	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Funding supports development of innovative capabilities to address Personnel Recovery in Large Scale Combat Operations, Multi-Domain Operations and anti-access/area denial environments for Combatant Commanders and the Services. Joint personnel Recovery Agency (JPRA) developmental efforts address Personnel Recovery capability gaps and shortfalls identified in the Personnel Recovery Initial Capabilities Document approved by the Joint Requirements Oversight Council memorandum 120-12 on 8 Aug 2012, and subsequent supporting documents approved in the Joint Capabilities Integration Development System. Activities include funding for research and development, support equipment, contract services and all associated costs specifically identified to support the JPRA headquarters Ft. Belvoir, VA and other agency operating locations.

This program is in Budget 7, Operational System Development, because this budget activity includes 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 year.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	2.023	2.060	2.096	0.000	2.096
Current President's Budget	1.947	2.060	2.092	0.000	2.092
Total Adjustments	-0.076	0.000	-0.004	0.000	-0.004
• 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	-0.076	0.000	-0.004	0.000	-0.004

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 0901202F <i>I Joint Personnel Recovery Agency</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
Title: Personnel Recovery Information Data System (PRIDS) Description: Development of the Personnel Recovery Information Data System FY 2020 Plans: Complete the POC/MVP phase and develop an initial operating capability (IOC). The PRIDS IOC will provide Combatant Commands and the Services an initial prototype and set conditions for investment in a Full Operational Capability in FY 2021. FY 2021 Plans: Full Operational Capability. FY 2020 to FY 2021 Increase/Decrease Statement: Increase is due to inflation.		1.161	2.060	2.092
Title: Optimal Search Study Description: Assess and evaluate technologies for personnel recovery geospatial data visualization, predictive and real-time planning capabilities. FY 2020 Plans: Budget reallocated to PRIDS. FY 2021 Plans: Budget reallocated to PRIDS.		0.168	0.000	0.000
Title: Analysis of Alternatives Description: Systems analysis to support a future program of record to satisfy the report and locate requirement gaps as identified by the combatant commands (CCMDs). FY 2020 Plans: Budget reallocated to PRIDS. FY 2021 Plans: Budget reallocated to PRIDS.		0.220	0.000	0.000
Title: DOD Support to Personnel Recovery in a Chief of Mission Environment (DSRCE) - Automated Development Tool. Description: Internet accessible database that addresses personnel recovery roles, responsibilities, and activities to develop a DOD Personnel Recovery Supplement to a U.S. diplomatic post's emergency action plan.		0.075	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901202F / <i>Joint Personnel Recovery Agency</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<i>FY 2020 Plans:</i> Budget reallocated to PRIDS.			
<i>FY 2021 Plans:</i> Budget reallocated to PRIDS.			
<i>Title:</i> Smartphone Initiative <i>Description:</i> Develop capabilities to enable Service members to use their smartphones as Personnel Recovery aids.	0.323	0.000	0.000
<i>FY 2020 Plans:</i> Budget reallocated to PRIDS.			
<i>FY 2021 Plans:</i> Budget reallocated to PRIDS.			
Accomplishments/Planned Programs Subtotals	1.947	2.060	2.092

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

Projects will leverage existing program contracts. In the rare instance where a contract does not already exist, contracts will be awarded through full and open competition.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901202F / <i>Joint Personnel Recovery Agency</i>	Project (Number/Name) 675196 / <i>Joint Technology Exploitation</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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.	
Common Distress Reporting System	
Optimal Search Study	
Collaborative Personnel Recovery planning systems	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901202F / <i>Joint Personnel Recovery Agency</i>	Project (Number/Name) 675196 / <i>Joint Technology Exploitation</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>No project title.</i>				
Common Distress Reporting System	1	2019	4	2024
Optimal Search Study	1	2019	4	2024
Collaborative Personnel Recovery planning systems	1	2019	4	2024

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901218F / <i>Civilian Compensation Program</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	2.849	3.809	3.869	0.000	3.869	3.950	4.021	4.092	4.167	Continuing	Continuing
674139: <i>Civilian Compensation Program</i>	-	2.849	3.809	3.869	0.000	3.869	3.950	4.021	4.092	4.167	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program element provides for payment of civilian compensation benefits for disability due to personal injury sustained while in the performance of duty or due to employment-related disease according to the Federal Employees Compensation Act (FECA) under Title 5 U.S.C., Chapter 81. The Department of Labor (DOL) administers this program and charges the Department of the Air Force for its employee costs; therefore, this is a MUST PAY bill for Air Force. The Program Element(PE) excludes manpower authorizations and costs. This PE is in Budget Activity 7 in support of payment of civilian compensation benefits for disability due to personal injury sustained while in the performance of duty or due to employment-related disease according to FECA under Title 5 U.S.C., Chapter 81.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	3.561	3.809	3.876	0.000	3.876
Current President's Budget	2.849	3.809	3.869	0.000	3.869
Total Adjustments	-0.712	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	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-0.712	0.000	-0.007	0.000	-0.007

Change Summary Explanation

FY2018 funding reduced by \$0.149M for the Federally Funded Research Development Center (FFRDC).
 FY2019 funding reduced by \$0.211M for the Federally Funded Research Development Center (FFRDC).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901218F / <i>Civilian Compensation Program</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: Civilian Compensation</p> <p>Description: Program compensates employees assigned to RDT&E facilities for work-related injuries or occupational diseases.</p> <p>FY 2020 Plans: Continue to provide compensation to employees assigned to RDT&E facilities for work-related injuries or occupational diseases, and implement services to expedite the return of employees back to work.</p> <p>FY 2021 Plans: Continue to provide compensation to employees assigned to RDT&E facilities for work-related injuries or occupational diseases, and implement services to expedite the return of employees back to work.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding increased to account for inflation.</p>	2.849	3.809	3.869
Accomplishments/Planned Programs Subtotals	2.849	3.809	3.869

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

Not Applicable.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901218F / <i>Civilian Compensation Program</i>	Project (Number/Name) 674139 / <i>Civilian Compensation Program</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>Civilian Compensation Program</i>	
Compensation program	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901218F / <i>Civilian Compensation Program</i>	Project (Number/Name) 674139 / <i>Civilian Compensation Program</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Civilian Compensation Program</i>				
Compensation program	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901220F / <i>Personnel Administration</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	4.102	6.476	1.584	0.000	1.584	1.723	1.843	1.966	2.093	Continuing	Continuing
675194: <i>Force Development Transformation</i>	-	4.102	6.476	1.584	0.000	1.584	1.723	1.843	1.966	2.093	Continuing	Continuing

A. Mission Description and Budget Item Justification

Personnel Services Delivery (PSD), under the Personnel Administration program, funds operational developments necessary to acquire, field, and modify business processes to transform the delivery of Human Resources (HR) capabilities through the structured redesign of the Total Force Personnel Community's people (Active Duty, Reserve, Guard, and Civilians), processes, and technologies. PSD Transformation fundamentally shifts the way personnel services are provided, transitioning from primarily face-to-face interactions with a personnelist to a tiered model with services delivered through online self-service, contact centers, and fewer in-person interactions. PSD supports the migration of legacy applications and other information technologies from on-premise data centers to a more sustainable cloud-based hosting solution and flexible services-based architecture as defined by the Defense Enterprise Service Management Framework (DESMF).

This program element may include necessary civilian pay expenses required to manage, execute, and deliver personnel administration capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	4.258	6.476	6.589	0.000	6.589
Current President's Budget	4.102	6.476	1.584	0.000	1.584
Total Adjustments	-0.156	0.000	-5.005	0.000	-5.005
• 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	-0.156	0.000	-5.005	0.000	-5.005

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0901220F / <i>Personnel Administration</i>				Project (Number/Name) 675194 / <i>Force Development Transformation</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675194: <i>Force Development Transformation</i>	-	4.102	6.476	1.584	0.000	1.584	1.723	1.843	1.966	2.093	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Personnel Services Delivery (PSD), under the Personnel Administration program, funds operational developments necessary to acquire, field, and modify business processes to transform the delivery of Human Resources (HR) capabilities through the structured redesign of the Total Force Personnel Community's people (Active Duty, Reserve, Guard, and Civilians), processes, and technologies. PSD Transformation fundamentally shifts the way personnel services are provided, transitioning from primarily face-to-face interactions with a personnelist to a tiered model with services delivered through online self-service, contact centers, and reduced in-person interactions. PSD supports the migration of legacy applications and other information technologies from on premises data centers to a more sustainable cloud-based hosting solution and flexible services-based architecture as defined by the Defense Enterprise Service Management Framework (DESMF). In addition, funds will be used to perform studies and innovative integration efforts for common technology capabilities such as cloud migration, technology development and mobile application.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Human Resource Systems (HRS) Transition	3.947	6.317	1.421
Description: In support of the A1 Digital Transformation and Application Data Center Optimization initiatives, identify and document human resource legacy systems for modernization, transition and/or decommission. Support the migration of legacy applications and other information technologies from on-premise data centers to a more sustainable cloud-based hosting solution and flexible services-based architecture as defined by the DoD Enterprise Service Management Framework (DESMF). Rapidly implement human resource capabilities utilizing Commercial-off-the-Shelf (COTS) solutions, Agile incremental delivery, and rapid prototyping. Execute the prototyping and development of legacy human resource systems through the deployment and transitioning of applications to Department of Defense (DoD) and commercial cloud services. In FY19, program completed planning for cloud transition.			
FY 2020 Plans:			
<ul style="list-style-type: none"> • Continue to provide technology demonstrations and studies for tiered HR service delivery, HR applications consolidation and cloud based technology insertion, including the ability to utilize Software as a Service (SaaS) delivery capabilities. • Complete migration of apps to an approved Cloud Service Provider. • Continue consolidation of apps by life cycle requirements and functionality. 			
FY 2021 Plans:			
<ul style="list-style-type: none"> • Will continue to provide technology demonstrations and studies for tiered HR service delivery, HR application consolidation and cloud based technology insertion, including the ability to utilize Software as a Service (SaaS) delivery capabilities 			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901220F / <i>Personnel Administration</i>	Project (Number/Name) 675194 / <i>Force Development Transformation</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<ul style="list-style-type: none"> • Will continue consolidation of apps by life cycle requirements and functionality. <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding decrease due to completion of cloud migration.</p> <p><i>Title:</i> Test and Evaluation/Systems Engineering</p> <p><i>Description:</i> Transition the Test and Development Environment (T&DE) to an approved Cloud Service Provider. Continued support for all aspects of engineering including software and systems engineering, requirements analysis, configuration management, database administration, and test and evaluation throughout the lifecycle of all Human Resources applications and continued infrastructure development.</p> <p><i>FY 2020 Plans:</i></p> <ul style="list-style-type: none"> • Continue migration of T&DE capability to an approved Cloud Service Provider. • Continue supporting all aspects of engineering including software and systems engineering, requirements analysis, configuration management, and database administration. • Perform test and evaluation of HRS transition activities including any emergent customer needs and provide system engineering support for the HRS transition. <p><i>FY 2021 Plans:</i></p> <ul style="list-style-type: none"> • Will ensure the Cloud instantiation of the TD&E is kept up-to-date. • Will continue to support all aspects of engineering, including software and systems engineering, requirements analysis, configuration management, and database administration. • Will continue to perform test and evaluation of HRS transition activities including any emergent customer needs and provide system engineering support for the HRS transition <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Funding increase due to inflation adjustment</p>		0.155	0.159	0.163
Accomplishments/Planned Programs Subtotals		4.102	6.476	1.584
C. Other Program Funding Summary (\$ in Millions)				
N/A				
Remarks				

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901220F / <i>Personnel Administration</i>	Project (Number/Name) 675194 / <i>Force Development Transformation</i>

D. Acquisition Strategy

Personnel Services Delivery employs an evolutionary acquisition strategy to deliver incremental Information Technology and Human Resources capabilities with development contracts that are awarded in a competitive environment. Technology demonstrations will be used to reduce technology risks, assess Commercial-Off-The-Shelf (COTS) products, and produce technology insertion and migration strategies. In 2015, the government conducted a Full and Open competition for Human Resources System Technical Support and awarded a contract to provide PSD with development and test/technical support. Air Force Program Executive Officer (PEO) for Business and Enterprise Systems (AFPEO BES) is the PEO and Milestone Decision Authority (MDA) for PSD. Air Force Life Cycle Management Center (AFLCMC) is the contracting authority for the PSD Program and provides contracts, legal and comptroller support.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901220F / <i>Personnel Administration</i>	Project (Number/Name) 675194 / <i>Force Development Transformation</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Service Oriented Architecture	C/FFP	Deloitte Consulting LLP : Alexandria, VA	-	0.000		0.000		-		-		-	Continuing	Continuing	0.000
HRS Transition Phase 1 (HCM)	MIPR	NCMS : TBD	-	2.000	Sep 2019	2.993	Jan 2020	-		-		-	Continuing	Continuing	4.993
HRS Transition Phase 2	TBD	TBD : TBD	-	-		1.009	Sep 2020	-		-		-	Continuing	Continuing	-
HCM SaaS Licenses	C/FFP	Emergent, LLC : Virginia Beach, VA	-	-		-		0.170	Oct 2021	-		0.170	Continuing	Continuing	-
Subtotal			-	2.000		4.002		0.170		-		0.170	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Engineering, Professional, and Administrative Support Services (EPASS)	C/CPFF	Oasis : Lincoln, MA	-	1.389	Apr 2019	1.750	Apr 2020	0.984	Apr 2021	-		0.984	Continuing	Continuing	-
Specialized Cost Services (SCS)	C/CPAF	BTAS : Beavercreek, OH	-	0.145	Apr 2019	0.150	Apr 2020	0.152	Apr 2021	-		0.152	Continuing	Continuing	-
FFRDC (SEI) Support	SS/CPAF	CMU-SEI : Pittsburgh, PA	-	0.000		0.000		0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	1.534		1.900		1.136		-		1.136	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation Support	MIPR	GSA : Atlanta, GA	-	0.000		0.000		-		-		-	Continuing	Continuing	-
Test/Evaluation Support	C/CPIF	Diversified Technical Services, Inc. : San Antonio, TX	-	0.155	Sep 2020	0.159	Jul 2020	0.163	Jul 2021	-		0.163	Continuing	Continuing	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901220F / <i>Personnel Administration</i>	Project (Number/Name) 675194 / <i>Force Development Transformation</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>Force Development Transformation</i>	
SOA Inc 3 Development/Fielding	
HR Applications Functionality Improvements	
HRS Transition Analysis	
HRS Transition Phase 1 Technology Demonstration (HCM SAAS)	
HRS Transition Phase 2 Contract Award/ Development/Testing/Fielding	
HRS Transition Phase 3 Contract Award/ Development/Testing/Fielding	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901220F / <i>Personnel Administration</i>	Project (Number/Name) 675194 / <i>Force Development Transformation</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Force Development Transformation</i>				
SOA Inc 3 Development/Fielding	1	2019	4	2019
HR Applications Functionality Improvements	1	2019	4	2020
HRS Transition Analysis	1	2019	4	2019
HRS Transition Phase 1 Technology Demonstration (HCM SAAS)	4	2019	4	2020
HRS Transition Phase 2 Contract Award/Development/Testing/Fielding	3	2020	4	2023
HRS Transition Phase 3 Contract Award/Development/Testing/Fielding	3	2023	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901226F / <i>Air Force Studies and Analysis Agency</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	1.364	1.443	1.197	0.000	1.197	1.497	1.524	1.550	1.579	Continuing	Continuing
676009: <i>M & S DEVELOPMENT</i>	-	1.364	1.443	1.197	0.000	1.197	1.497	1.524	1.550	1.579	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Provides for development and enhancement of modeling and simulation (M&S) tools for strategic planning, operational requirements, modernization and recapitalization of systems and programs, as well as the Planning, Programming, Budgeting and Execution (PPBE) processes for the AF Analytic Community and Secretary of the Air Force Standard Analysis Toolkit in support of AF Senior Leadership. As new technologies are introduced to the battlefield (Digital Electronic Jammers, maneuvering Surface-to-Surface Missiles, Directed Energy Weapons, etc.) along with evolving warfighting techniques and support operations, the range of capabilities that needs to be covered by analytic tools needs to expand as well. M&S creation and enhancement can require extensive research in how to properly implement the emerging weapons capabilities as well as demand development of software techniques to implement the changes. Additionally, emerging and continuing focus areas such as Space, Irregular Warfare, Information Operations, Cyber warfare and ISR demand specific tools of their own for new exploration and development. These focus areas require examination in isolation as well as cross-domain making the problem more complex and increasing the R&D challenges to field new decision support tools.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	1.418	1.443	1.468	0.000	1.468
Current President's Budget	1.364	1.443	1.197	0.000	1.197
Total Adjustments	-0.054	0.000	-0.271	0.000	-0.271
• 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	-0.054	0.000			
• Other Adjustments	0.000	0.000	-0.271	0.000	-0.271

Change Summary Explanation

Increases due to development and application of advanced analytics, capability to improve efficiency and effectiveness within Air Force Enterprise. Expanding the capability to exploit large data sets using modern algorithms and machine learning.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901226F / <i>Air Force Studies and Analysis Agency</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: Modeling and Simulation Development</p> <p>Description: Develop and Update Modeling & Simulation (M&S) tools.</p> <p>FY 2020 Plans: Continue research and development of M&S Tools</p> <p>FY 2021 Plans: Continue research and development of M&S Tools</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding decreased due to other higher Air Force priorities.</p>	1.364	1.443	1.197
Accomplishments/Planned Programs Subtotals	1.364	1.443	1.197

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

N/A.

E. Acquisition Strategy

Previous and planned future efforts have been/will be awarded under existing Task Order contracts. AF/A9 does not anticipate awarding a new contract for R&D work in the next year.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901226F / Air Force Studies and Analysis Agency	Project (Number/Name) 676009 / M & S DEVELOPMENT

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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&S Development	
Modeling & Simulation Development	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901226F / <i>Air Force Studies and Analysis Agency</i>	Project (Number/Name) 676009 / <i>M & S DEVELOPMENT</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>M&S Development</i>				
Modeling & Simulation Development	1	2019	4	2025

Note

Applying the resources under this PE started in 1Q FY2012 and has continued to develop successful products over time. A9 anticipates work to begin continue for 12-24 months for (1)research into how to better model new friendly and enemy weapons systems, (2) continue to develop tools to better examine evolving weapons technologies and (3) developing new models to better populate the data requirements of existing tools.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	0.000	86.578	9.323	7.006	0.000	7.006	5.185	5.278	5.372	5.472	Continuing	Continuing
672222: <i>Program Budget Enterprise Service (PBES)</i>	0.000	15.346	4.359	1.967	0.000	1.967	0.041	0.042	0.043	0.044	0.000	21.842
675177: <i>Cost Estimating Modeling (CEM)</i>	0.000	4.773	4.964	5.039	0.000	5.039	5.144	5.236	5.329	5.428	Continuing	Continuing
675178: <i>DEAMS Continuous Capability Development</i>	0.000	5.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.500
675179: <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>	0.000	60.959	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	60.959

Program MDAP/MAIS Code: N87

Note

In FY20, PE 0901554F, DEAMS, changed from PE 0901538F, Financial Management Information Systems Development.
 In FY20, Project 675178, DEAMS Continuous Capability Development, changed from Defense Enterprise Accounting Management System Increment 2 (DEAMS Inc 2).

A. Mission Description and Budget Item Justification

This program element develops upgrades to existing financial management systems. These upgrades are required to comply with auditability and transparency requirements as well as efficiencies in processing financial transactions. This program element also supports studies and analysis to improve future program planning and execution.

There are four projects within this program element: Program and Budget Enterprise Services (PBES), Cost Estimating Modeling (CEM), Defense Enterprise Accounting and Management System (DEAMS) Increment 1 (Inc 1), and DEAMS Continuous Capability Development (CCD), formally known as DEAMS Increment 2, prior to FY20.

PBES is a software development effort that will utilize a Service Oriented Architecture (SOA) to deliver budgeting and programming capability for the Air Force and will replace legacy systems (Automated Budget Interactive Data Environment System (ABIDES) and Resource Allocation Programming Information Decision System (RAPIDS), and Enhanced Tradespace Tool (ETT) that support the budget formulation and force programming process.

CEM is a knowledge-based study effort to improve Air Force-wide cost estimating by analyzing cost data and recommending changes to estimating models, methods, and tools.

DEAMS development will be governed in Capability Support Phase after Increment 1 Full Deployment (FD).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>
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DEAMS is the Air Force's target core accounting and financial management solution and is a key component of the long-term business process improvements needed to sustain auditability and correct financial system weaknesses.

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 financial management information system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	93.418	9.323	7.020	0.000	7.020
Current President's Budget	86.578	9.323	7.006	0.000	7.006
Total Adjustments	-6.840	0.000	-0.014	0.000	-0.014
• 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	-6.840	0.000	-0.014	0.000	-0.014

Change Summary Explanation

FY2020 funds for DEAMS transitioned to new PE 0901554F

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>					Project (Number/Name) 672222 / <i>Program Budget Enterprise Service (PBES)</i>		
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672222: <i>Program Budget Enterprise Service (PBES)</i>	0.000	15.346	4.359	1.967	0.000	1.967	0.041	0.042	0.043	0.044	0.000	21.842
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

PBES will be the single solution software development effort to deliver planning, programming, budgeting and execution (PPBE) capability for the United States Air Force. PBES will replace legacy systems such as the Automated Budget Interactive Data Environment System (ABIDES), Resource Allocation Programming Information Decision System (RAPIDS) and the Enhanced Tradespace Tool (ETT), supporting the budget formulation and force programming process. Upon full deployment of PBES, the system will be compliant with the Standard Financial Information Structure (SFIS) and Standard Line of Accounting (SLOA) conventions, which will enable data standardization across the Department of Defense (DoD).

Utilizing Business Process Re-engineering (BPR), the Air Force has designated PBES as the solution to deliver traceability of financial data in support of the PPBE process. Through the use of BPR, PBES will address excessive overhead, outdated business practices and other time-consuming support activities. PBES will make the budget formulation process more efficient by incorporating business best practices, organizing programming and budgeting personnel, as well as utilizing current technology. PBES will also eliminate checks and balances required of older technology, taking advantage of automated reconciliation services. In addition, the solution will allow the use of Authoritative Data Sources (ADS) for data exposure, resulting in more timely and accurate budget submissions to Office of the Secretary of Defense (OSD), Congress, and other internal and external customers.

A Commercial-off-the-Shelf (COTS) product has been selected as the tool of choice which will require minor configuration changes to meet the stated user requirements. This strategy requires no code changes to the actual COTS product and will drive lower support costs along with making future requirements changes easier in the out-years. Requirements will be satisfied through an iterative process of sprint development cycles, where usable capability is produced and made available to operational users after every sprint. The Integrated Product Office 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.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver financial management information system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: PBES	15.346	4.359	1.967	0.000	1.967

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 672222 / <i>Program Budget Enterprise Service (PBES)</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Description: Software development effort providing modern and enhanced planning, programming, budgeting and execution capabilities to the USAF. Funding supports engineering, cybersecurity, technical development, implementation and automated testing.</p> <p>ACCOMPLISHMENTS:</p> <ul style="list-style-type: none"> - Stood-up Integration/Development pipeline environments needed for agile development of software and training - Delivered programming/budgeting capability to Air Staff to shadow build the FY2021 PB - Delivered Sprints 6-11 (AF submission to OSD and reporting with Business Intelligence Reporting Tool) for test and fielding - Delivered foundational Planning capability - 1 Year early - Received approval to deploy to MAJCOM and Air Staff users to support the FY2021 PB build - Migrated Legacy system historical data into PBES module (ETT, RAPIDS, ASARS, ABIDES) <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Deliver expanded programming/budgeting capability to MAJCOM to support FY2021 PB inputs to Air Staff - Deliver final Sprints 12-14 (Fidelity of programming and budget functions) for test and fielding - Complete 2 Limited Deployments and pursue Authority to Proceed with Milestone Decision Authority - Deliver patches as needed to correct system deficiencies or upgrades required - Continue PBES acquisition planning, reporting, and execution activities - Continue to make updates to system design, configuration, test, and training - Continue to satisfy risk management framework (RMF) controls needed for ATO <p>FY 2021 Base Plans:</p> <ul style="list-style-type: none"> - Will deliver additional development Sprints 15-22 (Expanded Planning, Program, and Budget capabilities) for test and fielding - Will complete Full Deployment Authority to Proceed with Milestone Decision Authority - Will deliver patches as needed to correct system deficiencies or upgrades required - Will continue PBES acquisition planning, reporting, and execution activities - Will continue to make updates to system design, configuration, test, and training - Will continue to satisfy risk management framework (RMF) controls needed for ATO <p>FY 2021 OCO Plans:</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 672222 / <i>Program Budget Enterprise Service (PBES)</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: Changes reflect ramp down toward contract completion					
Accomplishments/Planned Programs Subtotals	15.346	4.359	1.967	0.000	1.967

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPAF 03 834010: <i>General Information Technology</i>	5.386	1.966	0.695	-	0.695	0.000	0.000	-	-	0.000	8.047

Remarks

D. Acquisition Strategy
PBES is a Business Category (BCAT) III program following DOD 5000.75 BCAC policy. The PBES strategy, supported by all Stakeholders, employed an empowered joint Program Office, Functional Community, and Senior Stakeholder group to rapidly develop, test, and deploy the Air Forces Planning, Programming, Budgeting, and Execution (PPBE) capability within two years. This strategy required mutual trust and risk acceptance by all parties to be successful. Thus far, this strategy has been highly successful delivering PBES capabilities ahead of schedule and substantially under budget.

The first step in this strategy utilized early risk reduction efforts (sometimes referred to as "prototyping") to prove the capability and contractors existed to meet user's needs. This was conducted using two 6-month contract vehicles which were both completed months early, delivering several hundred user requirements. The success of these efforts led to the strategy of selecting a COTS product called Oracle Hyperion and to hire a small-business system integrator (SI). The significance in both of these is that the COTS product and the SI have both already been deployed across commercial companies and multiple DoD agencies, thus reducing the risk for implementation by the Government.

Both contract awards for the SI and Oracle licenses were made in 1QFY2018, with substantial cost savings received by negotiating bulk license purchases for all AF users. The development strategy employs agile development methods creating 4-6 week "Sprint" releases to deploy capability rapidly with substantial user feedback along the way. Fourteen total Sprints were planned across two years in an attempt to match on-going Air Force PPBE cycles. As Sprints are developed and tested, they are then deployed for operational use.

MAJCOMs will first use PBES in October 2019, for their FY2022 POM development and then submit their budget requests up to the Air Staff for their review and creation of the Air Force FY2022 POM. Air Staff will primarily use PBES over the legacy system in April 2020, with continued use throughout the FY2022 POM cycle. In

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity	R-1 Program Element (Number/Name)	Project (Number/Name)
3600 / 7	PE 0901538F / <i>Financial Management Information Systems Development</i>	672222 / <i>Program Budget Enterprise Service (PBES)</i>

FY2018, the AF decided to accelerate the PBES Planning application, so AF Planners will first use PBES for the FY2022 Plan creation in Feb 2020. While PBES will be continually updated throughout these two years, it is also the strategy to migrate all legacy system data into PBES in manageable packages across the two years.

Full deployment of PBES is on schedule to be completed in 2QFY2021. The success of this strategy can be attributed to mutual buy-in by all parties, risk acceptance that the solution will not be perfect from the start, and an understanding that not all requirements are exactly known up-front and that changes will be required continuously to be successful.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 672222 / <i>Program Budget Enterprise Service (PBES)</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PBES Systems Integrator	C/FFP	AFLCMC : Maxwell-Gunter AFB, AL	0.000	7.896	Dec 2018	1.675	Dec 2019	0.564	Dec 2020	-		0.564	Continuing	Continuing	-
Architecture	C/Variou	Bowhead Technology : Alexandria, VA	0.000	0.115	Mar 2019	0.126	Mar 2020	-		-		-	0.000	0.241	-
Subtotal			0.000	8.011		1.801		0.564		-		0.564	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PBES DEV/TEST Hosting	MIPR	HEDC : Hill AFB, UT	0.000	2.503	Sep 2019	1.260	Sep 2020	1.403	Apr 2021	-		1.403	Continuing	Continuing	-
PMO Technical/SME Support	C/FFP	TACG : Beavercreek, OH	0.000	1.140	May 2019	0.780	May 2020	-		-		-	0.000	1.920	-
Cyber Security Analyst DDC-IT	C/FFP	DDC IT Services : Albuquerque, NM	0.000	0.139	Mar 2019	0.169	Mar 2020	-		-		-	0.000	0.308	-
Subtotal			0.000	3.782		2.209		1.403		-		1.403	Continuing	Continuing	N/A

Remarks
Hill AFB Enterprise Data Center

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Support	MIPR	96 Test Wing : Eglin AFB, FL	0.000	0.083	Apr 2019	0.092	Dec 2019	-		-		-	0.000	0.175	-
Subtotal			0.000	0.083		0.092		-		-		-	0.000	0.175	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 672222 / <i>Program Budget Enterprise Service (PBES)</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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 Budget Enterprise Service	
System Integrator Contract Award	
Develop/Modify Air Staff Application	
Load of Legacy System Data	
Develop/Modify MAJCOM Application	
Develop/Modify Planning Application	
Limited Deployment Decision #2 (release MAJCOM app)	
Limited Deployment Decision #3 (release PBES data outside AF)	
Limited Deployment Decision #4 (release final MAJCOM, Program & Budget Requests)	
Limited Deployment Decision #5 (release Reporting, Data Warehouse & FSDM)	
Full Deployment Decision (fully deploy PBES & authorize Legacy sys shutdown)	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 672222 / <i>Program Budget Enterprise Service (PBES)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Program Budget Enterprise Service				
System Integrator Contract Award	1	2019	1	2021
Develop/Modify Air Staff Application	1	2019	1	2021
Load of Legacy System Data	4	2019	4	2019
Develop/Modify MAJCOM Application	1	2019	4	2019
Develop/Modify Planning Application	1	2019	2	2020
Limited Deployment Decision #2 (release MAJCOM app)	1	2019	1	2019
Limited Deployment Decision #3 (release PBES data outside AF)	4	2019	4	2019
Limited Deployment Decision #4 (release final MAJCOM, Program & Budget Requests)	2	2020	2	2020
Limited Deployment Decision #5 (release Reporting, Data Warehouse & FSDM)	3	2020	3	2020
Full Deployment Decision (fully deploy PBES & authorize Legacy sys shutdown)	2	2021	2	2021

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>					Project (Number/Name) 675177 / <i>Cost Estimating Modeling (CEM)</i>		
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675177: <i>Cost Estimating Modeling (CEM)</i>	0.000	4.773	4.964	5.039	0.000	5.039	5.144	5.236	5.329	5.428	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Cost Estimating Modeling (CEM) provides and enhances Air Force-wide cost estimating capabilities by developing current cost data and estimating methods and tools, data process reengineering, data structure development, and gap filling initiatives. In collaboration with the OSD Cost Assessment Data Enterprise (CADE) project (DoD's unified initiative to collect, organize, store, and use data more efficiently), these products will improve the quality, timeliness, and effectiveness of the acquisition program cost estimates required by statute (e.g., 10 USC 2366, 2433, 2434) and policy directives (e.g., DoDI 5000.02) in support of AF and DoD acquisition decisions, programming and execution decisions, and Congressional mandates.

CEM will ensure the Air Force continuously improves cost estimating capabilities for broad cross-cutting areas, as well as specific to each weapon system type (aircraft, UAVs, ballistic missiles, tactical missiles, munitions, electronics and aircraft modifications, ground stations and automated information systems, space and launch vehicles). Changing technologies, acquisition laws, policy directives, and initiatives drive the need to revise cost estimating processes, methods, and tools. For example, current capability shortfalls reflect gaps in the ability to respond effectively to the laws and regulations that drive increased cost estimating demands such as FY16/17/18 NDAA reports (PL 114-92/114-328/115-91--provisions relating to Major Defense Acquisition Programs (Section 804 of the FY16 NDAA authorized rapid prototyping and rapid fielding of defense systems), Weapon System Acquisition Reform Act (WSARA) (provisions related to improving cost estimating quality, especially earlier in the program life-cycle and affordability analysis), Secretary of the Air Force Acquisition Excellence Plan (priorities to improve cost estimating capability and affordability analysis and improved cost estimating support to requirements process), and Office of the Secretary of Defense policy (initiatives on enhanced trade-off analysis, affordability analysis, and will- versus should-cost analysis). The CADE and CEM partnership is the lead example for better data initiatives designed as a response to Congressional expressed desire for better outcomes in acquisition. The partnership provides data/analysis/methods/tools and institutional knowledge at the analysts' fingertips versus the status quo inefficient, ad hoc approach.

This project will perform knowledge-based studies to include analyzing historical data and changing technologies/programmatics to develop new estimating methods (e.g. statistical tools, cost estimating relationships) across hundreds of product work breakdown structure elements and functional cost elements within each weapon system type noted above. Examples of areas of cost studies and modeling efforts that cut across all weapon system types are directed energy costs, software cost datasets and metrics; contract or engineering change order studies, analysis, and models; other government cost data, methods, and analysis tools (e.g., depot standup and government test); reliability and maintainability trends and impacts on cost; and fixed price contract performance.

CEM will deliver valuable analytical tools in support of higher quality/credible estimates (as required by statute and regulation) allowing for more realistic cost conscious decisions on over \$100B of critical warfighter capability.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675177 / <i>Cost Estimating Modeling (CEM)</i>
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This program element may include necessary civilian pay expenses required to manage, execute, and deliver financial management information system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>Title: CEM</p> <p>Description: Perform knowledge-based studies (KBS) — Develop/modernize cost data, data collection process improvements, collect and analyze data to develop new estimating methods (e.g. statistical tools, cost estimating relationships (CERs)), and perform other gap filling studies for aircraft, UAVs, ballistic and tactical missiles, munitions, electronics and aircraft modifications, ground stations and automated information systems, space, launch vehicles, and cross-cutting areas.</p> <p>FY19 ACCOMPLISHMENTS:</p> <ul style="list-style-type: none"> - Completed studies in the areas of electronic warfare, space systems O&S, advanced materials and manufacturing processes, joint cost analysis research, ECO, common computing environments (cloud), agile, cybersecurity, ground radios/terminals - Completed several data collection process reforms <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continue to collect historical program data to fill gaps against defined data collection requirements from previous year efforts and integrate historical data collected into CADE system for central access to all DoD - Develop normalized data sets, benchmark metrics, and cost estimating methods/analytical tools with recent data collections - Continue studies started in FY17/18/19 and begin in areas such as advanced engines, O&S shortfalls cost, and tie depot workshare to cost - Continue to work with OSD CADE team to implement data design and structure requirements and visual analysis tool requirements into CADE system - Conduct weekly reviews with technical/cost teams and quarterly contractor progress reviews with entire government cost community <p>FY 2021 Base Plans:</p> <ul style="list-style-type: none"> - Will continue to collect historical program data to fill gaps against defined data collection requirements from previous year efforts and integrate historical data collected into CADE system for central access to all DoD - Will develop normalized data sets, benchmark metrics, and cost estimating methods/analytical tools with recent data collections 	4.773	4.964	5.039	-	5.039

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675177 / <i>Cost Estimating Modeling (CEM)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Will continue studies started in FY17/18/19/20 and begin in areas that are topical/timely or surface from prior research - Will continue to work with OSD CADE team to implement data design and structure requirements and visual analysis tool requirements into CADE system - Will conduct weekly reviews with technical/cost teams and quarterly contractor progress reviews with entire government cost community FY 2020 to FY 2021 Increase/Decrease Statement: Inflationary Adjustment					
Accomplishments/Planned Programs Subtotals	4.773	4.964	5.039	-	5.039

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

N/A

D. Acquisition Strategy

Contracts are expected to be firm-fixed price and/or cost plus, and will be awarded through full and open competition and follow Federal Acquisition Regulations (FAR) guidelines. Headquarters Air Force will provide contract management oversight and direction. Contracted knowledge-based studies progress will be reviewed on a quarterly basis and adjusted as appropriate.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675177 / <i>Cost Estimating Modeling (CEM)</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

CEM	
Commodity Specific KBS Activities	
Populate Data Templates w/ Commodity Specific KBS findings (ongoing)	
Develop CERs/Estimating Tools/Models	
Data / CERs / Tools / Models Deliverables (Feb 2019)	■
Data / CERs / Tools / Models Deliverables (Sep 2019)	■
Data / CERs / Tools / Models Deliverables (Feb 2020)	■
Data / CERs / Tools / Models Deliverables (Sep 2020)	■
Data / CERs / Tools / Models Deliverables (Feb 2021)	■
Data / CERs / Tools / Models Deliverables (Sep 2021)	■
Data / CERs / Tools / Models Deliverables (Feb 2022)	■
Data / CERs / Tools / Models Deliverables (Sep 2022)	■
Data / CERs / Tools / Models Deliverables (Feb 2023)	■
Data / CERs / Tools / Models Deliverables (Sep 2023)	■
Data / CERs / Tools / Models Deliverables (Feb 2024)	■

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675177 / <i>Cost Estimating Modeling (CEM)</i>
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

Data / CERs / Tools / Models Deliverables (Sep 2024)	■																											
Data / CERs / Tools / Models Deliverables (Feb 2025)	■																											
Data / CERs / Tools / Models Deliverables (Sep 2025)	■																											
Quarterly KBS Progress Reviews																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675177 / <i>Cost Estimating Modeling (CEM)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
CEM				
Commodity Specific KBS Activities	1	2019	4	2025
Populate Data Templates w/ Commodity Specific KBS findings (ongoing)	1	2019	4	2025
Develop CERs/Estimating Tools/Models	1	2019	4	2025
Data / CERs / Tools / Models Deliverables (Feb 2019)	2	2019	2	2019
Data / CERs / Tools / Models Deliverables (Sep 2019)	4	2019	4	2019
Data / CERs / Tools / Models Deliverables (Feb 2020)	2	2020	2	2020
Data / CERs / Tools / Models Deliverables (Sep 2020)	4	2020	4	2020
Data / CERs / Tools / Models Deliverables (Feb 2021)	2	2021	2	2021
Data / CERs / Tools / Models Deliverables (Sep 2021)	4	2021	4	2021
Data / CERs / Tools / Models Deliverables (Feb 2022)	2	2022	2	2022
Data / CERs / Tools / Models Deliverables (Sep 2022)	4	2022	4	2022
Data / CERs / Tools / Models Deliverables (Feb 2023)	2	2023	2	2023
Data / CERs / Tools / Models Deliverables (Sep 2023)	4	2023	4	2023
Data / CERs / Tools / Models Deliverables (Feb 2024)	2	2024	2	2024
Data / CERs / Tools / Models Deliverables (Sep 2024)	4	2024	4	2024
Data / CERs / Tools / Models Deliverables (Feb 2025)	2	2025	2	2025
Data / CERs / Tools / Models Deliverables (Sep 2025)	4	2025	4	2025
Quarterly KBS Progress Reviews	1	2019	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>				Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675178: <i>DEAMS Continuous Capability Development</i>	0.000	5.500	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	5.500
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2020, PE 0901554F, DEAMS, changed from PE 0901538F, Financial Management Information Systems Development.
 In FY2020, Project 675178, DEAMS Continuous Capability Development, changed from Defense Enterprise Accounting Management System Increment 2 (DEAMS Inc. 2).

A. Mission Description and Budget Item Justification

Defense Enterprise Accounting and Management System (DEAMS) is a commercial-off-the-shelf (COTS), Oracle-based software implementation effort that will provide an auditable, modern accounting and finance system. DEAMS is a Joint United States Air Force (USAF) and United States Transportation Command (USTRANSCOM) Enterprise Resource Planning (ERP) Program that will replace many existing accounting and finance legacy systems and will provide core funds execution management functions consistent with financial management laws, regulations and policy, general ledger, funds management, payments, receivables, cost and revenues, and fiduciary reporting. DEAMS is compliant with the Clinger-Cohen Act, Business Enterprise Architecture (BEA), and integrates into Global Combat Support System-Air Force (GCSS-AF). When fully deployed, DEAMS will be key to Air Force compliance with the Financial Improvement and Audit Readiness (FIAR) requirement in the 2010 NDAA.

The remaining DEAMS Increment 1 development activities will be completed using agile software development methodologies under a project called DEAMS Rapid Acquisition. As a Section 873 Agile Pilot program, Rapid Acquisition will also be a stepping stone in the implementation of agile development methodologies for DEAMS Continuous Capability Development (CCD). Under Rapid Acquisition, the program contracted with a new System Integrator (SI) to sustain the DEAMS R12 baseline, develop the remaining Inc. 1 requirements (disbursing, reporting, Governance/Risk/Compliance (GRC)), and provide continual enhancement and improvement to the deployed system, utilizing agile software development.

DEAMS CCD capabilities will be implemented utilizing an agile software development methodology. Requirements for CCD include, but are not limited to, development of the core accounting and reporting functionality necessary to enable deployment of modernized personnel, contracting, and logistics systems. Additional capabilities under requirements definition include complex acquisition management, reimbursable cost accounting, military entitlement accounting, advanced accounting controls and audit sustainment, treasury cash accountability, and management accounting and billing for revolving funds. Included in these capabilities are selected requirements deferred from Increment 1.

Requirements will be addressed through an iterative process of sprint development cycles, where usable capability is produced after every sprint. The PMO 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>

Additional user deployments enabled by future increment capabilities include acquisition program executive offices; ranges, laboratories and test centers; and air logistics centers. These deployments will add an additional 4,600 users to the Inc 1 baseline for a total of 22,500 users.

This funding request will support development of the Business Capability Acquisition Cycle (BCAC) compliance information artifacts and plans necessary to support the program, Capability Process Maps (CPMs) for each business capability, and mapping of financial management processes the capability will require (Blueprinting). Additionally, the funding will support acquisition strategy planning by early identification/definition of Information Technology Functional Requirements (ITFRs) and Information Assets (IA), Acquisition Strategy Determination, Solution Approach, and Request for Proposal (RFP) preparation.

Funds may be used to develop, acquire, and integrate hardware and software solutions to provide improvements and enhancements in support of the development of the DEAMS capabilities.

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 financial management information system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: DEAMS Continuous Capability Development (CCD) Product Development	5.500	0.000	-	-	-
Description: DEAMS CCD system capabilities will be developed and enhanced through completion of development sprint cycles in accordance with an agile software development strategy. DEAMS expects to leverage lessons learned during the Increment I rapid acquisition to develop a T&E process that is more complimentary to the Agile software development process. Development activities include requirements analysis, design, build, test, data conversion, cut-over from legacy systems, and the resolution of deficiency reports and defects. Also includes the support services (product development support, solution architecture support, configuration control and management support, quality assurance support, acquisition strategy support, test planning support, and cybersecurity support) of various Advisory and Assistance Services (A&ASs), Program Management Administration (PMA) activities, and Federally Funded Research and Development Centers (FFRDCs).					
FY2019 ACCOMPLISHMENTS - Formed Integrated Product Team (IPT) and started planning for follow-on acquisition of System Integrator post Inc 1 completion					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
- Procured resources (EN, DBAs Testers and FMO Integration) needed as DEAMS transitions to agile software development - Initiated planning for infrastructure/architecture modernization FY 2020 Plans: See new PE 0901554F FY 2020 to FY 2021 Increase/Decrease Statement: Funding moved to PE 091554 after FY19					
Accomplishments/Planned Programs Subtotals	5.500	0.000	-	-	-

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	<u>Cost To Complete</u>	<u>Total Cost</u>
• OPAF 03 834470: <i>Defense Enterprise Accounting & Mgt Sys</i>	0.802	1.905	0.899	-	0.899	3.104	3.158	3.215	3.274	Continuing	Continuing

Remarks

D. Acquisition Strategy

The DEAMS Continuous Capability Development (CCD) acquisition strategy will leverage experience gained from FY2019 NDAA Section 869 Pilot Program activities and from agile software development efforts in Increment 1. CCD will be implemented using an agile methodology approach following the Business Capability Acquisition Cycle (BCAC). DEAMS will be in the Capability Sustainment Phase 5 (per DOD Instruction 5000.75) and will conduct continual enhancement/process improvements for the life of the program. DEAMS will continue technical support services for requirements definition and analysis and System Integrator request for proposal (RFP) development, and continue acquisition planning and support for first set of agile development epics supporting CCD system capabilities.

CCD will deliver functionality at earliest opportunity on a stable Increment 1 baseline. User experience and mission impact will be taken into account when establishing the release battle rhythm to the operational system. Factors for software releases include:

- Budget formulation and justification cycles
- End of year financial closeout
- Interdependencies with enterprise business systems
- Higher DOD requirements
- On-going development efforts with LOG-IT, CON-IT, MRO, AFIPPS, and other legacy systems
- Interfaces/data standards changes

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>
- Changes to hosting, deployment technologies, or strategies to optimize system security, performance, and cost savings		

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

DEAMS	
Acquisition Planning	[REDACTED]
Agile Software Development Contract Award	[REDACTED]
Continuous Capability Development	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
DEAMS				
Acquisition Planning	1	2019	1	2021
Agile Software Development Contract Award	3	2020	2	2021
Continuous Capability Development	2	2021	4	2024

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>				Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675179: <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>	0.000	60.959	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	60.959
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2020, PE 0901554F, DEAMS, changes from PE 0901538F, Financial Management Information Systems Development.

A. Mission Description and Budget Item Justification

Defense Enterprise Accounting and Management System (DEAMS) is a commercial-off-the-shelf (COTS), Oracle-based software implementation effort that will provide an auditable, modern accounting and finance system. DEAMS is a Joint United States Air Force (USAF) and United States Transportation Command (USTRANSCOM) Enterprise Resource Planning (ERP) Program that will replace many existing accounting and finance legacy systems and will provide core funds execution management functions consistent with financial management laws, regulations and policy, general ledger, funds management, payments, receivables, cost and revenues, and fiduciary reporting. DEAMS is compliant with the Clinger-Cohen Act, Business Enterprise Architecture (BEA), and integrates into Global Combat Support System-Air Force (GCSS-AF). When fully deployed, DEAMS will be key to Air Force compliance with the Financial Improvement and Audit Readiness (FIAR) requirement in the 2010 NDAA.

DEAMS user deployments include:

- Air Mobility Command (AMC) without Transportation Working Capital Funds (TWCF)
- AMC with TWCF, in conjunction with Defense Finance and Accounting Service (DFAS) Rome
- Air Combat Command (ACC) and Air Force Global Strike Command (AFGSC)
- Air Force Reserve Command (AFRC), and Air National Guard (ANG) and other Geographically Separated Units (GSUs) to include DFAS Limestone, Air Force District of Washington (AFDW), Air Force Special Operations Command (AFSOC), U.S. Air Force Academy (USAFA), Pacific Air Forces (PACAF), and DFAS Japan
- U. S. Air Forces in Europe (USAFE), DFAS Europe, and Air Education and Training Command (AETC), Joint Base San Antonio
- Air Force Material Command (AFMC) and Air Force Space Command (AFSPC) (Incremental Deployments)
- Remaining DFAS locations and all other GSUs

On 23 January 2017, the senior official provided the Critical Change Report (CCR) with certifications to Congress. The report recommended a restructure of DEAMS from one increment to multiple increment. The Milestone Decision Authority (MDA) approved the restructured program for DEAMS Inc 1, to include deferring certain requirements to future increments, a limited deployment to an additional 700 users for Inc 1 to United States Air Force in Europe (USAFE), and the updated Full Deployment Authority to Proceed (FD ATP) criteria via an Acquisition Decision Memorandum (ADM) dated 2 June 2017. (FD ATP date is August 2020 and Capability Support Authority to Proceed (CS ATP) date is February 2021.)

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>

The remaining DEAMS Inc 1 schedule includes the Oracle e-Business Suite R12 upgrade and development and deployment of the remaining Increment 1 capabilities (disbursing, reporting, and Governance/Risk/Compliance (GRC)), as well as enhancements and improvements to the existing baseline. In accordance with the FY2019 NDAA, DEAMS is an Agile Pilot program as defined in Sec 873 of the FY2018 NDAA, and all remaining development will be accomplished using agile software development methodologies.

DEAMS Inc 1 is developing capability which allows for deployment to the remaining user locations. However, DEAMS has also begun transitioning the support of previously deployed locations to the Operation and Support (O&S) phase.

Funds may be used to develop, acquire, and integrate hardware and software solutions to provide improvements and enhancements in support of the development of the DEAMS capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver financial management information system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Product Development	60.428	0.000	-	-	-
<p>Description: DEAMS Inc 1 capability development activities support multiple software releases and user deployments as described in the mission description. Development activities include design, build, test, data conversion, reporting, cutover from legacy systems, and the resolution of deficiency reports and defects. Activities also include hardware support (system administration and database security) and storage service by Defense Information Systems Agency (DISA); continued development of interface to Global Combat Support System - Air Force (GCSS-AF); Enterprise Resource Planning (ERP) Common Computing Environment (CCE); Independent Verification and Validation (IV&V); Developmental Release Field Support (DRFS) to include process execution and data scripts; help desk support; Engineering Integration Services (EIS) for oversight of development tools and processes; deployment training and change management activities. Provides acquisition, contract, finance, and cost management planning and Program Management Administration (PMA) utilizing an agile approach for reporting, disbursing, and auditing initiatives.</p> <p>Develop, using an Agile software development approach, the Disbursing Initiative (includes modernizing disbursing and implementing daily reconciliation with the U.S. Treasury, which will manage the receipt and acceptance of agreements, orders, and invoices), the Reporting Initiative (establish a modernized Business Intelligence reporting solution), and the Segregation of Duties (SOD) Initiative (allow DEAMS to meet regulatory compliance requirements associated with Financial Information System Controls Audit Manual (FISCAM)).</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>FY2019 ACCOMPLISHMENTS</p> <ul style="list-style-type: none"> - Completed planned FY2019 deployment of DEAMS to 800 personnel at 10 locations, bringing total users to 15,500 - Awarded contract for Agile software development for remaining Increment 1 capabilities, in accordance with Sec 873 of the FY2018 NDAA - Awarded contracts for development, test, and training environments with the Oracle Federal Managed Cloud Services, for all Agile software development on DEAMS - Awarded bridge contract for R12 upgrade to continue developmental testing and defect correction while contract for new System Integrator was finalized - Successful FY2019 end of year closeout <p>FY 2020 Plans: See new PE 0901554F</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Funding moved to PE 091554 after FY19</p>					
<p>Title: Test and Evaluation (T&E)</p> <p>Description: The T&E process will be a complete system operational test to determine DEAMS effectiveness, suitability, and mission capability using the R12 Upgrade. It begins with validation of requirements and end to end functional capabilities including compliance mandates. The T&E effort are conducted in developer sites, Air Force test sites, DISA production sites, and user locations. The DEAMS Test and Evaluation Master Plan (TEMP), Lead Developmental Test Organization (LDTO) Integrated Test Plan (ITP), System Integrators (SIs) Software Test Plans (STPs), and Operational Test Agency (OTA) operational test plans covers the details of Increment 1 T&E. Database Administrator (DBA) Test Support required to service test instances. Capabilities Integration Environment (CIE) Integration/Development support for ancillary Test activities required. Hardware and software required for test activities.</p> <p>The T&E effort for the Agile Pilot Program includes Sprint Testing where functionality developed code in the sprint is tested for conformance to functional and non-functional requirements. Sprint Testing shall address unit and integrated testing. Additionally, there will be Regression Testing to validate that the work within the sprint</p>	0.531	0.000	-	-	-

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
has not introduced defects into areas of the product not directly impacted by the work of the sprint and has not introduced defects into cross-product dependencies such as interfaces.					
FY 2020 Plans: See new PE 0901554F					
FY 2020 to FY 2021 Increase/Decrease Statement: Funding moved to PE 091554 after FY19					
Accomplishments/Planned Programs Subtotals	60.959	0.000	-	-	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• OPAF 03 834470: <i>Defense Enterprise Accounting and Mgmt System</i>	0.802	1.905	0.899	-	0.899	3.104	3.158	3.215	3.274	Continuing	Continuing

Remarks

D. Acquisition Strategy

DEAMS Inc 1 is over 87% deployed as the baseline viable product for the AF operational finance community. The program relies on heavy customer involvement through the functional management office to govern system changes, requirements development, and day-to-day customer support. DEAMS will employ multiple contract actions as the various Development Activities and Releases are developed, tested, and deployed through FY 2020.

DEAMS Inc 1 accelerated deployment to Air Combat Command (ACC), Air Education & Training Command (AETC), and AF Reserve Command (AFRC) tenant users from FY2020 to FY2019. This user base was orphaned from ACC, AETC, and AFRC because they reside on bases owned by other Major Commands.

AF Space Command and AF Materiel Command Incremental users at the base operations level will migrate to DEAMS Inc 1 capability in FY2020 as planned.

In the FY2019 NDAA, DEAMS was selected as an FY2018 NDAA Sec 873 Agile Pilot program. To facilitate the transition from traditional to agile software development, Increment 1 development items will be completed under a new rapid acquisition contract action using agile software development methods. This new effort will also inform and facilitate the agile program implementation for DEAMS Continuous Capability Development.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020				
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>				Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>							

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
DEAMS DRFS (Post Production Support, Level 2/3 Help Desk Support), System Stabilization, Design, Blueprint, Code, Development tools/ processes, etc.	C/FFP	Accenture Federal Services LLC : Various	0.000	2.828	Oct 2018	-		-		-		-	0.000	2.828	-
DEAMS: Direct Mission Support (Development/ Integration Environments)	Various	Various : Various	0.000	6.772	Oct 2018	-		-		-		-	0.000	6.772	-
DEAMS FFRDC ERP Engineering	C/Various	The MITRE Corporation : Various	0.000	1.390	Oct 2018	-		-		-		-	0.000	1.390	-
DEAMS: Rapid Acquisition	C/CPAF	CACI-ISS, INC : Chantilly, VA	0.000	43.448	Apr 2019	-		-		-		-	0.000	43.448	-
DEAMS: ERP DBA Development and Support Services	C/FFP	DDC IT Services : Albuquerque, NM	0.000	1.090	Feb 2019	-		-		-		-	0.000	1.090	-
Subtotal			0.000	55.528		-		-		-		-	0.000	55.528	N/A

Remarks
 DRFS: Developmental Release Field Support
 ERP: Enterprise Resource Planning
 FFRDC: Federally Funded Research and Development Center
 SME: Subject Matter Expert

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020				
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>				Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>							

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DEAMS: Test services from AFOTEC, JITC, LDTO and other miscellaneous test resources	MIPR	Various : Various	0.000	0.531	Oct 2018	-		-		-		-	0.000	0.531	-
Subtotal			0.000	0.531		-		-		-		-	0.000	0.531	N/A

Remarks

AFOTEC: Air Force Operational Test and Evaluation Center
 JITC: Joint Interoperability Test Command
 LDTO: Lead Developmental Test Organization

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
DEAMS:Program Management Administration	Various	AFLCMC : Wright-Patterson AFB, OH	0.000	4.900	Oct 2018	-		-		-		-	0.000	4.900	-
Subtotal			0.000	4.900		-		-		-		-	0.000	4.900	N/A

Remarks

A&AS: Advisory & Assistance Services

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		0.000	60.959	0.000	-	-	-	0.000	60.959	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

DEAMS	
DEAMS Inc 1, Software Change Requests	[REDACTED]
DEAMS Inc 1, R12 Software Baseline Development	[REDACTED]
DEAMS Inc 1, Reporting	[REDACTED]
DEAMS Inc 1, Disbursing	[REDACTED]
DEAMS Inc 1, Auditing	[REDACTED]
Deploy DEAMS Inc 1 Capability	[REDACTED]
DEAMS Inc 1, Follow-on Operational Test and Evaluation (FOT&E)	[REDACTED]
DEAMS Inc 1, Full Deployment Authority to Proceed	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901538F / <i>Financial Management Information Systems Development</i>	Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
DEAMS				
DEAMS Inc 1, Software Change Requests	1	2019	3	2021
DEAMS Inc 1, R12 Software Baseline Development	1	2019	1	2020
DEAMS Inc 1, Reporting	3	2019	3	2021
DEAMS Inc 1, Disbursing	3	2019	3	2021
DEAMS Inc 1, Auditing	3	2019	3	2021
Deploy DEAMS Inc 1 Capability	1	2019	4	2020
DEAMS Inc 1, Follow-on Operational Test and Evaluation (FOT&E)	1	2020	3	2020
DEAMS Inc 1, Full Deployment Authority to Proceed	4	2020	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	46.789	45.638	0.000	45.638	55.067	49.973	50.866	51.802	Continuing	Continuing
675178: <i>DEAMS Continuous Capability Development</i>	-	0.000	14.895	45.638	0.000	45.638	55.067	49.973	50.866	51.802	Continuing	Continuing
675179: <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>	-	0.000	31.894	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	31.894

Note
 In FY2020, PE 0901554F, DEAMS, changed from PE 0901538F, Financial Management Information Systems Development.
 In FY2020, Project 675178, DEAMS Continuous Capability Development, changed from Defense Enterprise Accounting Management System Increment 2 (DEAMS Inc. 2).

A. Mission Description and Budget Item Justification

This program element develops upgrades to existing financial management systems. These upgrades are required to comply with auditability and transparency requirements as well as efficiencies in processing financial transactions. This program element also supports studies and analysis to improve future program planning and execution.

There are two projects within this program element: Defense Enterprise Accounting and Management System (DEAMS) Increment 1 (Inc 1), and DEAMS Continuous Capability Development (CCD), formerly known as DEAMS Increment 2. Project 675178: DEAMS Continuous Capability Development (CCD) started in FY2019 under PE 0901538F. Project 675179: DEAMS Increment 1 was under PE 0901538F through FY2019.

The Defense Enterprise Accounting and Management System (DEAMS) is a commercial-off-the-shelf (COTS), Oracle-based software implementation effort that will provide an auditable, modern accounting and finance system. The DEAMS implementation will replace many existing accounting and finance legacy systems and will provide core funds execution management functions consistent with financial management laws, regulations and policy, general ledger, funds management, payments, receivables, cost and revenues, and fiduciary reporting. DEAMS is compliant with the Clinger-Cohen Act, Business Enterprise Architecture (BEA), and integrates into Global Combat Support System-Air Force (GCSS-AF). DEAMS is a key enabler and provides the core accounting system for all enterprise business system development necessary to sustain financial statement auditability.

DEAMS enhancements will be governed in Capability Support Phase after Increment 1 Full Deployment (FD).

DEAMS is the Air Force's target core accounting and financial management solution and is a key component of the long-term business process improvements needed to sustain auditability and correct financial system weaknesses.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>
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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 accounting and financial management capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

The FY 2021 funding request was reduced by \$11.378 million to account for the availability of prior year execution balances.

This requirement supports performance of a full financial audit as required by title 10 U.S.C. Chapter 9A, Sec 240-D.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	46.789	57.016	0.000	57.016
Current President's Budget	0.000	46.789	45.638	0.000	45.638
Total Adjustments	0.000	0.000	-11.378	0.000	-11.378
• 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	-11.378	0.000	-11.378

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>				Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675178: <i>DEAMS Continuous Capability Development</i>	-	0.000	14.895	45.638	0.000	45.638	55.067	49.973	50.866	51.802	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2020, PE 0901554F, DEAMS, changed from PE 0901538F, Financial Management Information Systems Development.
 In FY2020, Project 675178, DEAMS Continuous Capability Development, changed from Defense Enterprise Accounting Management System Increment 2 (DEAMS Inc. 2).

A. Mission Description and Budget Item Justification

Defense Enterprise Accounting and Management System (DEAMS) is a commercial-off-the-shelf (COTS), Oracle-based software implementation effort that will provide an auditable, modern accounting and finance system. DEAMS is a Joint United States Air Force (USAF) and United States Transportation Command (USTRANSCOM) Enterprise Resource Planning (ERP) Program that will replace many existing accounting and finance legacy systems and will provide core funds execution management functions consistent with financial management laws, regulations and policy, general ledger, funds management, payments, receivables, cost and revenues, and fiduciary reporting. DEAMS is compliant with the Clinger-Cohen Act, Business Enterprise Architecture (BEA), and integrates into Global Combat Support System-Air Force (GCSS-AF). When fully deployed, DEAMS will be key to Air Force compliance with the Financial Improvement and Audit Readiness (FIAR) requirement in the 2010 NDAA.

The remaining DEAMS Increment 1 development activities will be completed using agile software development methodologies under a project called DEAMS Rapid Acquisition. In FY2019, DEAMS CCD was added to the FY2018 NDAA, as a Section 873 Agile Pilot program; Rapid Acquisition will also be a stepping stone in the implementation of agile development methodologies for DEAMS Continuous Capability Development (CCD). Under Rapid Acquisition, the program contracted with a new System Integrator (SI) to sustain the DEAMS R12 baseline, develop the remaining Inc. 1 requirements (disbursing, reporting, Governance/Risk/Compliance (GRC)), and provide continual enhancement and improvement to the deployed system, utilizing agile software development.

DEAMS CCD capabilities will be implemented utilizing an agile software development methodology. Requirements for CCD include, but are not limited to, development of the core accounting and reporting functionality necessary to enable deployment of modernized personnel, contracting, and logistics systems. Additional capabilities under requirements definition include complex acquisition management, reimbursable cost accounting, military entitlement accounting, advanced accounting controls and audit sustainment, treasury cash accountability, and management accounting and billing for revolving funds. Included in these capabilities are selected requirements deferred from Increment 1.

Requirements will be addressed through an iterative process of sprint development cycles, where usable capability is produced after every sprint. The PMO 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.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>	Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>

Additional user deployments enabled by future increment capabilities include acquisition program executive offices; ranges, laboratories and test centers; and air logistics centers. These deployments will add an additional 4,600 users to Inc 1 baseline for a total of 22,500 users.

This funding request will support development of the Business Capability Acquisition Cycle (BCAC) compliant information artifacts and plans necessary to support the program, Capability Process Maps (CPMs) for each business capability, and mapping of financial management processes the capability will require (Blueprinting). Additionally, the funding will support acquisition strategy planning by early identification/definition of Information Technology Functional Requirements (ITFRs) and Information Assets (IA), Acquisition Strategy Determination, Solution Approach, and Request for Proposal (RFP) preparation.

Funds may be used to develop, acquire, and integrate hardware and software solutions to provide improvements and enhancements in support of the development of the DEAMS capabilities. Additional activities also include studies and analysis to support both program planning and execution.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver accounting and financial management capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: DEAMS Continuous Capability Development (CCD) Product Development	0.000	14.895	45.138
<p>Description: DEAMS CCD system capabilities will be developed and enhanced through completion of development sprint cycles in accordance with an agile software development strategy. DEAMS expects to leverage lessons learned during the Increment I rapid acquisition to develop a T&E process that is more complimentary to the Agile software development process. Development activities include requirements analysis, design, build, test, data conversion, cut-over from legacy systems, and the resolution of deficiency reports and defects. Also includes the support services (product development support, solution architecture support, configuration control and management support, quality assurance support, acquisition strategy support, test planning support, and cybersecurity support) of various Advisory and Assistance Services (A&ASs), Program Management Administration (PMA) activities, and Federally Funded Research and Development Centers (FFRDCs).</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continue Technical support services for requirements definition and analysis and System Integrator request for proposal (RFP) development - Continue Acquisition planning and support for first set of agile development epics supporting Continuous Capability Development (CCD) system capabilities to include but not limited to: <ul style="list-style-type: none"> - Ad Hoc Cost Analysis Reporting - Additional Business Intelligence (BI) functionality - Base Supply Expenditures General Funds only - Accounting for base supply purchases 			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>	Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<ul style="list-style-type: none"> - Treasury Direct Phase 2 & 3 - Implements Treasury Direct collections - Civilian Pay Cost Accounting - Record Civilian Pay detail for accruals and expenditure accounting - Contract Data Standards - Implements Acquisition data standards for contract writing systems - Major Acquisition/Reimbursable Program Systems - Interfaces/Capabilities necessary for major acquisition programs reporting and Complex contract obligation and pre-validation - Job Order Cost Accounting - Interface enhancement of Job Order Cost Accounting System (JOCAS) II with Standard Financial Information Structure (SFIS) upgrade - Initiate test planning for Agile acquisition <p>FY 2021 Plans:</p> <ul style="list-style-type: none"> - Will continue acquisition process, develop and release System Integrator request for proposal (RFP) and prepare for source selection and contract award to transition from previous SI - Will continue Acquisition planning and support for first set of agile development epics supporting Continuous Capability Development (CCD) system capabilities to include but not limited to: <ul style="list-style-type: none"> - Ad Hoc Cost Analysis Reporting - Additional Business Intelligence (BI) functionality - Base Supply Expenditures General Funds only - Accounting for base supply purchases - Treasury Direct Phase 2 & 3 - Implements Treasury Direct collections - Civilian Pay Cost Accounting - Record Civilian Pay detail for accruals and expenditure accounting - Contract Data Standards - Implements Acquisition data standards for contract writing systems - Major Acquisition/Reimbursable Program Systems - Interfaces/Capabilities necessary for major acquisition programs reporting and Complex contract obligation and pre-validation - Job Order Cost Accounting - Interface enhancement of Job Order Cost Accounting System (JOCAS) II with Standard Financial Information Structure (SFIS) upgrade 				

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>	Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
- Will continue test planning for Agile acquisition			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> DEAMS Inc 1 completion shifts focus to the DEAMS CCD activities.			
<i>Title:</i> Test and Evaluation	-	0.000	0.500
<i>Description:</i> The T&E process will be a complete system operational test to determine DEAMS effectiveness, suitability and mission capability. The T&E efforts conducted are in developer sites, Air Force test sites, DISA production sites and user locations. The T&E effort will include the implementation of the AGILE principles which includes Sprint Testing where functionality developed code in the sprint is tested for conformance to functional and non-functional requirements. Sprint Testing shall address unit and integrated testing. Additionally, there will continue to be regression testing to validate that the work within the sprint has not introduced new defects into areas of the product no directly impacted by the work of the sprint and has not introduced defects into the cross-product dependencies such as interfaces.			
<i>FY 2020 Plans:</i> N/A			
<i>FY 2021 Plans:</i> Will continue Follow-on Operational Test and Evaluation as required Will continue to validate planned software releases and coordinate testing Will continue to validate user deployments and coordinate testing			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Testing events in FY20 were related to Inc 1 only			
Accomplishments/Planned Programs Subtotals	0.000	14.895	45.638

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 834470: <i>Defense Enterprise Accounting & Mgt Sys</i>	0.962	1.905	0.899	-	0.899	3.104	3.158	3.215	3.274	Continuing	Continuing
Remarks											

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901554F / Defense Enterprise Acntng and Mgt Sys (DEAMS)	Project (Number/Name) 675178 / DEAMS Continuous Capability Development

D. Acquisition Strategy

The DEAMS Continuous Capability Development (CCD) acquisition strategy will leverage experience gained from FY2019 NDAA Section 869 Pilot Program activities and from agile software development efforts in Increment 1. CCD will be implemented using an agile methodology approach following the Business Capability Acquisition Cycle (BCAC). DEAMS will conduct continual enhancement/process improvements for the life of the program. DEAMS will continue technical support services for requirements definition and analysis and System Integrator request for proposal (RFP) development, and continue acquisition planning and support for first set of agile development epics supporting CCD system capabilities.

CCD will deliver functionality at earliest opportunity on a stable Increment 1 baseline. User experience and mission impact will be taken into account when establishing the release battle rhythm to the operational system. Factors for software releases include:

- Budget formulation and justification cycles
- End of year financial closeout
- Interdependencies with enterprise business systems
- Higher DOD requirements
- On-going development efforts with LOG-IT, CON-IT, MRO, and AFIPPS
- Interfaces/data standards changes
- Changes to hosting, deployment technologies, or strategies to optimize system security, performance, and cost savings

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)						Project (Number/Name)					
3600 / 7				PE 0901554F / Defense Enterprise Acntng and Mgt Sys (DEAMS)						675178 / DEAMS Continuous Capability Development					
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
DEAMS Continuous Capability Development (CCD) Product Development	C/TBD	TBD : TBD	-	-		14.895	May 2020	41.010	May 2021	-		41.010	Continuing	Continuing	-
Subtotal			-	-		14.895		41.010		-		41.010	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		0.500	May 2021	-		0.500	Continuing	Continuing	-
Subtotal			-	-		-		0.500		-		0.500	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administrative (PMA) Costs	C/Various	Various : TBD	-	-		-		4.128	Feb 2021	-		4.128	Continuing	Continuing	-
Subtotal			-	-		-		4.128		-		4.128	Continuing	Continuing	N/A
Project Cost Totals			-	-		14.895		45.638		-		45.638	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>	Project (Number/Name) 675178 / <i>DEAMS Continuous Capability Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
DEAMS				
Acquisition Planning	1	2019	1	2021
Agile Software Development Contract Award	3	2020	2	2021
Continuous Capability Development	2	2021	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>				Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
675179: <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>	-	0.000	31.894	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	31.894
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2020, PE 0901554F, DEAMS, changed from PE 0901538F, Financial Management Information Systems Development.

A. Mission Description and Budget Item Justification

Defense Enterprise Accounting and Management System (DEAMS) is a commercial-off-the-shelf (COTS), Oracle-based software implementation effort that will provide an auditable, modern accounting and finance system. DEAMS is a Joint United States Air Force (USAF) and United States Transportation Command (USTRANSCOM) Enterprise Resource Planning (ERP) Program that will replace many existing accounting and finance legacy systems and will provide core funds execution management functions consistent with financial management laws, regulations and policy, general ledger, funds management, payments, receivables, cost and revenues, and fiduciary reporting. DEAMS is compliant with the Clinger-Cohen Act, Business Enterprise Architecture (BEA), and integrates into Global Combat Support System-Air Force (GCSS-AF). When fully deployed, DEAMS will be key to Air Force compliance with the Financial Improvement and Audit Readiness (FIAR) requirement in the 2010 NDAA.

DEAMS user deployments include:

- Air Mobility Command (AMC) without Transportation Working Capital Funds (TWCF)
- AMC with TWCF, in conjunction with Defense Finance and Accounting Service (DFAS) Rome
- Air Combat Command (ACC) and Air Force Global Strike Command (AFGSC)
- Air Force Reserve Command (AFRC), and Air National Guard (ANG) and other Geographically Separated Units (GSUs) to include DFAS Limestone, Air Force District of Washington (AFDW), Air Force Special Operations Command (AFSOC), U.S. Air Force Academy (USAFA), Pacific Air Forces (PACAF), and DFAS Japan
- U. S. Air Forces in Europe (USAFE), DFAS Europe, and Air Education and Training Command (AETC), Joint Base San Antonio
- Air Force Material Command (AFMC) and Air Force Space Command (AFSPC) (Incremental Deployments)
- Remaining DFAS locations and all other GSUs

On 23 January 2017, the senior official provided the Critical Change Report (CCR) with certifications to Congress. The report recommended a restructure of DEAMS from one increment to multiple increments. The Milestone Decision Authority (MDA) approved the restructured program for DEAMS Inc 1, to include deferring certain requirements to future increments, a limited deployment to an additional 700 users for Inc 1 to United States Air Force in Europe (USAFE), and the updated Full Deployment Authority to Proceed (FD ATP) criteria via an Acquisition Decision Memorandum (ADM) dated 2 June 2017. (FD ATP date is August 2020 and Capability Support Authority to Proceed (CS ATP) date is February 2021.)

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>	Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>

The remaining DEAMS Inc 1 schedule includes the Oracle e-Business Suite R12 upgrade and development and deployment of the remaining Increment 1 capabilities (disbursing, reporting, and Governance/Risk/Compliance (GRC)), as well as enhancements and improvements to the existing baseline. In accordance with the FY2019 NDAA, DEAMS is an Agile Pilot program as defined in Sec 873 of the FY2018 NDAA, and all remaining development will be accomplished using agile software development methodologies.

DEAMS Inc 1 is developing capability which allows for deployment to the remaining user locations. However, DEAMS has also begun transitioning previously deployed locations to the Operation and Support (O&S) phase.

Funds may be used to develop, acquire, and integrate hardware and software solutions to provide improvements and enhancements in support of the development of the DEAMS capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver accounting and financial management capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Product Development	0.000	31.271	-
<p>Description: DEAMS Inc 1 capability development activities support multiple software releases and user deployments as described in the mission description. Development activities include design, build, test, data conversion, reporting, cutover from legacy systems, and the resolution of deficiency reports and defects.</p> <p>Activities also include hardware support (system administration and database security) and storage service by Defense Information Systems Agency (DISA); continued development of interface to Global Combat Support System - Air Force (GCSS-AF); Enterprise Resource Planning (ERP) Common Computing Environment (CCE); Independent Verification and Validation (IV&V); Developmental Release Field Support (DRFS) to include process execution and data scripts; help desk support; Engineering Integration Services (EIS) for oversight of development tools and processes; deployment training and change management activities. Provides acquisition, contract, finance, and cost management planning and Program Management Administration (PMA) utilizing an agile approach for reporting, disbursing, and auditing initiatives.</p> <p>Develop, using an Agile software development approach, the Disbursing Initiative (includes modernizing disbursing and implementing daily reconciliation with the U.S. Treasury, which will manage the receipt and acceptance of agreements, orders, and invoices), the Reporting Initiative (establish a modernized Business Intelligence reporting solution), and the Segregation of Duties (SOD) Initiative (allow DEAMS to meet regulatory compliance requirements associated with Financial Information System Controls Audit Manual (FISCAM)).</p> <p>FY2019 ACCOMPLISHMENTS:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>	Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<ul style="list-style-type: none"> - Completed planned FY2019 deployment of DEAMS to 800 personnel at 10 locations, bringing total users to 15,500 - Awarded contract for Agile software development for remaining Increment 1 capabilities, in accordance with Sec 873 of the FY2018 NDAA - Awarded contracts for development, test, and training environments with the Oracle Federal Managed Cloud Services, for all Agile software development on DEAMS - Awarded bridge contract for R12 upgrade to continue developmental testing and defect correction while contract for new System Integrator was finalized - Successful FY2019 end of year closeout <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continue with agile development/integration sprints of DEAMS disbursing initiative, auditing and long term reporting using Agile Software Development - Continue to work DEAMS enhancements and improvements using Agile Software Development - Continue remaining development activities to develop capability in support of remaining deployments using Agile Software Development - Pursue authority to proceed with Milestone Decision Authority <p>FY 2020 to FY 2021 Increase/Decrease Statement: Ramp down of Inc 1 developmental activities</p>			
<p>Title: Test and Evaluation (T&E)</p> <p>Description: The T&E process will be a complete system operational test to determine DEAMS effectiveness, suitability, and mission capability using the R12 Upgrade. It begins with validation of requirements and end to end functional capabilities including compliance mandates. The T&E effort are conducted in developer sites, Air Force test sites, DISA production sites, and user locations. The DEAMS Test and Evaluation Master Plan (TEMP), Lead Developmental Test Organization (LDTO) Integrated Test Plan (ITP), System Integrators (SIs) Software Test Plans (STPs), and Operational Test Agency (OTA) operational test plans covers the details of Increment 1 T&E. Database Administrator (DBA) Test Support required to service test instances. Capabilities Integration Environment (CIE) Integration/Development support for ancillary Test activities required. Hardware and software required for test activities.</p> <p>The T&E effort for the Agile Pilot Program includes Sprint Testing where functionality developed code in the sprint is tested for conformance to functional and non-functional requirements. Sprint Testing shall address unit and integrated testing. Additionally, there will be Regression Testing to validate that the work within the sprint has not introduced defects into areas of the product not directly impacted by the work of the sprint and has not introduced defects into cross-product dependencies such as interfaces.</p>	0.000	0.623	-

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901554F / Defense Enterprise Acntng and Mgt Sys (DEAMS)	Project (Number/Name) 675179 / Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p><i>FY 2020 Plans:</i></p> <ul style="list-style-type: none"> - Complete Follow-on Operational Test and Evaluation (FOT&E) - Continue development/integration of DEAMS disbursing initiative and other system capabilities - Continue to validate planned software releases and coordinate the complete testing of the Oracle R12 technical software upgrade - Continue to validate user deployments and coordinate testing - Continue to plan for and start execution of FOT&E <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Ramp down of test and evaluation activities</p>			
Accomplishments/Planned Programs Subtotals	0.000	31.894	-

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 834470: Defense Enterprise Accounting & Mgt Sys	0.962	1.905	0.899	-	0.899	3.104	3.158	3.215	3.274	Continuing	Continuing

Remarks

D. Acquisition Strategy

DEAMS Inc 1 is over 87% deployed as the baseline viable product for the AF operational finance community. The program relies on heavy customer involvement through the functional management office to govern system changes, requirements development, and day-to-day customer support. DEAMS will employ multiple contract actions as the various Development Activities and Releases are developed, tested, and deployed through FY2020.

DEAMS Inc 1 accelerated deployment to Air Combat Command (ACC), Air Education & Training Command (AETC), and AF Reserve Command (AFRC) tenant users from FY2020 to FY2019. This user base was orphaned from ACC, AETC, and AFRC only because they reside on bases owned by other Major Commands.

AF Space Command and AF Materiel Command Incremental users at the base operations level will migrate to DEAMS Inc 1 capability in FY2020 as planned.

In the FY2019 NDAA, DEAMS was nominated to be an FY2018 NDAA Sec 873 Agile Pilot program. To facilitate the transition from traditional to agile software development, Increment 1 development items will be completed under a new rapid acquisition contract action using agile software development methods. This new effort will also inform and facilitate the agile program implementation for DEAMS Continuous Capability Development.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020				
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 0901554F / Defense Enterprise Acntng and Mgt Sys (DEAMS)				Project (Number/Name) 675179 / Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)							

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DEAMS: Rapid Acquisition	C/T&M	CACI-ISS, INC : Chantilly, VA	-	-		7.333	Apr 2020	-		-		-	0.000	7.333	-
DEAMS: SME Support, General Ledger Reports and Analysis, Business Process Analysis, Master Data Conversion and Training Development	C/T&M	Kearney and Company : Various	-	-		5.041	Feb 2020	-		-		-	0.000	5.041	-
DEAMS: ERP Solutions Architecture services	C/FP	Lintech Global, Inc. : Farmington Hills, MI	-	-		3.407	Feb 2020	-		-		-	0.000	3.407	-
DEAMS: Oracle Software Solutions	Various	Various : Various	-	-		3.635	May 2020	-		-		-	0.000	3.635	-
DEAMS: Direct mission Support (Development/ Integration Environments)	Various	Various : Various	-	-		1.904	Jan 2020	-		-		-	0.000	1.904	-
DEAMS: ERP DBA Development and Support Services	C/FFP	DDC IT Services, LLC : Albuquerque, NM	-	-		1.121	Jun 2020	-		-		-	0.000	1.121	-
Subtotal			-	-		22.441		-		-		-	0.000	22.441	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DEAMS: Test services from AFOTEC, JITC, LDTO and other miscellaneous test resources	Various	Various : Various	-	-		0.623	Jan 2020	-		-		-	0.000	0.623	-
Subtotal			-	-		0.623		-		-		-	0.000	0.623	N/A

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 0901554F / <i>Defense Enterprise Acntng and Mgt Sys (DEAMS)</i>	Project (Number/Name) 675179 / <i>Defense Enterprise Accounting Management System Increment 1 (DEAMS Inc 1)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>DEAMS Inc 1, Software Change Requests</i>				
DEAMS Inc 1, Software Change Requests	1	2019	3	2021
DEAMS Inc 1, R12 Software Baseline Development	1	2019	1	2020
DEAMS Inc 1, Reporting	3	2019	3	2021
DEAMS Inc 1, Disbursing	3	2019	3	2021
DEAMS Inc 1, Auditing	3	2019	3	2021
Deploy DEAMS Inc 1 Capability	1	2019	4	2020
DEAMS Inc 1, Follow-on Operational Test and Evaluation (FOT&E)	1	2020	3	2020
DEAMS Inc 1, Full Deployment Authority to Proceed (FD ATP)	4	2020	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1201017F / <i>Global Sensor Integrated on Network (GSIN)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	3.647	1.889	0.000	1.889	6.590	6.590	6.589	6.590	0.000	31.895
675368: <i>GSIN (Global Integrated Sensor Network)</i>	-	0.000	3.647	1.889	0.000	1.889	6.590	6.590	6.589	6.590	0.000	31.895
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Note
 In FY 2020, PE 0301017F, Global Sensor Integrated on Network (GSIN), Project 675368, GSIN (Global Integrated Sensor Network), efforts were transferred to PE 1201017F, Global Sensor Integrated on Network (GSIN), Project Project 675368, GSIN (Global Integrated Sensor Network), for more accurate classification of work.

A. Mission Description and Budget Item Justification

In FY 2021, PE 1201017F, Global Sensor Integrated on Network efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1201017SF Global Sensor Integrated on Network from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

\$1.889M is included in FY 2021 in this request for Appropriation 3600, Research, Development, Test & Evaluation, Air Force, PE 1201017F; these funds should have been requested under Appropriation 3620 Research, Development, Test & Evaluation, Space Force, PE 1201017SF. Justification and plans for these funds are included in PE 1201017SF, Global Sensor Integrated on Network (GSIN), R-1 Line #26.

The missions of USSPACECOM and USSTRATCOM include establishing and providing full-spectrum, global strike, coordinated space and information operations capabilities to meet both deterrent and decisive national security objectives and to provide operational space support, integrated missile defense, Global Command Control, Communications, and Computers Intelligence Surveillance and Reconnaissance (C4ISR), and specialized planning expertise to the joint warfighter.

The Nation's strategic C2 sensors, and mission planning programs cannot rapidly exchange information across multiple missions creating ambiguity that delays time critical national C2 decision making processes. GSIN developed and established a unified schema that integrates disparate Missile Warning/Missile Defense (MW/MD) data into a single, exposed data set, providing redundant and unambiguous MW/MD data to national leadership. GSIN also enables existing radars and sensors to provide data in net-centric formats consumable by other authorized systems and mission areas, thus reducing the need to acquire more systems. Activities also include studies and analysis to support current program planning, execution, and future program planning.

GSIN directly supports USSPACECOM, USSTRATCOM and other Combatant Command and MAJCOM mission sets. GSIN meshes together selected systems and sensors (from tactical to strategic), including the Nation's most modern and capable assets, taking advantage of their larger numbers, improved algorithms, mobility, and forward deployment to provide earlier cross-cueing and expanded decision space when every second counts. Repurposing these traditionally stove-piped systems and sensors, GSIN enables the warfighter in several ways. GSIN enables creation of a User Defined Operating Picture (UDOP) to provide a single, unambiguous missile event picture allowing realtime collaboration for nuclear C2 and improved senior leader situational awareness (SA) for effective decision-making. GSIN also improves Space Situational Awareness (SSA) by tapping additional sensor capability and provides this data for the larger space order of battle capabilities. GSIN

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1201017F / <i>Global Sensor Integrated on Network (GSIN)</i>
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dramatically improves the ingestion of nontraditional, but readily available, non-US government and commercial data to the United States Space Force (USSF) satellite catalog. GSIN addresses NORTHCOM/STRATCOM's signed Joint Emergent Operational Need (JEON) ST-0010 request for uninterrupted traditional and non-traditional sensor data integration and the Global Threat Characterization Assessment (GTCA) Operational Planning Team report. GSIN provides critical and unique data to the USSPACECOM SSA data repositories to facilitate the large Space Battle Management Command and Control (BMC2) suite of capabilities/programs. Finally, GSIN provides Machine Learner and Data Analysis functions to optimize and operate situational awareness in the field.

Space Acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver GSIN 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 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	3.647	3.709	0.000	3.709
Current President's Budget	0.000	3.647	1.889	0.000	1.889
Total Adjustments	0.000	0.000	-1.820	0.000	-1.820
• 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	-1.820	0.000	-1.820

Change Summary Explanation

FY2021: -\$1.820M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1201017F / <i>Global Sensor Integrated on Network (GSIN)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Title: Radar, sensor, technical intelligence (TI), and Allied Systems</p> <p>Description: Radar, sensor, technical intelligence and Allied Systems: Designs, develops, exposes and integrates data from radar, sensors and technical intelligence systems in regions of the world where potential GSIN users currently do not have coverage. Provide real time data from systems that previously reported in hours or days after critical events. Conduct studies/surveys/meetings as necessary to continually identify systems meeting GSIN user data exposure needs. Space Situational Awareness (SSA): Designs, develops, tests, exposes, and integrates SSA data from previously untapped systems into space production systems and the Global Information Grid (GIG). Develop implementation plans to mature data exposure capabilities.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Begin Implementing Strategic Study - Complete deployment and testing of Radar/Sensor/TI Project 4 and transition to PoR - Identify and begin development of Radar/Sensor/TI Project 5. <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		0.000	2.200	0.000
<p>Title: Data Services, Net Centric Integration and Configuration Control, and program outreach</p> <p>Description: Develop common XML net-enabled data schemas and configuration management processes and procedures for Missile Warning, Missile Defense, Space, MASINT/Technical Intelligence, and Sensor data to manage the XML schema and associated XML messaging and services. Develop technical outreach for potential new GSIN data consumers and providers who require GSIN sensor data. Upgrade GSIN capabilities as DISA Enterprise Services evolve. Continue modifications to data services. Support integration of GSIN sensor data into appropriate registries/catalogs. Continue development of GSIN data services to enable visualization in a common operating picture. Conduct studies and demonstrations of SSA capabilities, data correlation, and assessment services for risk reduction evaluations.</p> <p>FY 2020 Plans:</p> <ul style="list-style-type: none"> - Continue developing plans to address NORTHCOM/USSTRATCOM JEON GTCA. Advocate and secure additional RDT&E funding if necessary. - Begin development of a record capability of GSIN exposed data and play it back in real time through a visualization tool. - Continue developing and releasing periodic configuration control processes. - Continue technical outreach processes for new GSIN data consumers and providers. - Deliver new GSIN capabilities to match evolving DISA Enterprise Service updates. 		0.000	1.447	1.889

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1201017F / <i>Global Sensor Integrated on Network (GSIN)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>- Continue development of new and improved data services.</p> <p>-- Complete deployment and integration of Radar/Sensor/TI Project 4 into DISA Enterprise Services.</p> <p>-- Begin development and integration of Radar/Sensor/TI Project 5 into DISA Enterprise Services.</p> <p>-- Begin development and integration of Radar/Sensor/TI Project 6 into DISA Enterprise Services.</p> <p>FY 2021 Plans: \$1.889M is incorrectly requested in PE 1201017F for FY 2021; these funds should have transferred to 1201017SF. Justification and plans for these funds are documented in PE 1201017SF, Global Sensor Integrated on Network (GSIN) R-1 Line #26.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>			
Accomplishments/Planned Programs Subtotals	0.000	3.647	1.889

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

GSIN uses existing government contract vehicles, from agencies such as Missile Defense Agency (MDA) or Air Force Life Cycle Management Center (AFLCMC); to develop and modernize the combined SSA/MW/MD/MASINT/TI data exposure architecture and solution. The contracts are managed by the relevant organization's contracting office. GSIN does not award or manage any contracts. The AFLCMC at Hanscom AFB (AFLCMC/HB) and SMC at Los Angeles AFB provide necessary program management, financial management, and other support as may be applicable for GSIN.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201017F / <i>Global Sensor Integrated on Network (GSIN)</i>	Project (Number/Name) 675368 / <i>GSIN (Global Integrated Sensor Network)</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GSIN Space Situational Awareness Data Exposure - Radar/Sensor/TI Project 5	C/CPAF	RAYTHEON : Colorado Springs, CO	-	-		1.417	Jan 2020	-		-		-	Continuing	Continuing	-
GSIN Space Situational Awareness Data Exposure - Radar/Sensor/TI Project 6	C/CPAF	RAYTHEON : Boston, MA	-	-		1.200	Jan 2020	1.889	Dec 2020	-		1.889	Continuing	Continuing	-
GSIN Strategic Study	C/CPAF	KBR Wyle : Omaha, NE	-	-		0.500	Nov 2019	-		-		-	Continuing	Continuing	-
Subtotal			-	-		3.117		1.889		-		1.889	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS	C/FFP	Various : Omaha, NE	-	-		0.530	Oct 2019	-		-		-	Continuing	Continuing	-
Subtotal			-	-		0.530		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals		-	-	3.647	1.889	1.889	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201017F / <i>Global Sensor Integrated on Network (GSIN)</i>	Project (Number/Name) 675368 / <i>GSIN (Global Integrated Sensor Network)</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

GSIN Data Exposure																												
(MASINT 4) Production/Fielding					■																							
(MASINT 4) Integration and Testing								■																				
(MASINT 4) Operational												■																
(MASINT 5) Design and Development								■																				
(Radar/MASINT 6) Design and Development												■																

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201017F / <i>Global Sensor Integrated on Network (GSIN)</i>	Project (Number/Name) 675368 / <i>GSIN (Global Integrated Sensor Network)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
GSIN Data Exposure				
(MASINT 4) Production/Fielding	1	2020	1	2020
(MASINT 4) Integration and Testing	3	2020	3	2020
(MASINT 4) Operational	4	2020	4	2020
(MASINT 5) Design and Development	3	2020	4	2020
(Radar/MASINT 6) Design and Development	4	2020	4	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	28.636	0.988	0.993	0.000	0.993	1.004	1.013	1.022	1.041	Continuing	Continuing
670373: <i>DCIP</i>	-	0.487	0.488	0.495	0.000	0.495	0.505	0.514	0.523	0.532	Continuing	Continuing
672486: <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>	-	21.902	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
67A011: <i>Space Analysis and Application Development</i>	-	6.247	0.500	0.498	0.000	0.498	0.499	0.499	0.499	0.509	Continuing	Continuing

Note

Prior to the FY20 PB cycle, The Space Analysis and Application Development Program (WSC 67A011), the Joint Navigation and Warfare Center (WSC 672486), along with the Data Integration and Fusion Center (WSC 67A011), and the Defense Critical Infrastructure Program (WSC 670373) funding were all reported under PE 1201921F. Beginning in FY20, the Space Analysis and Application Development program and the Joint Navigation Warfare Center will be reported under the newly created PE 1202140F, USSPACECOM. Leaving only the Data Integration and Fusion Center and the Defense Critical Infrastructure Program being reported under PE 1201921F.

A. Mission Description and Budget Item Justification

The USSTRATCOM Data Integration and Fusion Center (DIFC) is an innovative organization developing and experimenting innovative concepts designed to validate both material and non-material methodologies to overcome data isolation in order to enable kill chains in the Joint Battlespace. Funds are necessary to update current government-owned software to ingest and disseminate new data sources from Title 10 and Title 50 sensors. The DIFC efforts at COCOM sponsored experimentation events will inform service acquisition decisions, capability gaps, intelligence gaps and tactics, techniques and procedures (TTP) development and implementation to mitigate effects on warfighter operations.

Mission Assurance (MA) is a DoD risk management effort, driven by DODD 3020.40 that seeks to ensure the availability of networked assets critical to DoD missions. "DoD will continue, under the MA construct and policy, existing efforts to meet national and Defense Critical Infrastructure (DCI) requirements established by PPD-21. Existing Department-level Defense Critical Infrastructure Program policy will remain effective until integrated into, replaced, or rescinded by MA policy. DoD Components will maintain sufficient resources to meet DCI responsibilities for identifying, assessing, managing, and monitoring risk to critical infrastructure and align associated security, protection, and risk management efforts under an MA construct." Critical infrastructure assets can include installations, facilities, antennas, vehicles, computing systems, and communications links. The USSTRATCOM Defense Critical Infrastructure Protection program (DCIP) is a risk management program that seeks to ensure the availability of networked assets critical to USSTRATCOM and other DoD missions. Critical infrastructure assets can include installations, facilities, antennas, vehicles, computing systems, and communications links. DCIP is directed by the Office of the Assistant Secretary of Defense (Homeland Defense & Americas' Security Affairs) [OASD (HD&ASA)]. DCIP manages the identification, prioritization, assessment, and assurance of Critical Infrastructure as a comprehensive program

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>
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that includes the development of adaptive plans and procedures to mitigate risk, restore capability in the event of loss or degradation, support incident management, and protect defense critical infrastructure.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	14.161	0.988	0.996	0.000	0.996
Current President's Budget	28.636	0.988	0.993	0.000	0.993
Total Adjustments	14.475	0.000	-0.003	0.000	-0.003
• 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	14.475	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-0.003	0.000	-0.003

Change Summary Explanation

FY19 funding increased by \$14.475 due to Joint Urgent Operational Need reprogramming.

In FY20 the decrease is associated with the funding for the Joint Navigation Warfare Center, and the USSTRATCOM Space Modeling and Simulation moving into the newly created USSPACECOM PE 1202140F. The only RDT&E funding remaining in 1201921F will be for the Data Integration and Fusion Center (~\$500K per year) and the Defense Critical Infrastructure Program (DCIP) (\$488K in FY20).

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 670373 / <i>DCIP</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
670373: <i>DCIP</i>	-	0.487	0.488	0.495	0.000	0.495	0.505	0.514	0.523	0.532	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

An October 2014 memorandum of agreement between USSTRATCOM and Deputy Assistant Secretary of Defense for Defense Continuity and Mission Assurance transferred budget authority for DCIP funding to USSTRATCOM beginning in FY16. THIS IS NOT A NEW START.

A. Mission Description and Budget Item Justification

Mission Assurance (MA) is a DoD risk management effort, driven by DODD 3020.40 that seeks to ensure the availability of networked assets critical to DoD missions. "DoD will continue, under the MA construct and policy, existing efforts to meet national and Defense Critical Infrastructure (DCI) requirements established by PPD-21. Existing Department-level Defense Critical Infrastructure Program (DCIP) policy will remain effective until integrated into, replaced, or rescinded by MA policy. DoD Components will maintain sufficient resources to meet DCI responsibilities for identifying, assessing, managing, and monitoring risk to critical infrastructure and align associated security, protection, and risk management efforts under an MA construct." Critical infrastructure assets can include installations, facilities, antennas, vehicles, computing systems, and communications links.

The USSTRATCOM Defense Critical Infrastructure Protection program (DCIP) is a risk management program that seeks to ensure the availability of networked assets critical to USSTRATCOM and other DoD missions. Critical infrastructure assets can include installations, facilities, antennas, vehicles, computing systems, and communications links. DCIP is directed by the Office of the Assistant Secretary of Defense (Homeland Defense & Americas' Security Affairs) [OASD (HD&ASA)]. DCIP manages the identification, prioritization, assessment, and assurance of Critical Infrastructure as a comprehensive program that includes the development of adaptive plans and procedures to mitigate risk, restore capability in the event of loss or degradation, support incident management, and protect defense critical infrastructure.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Mission Assurance Defense Critical Infrastructure Program	0.487	0.488	0.495	0.000	0.495
Description: Supports 1) systems engineering analysis for the decomposition of mission systems and assets, and supporting networks and infrastructure that execute USSTRATCOM missions, 2) research, studies, analysis, and operational assessment of mission system capabilities, methodologies, and tactics to identify critical assets and dependency relationships, and 3) evaluation of mission risk through research, studies, analysis and assessment of threats and hazards paired with exploitable vulnerabilities.					
FY 2020 Plans:					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 670373 / <i>DCIP</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
DCIP continued to support of analysis, studies and research of critical infrastructure assets and dependencies supporting all USSTRATCOM assigned missions, to include focusing efforts of future critical infrastructure vulnerability assessments and researching the various sources to perform threats and hazards assessments.					
No OCO requested					
<i>FY 2021 Base Plans:</i> Provide analysis, studies and research of critical infrastructure assets and dependencies supporting all USSTRATCOM assigned missions, to include focusing efforts of future critical infrastructure vulnerability assessments and researching the various sources to perform threats and hazards assessments. Develop link-node display of systems connecting tasked missions and operational plans to mission essential tasks and critical infrastructure assets. Identifies vulnerabilities, and participate in risk management process for remediation and mitigation.					
<i>FY 2021 OCO Plans:</i> No OCO Requested					
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> Increase from 2020 to 2021 is due to inflation adjustments					
Accomplishments/Planned Programs Subtotals	0.487	0.488	0.495	0.000	0.495

C. Other Program Funding Summary (\$ in Millions)
N/A

Remarks
The Defense Critical Infrastructure Program is an on-going program, cost to complete is N/A

D. Acquisition Strategy
Projects funded through DCIP will be awarded using competitive contracts to the maximum extent possible.

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 670373 / <i>DCIP</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Defense Critical Infrastructure Program</i>				
Asset Dependency, Risk Mitigation, Ops Research, Design/Development, Modeling and Simulation, Test and Evaluation...this is an on-going effort	1	2019	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672486: <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>	-	21.902	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY20 all funding moved to PE 1202140F - USSPACECOM PE

A. Mission Description and Budget Item Justification

The JNWC mission has transferred to USSPACECOM. Funding for the JNWC has moved into PE 1201240F,

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: PNT Operational Field Assessments	21.902	0.000	0.000	0.000	0.000
Description: The JNWC will be reported under PE 1202140F, a USSPACECOM PE					
FY 2020 Plans: N/A					
FY 2021 Base Plans: N/A					
FY 2021 OCO Plans: N/A					
FY 2020 to FY 2021 Increase/Decrease Statement: N/A					
Accomplishments/Planned Programs Subtotals	21.902	0.000	0.000	0.000	0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

Beginning in FY20, the program will be reported under the newly created PE 1202140F, USSPACECOM

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>

D. Acquisition Strategy
N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
PNT Operational Field Assessments	PO	Multiple : Kirtland AFB, NM	-	21.902	Oct 2018	-		-		-		-	Continuing	Continuing	-
Subtotal			-	21.902		-		-		-		-	Continuing	Continuing	N/A

Remarks
Beginning in FY 2018 the JNWC portfolio transferred out of PE 15921F in to PE 120921F.

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	21.902	0.000	-	-	-	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Navigation Warfare (NAVWAR)	
NAVWAR Operational Field Assessments	
Create Maintain NAVWAR Knowledge - PNTAA	
NAVWAR Operations & CONOPS Events	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Navigation Warfare (NAVWAR)				
NAVWAR Operational Field Assessments	1	2019	4	2019
Create Maintain NAVWAR Knowledge - PNTAA	2	2019	4	2019
NAVWAR Operations & CONOPS Events	1	2019	4	2019

Note

Joint Navigation Warfare Center (JNWC) conducts PRISM, FORTUNE, and GYPSY operational field assessments on an on-going, annual basis.

PRISM events encompass all Operations, Actions, and Activities (OAAs) associated with events outside of specific Combatant Command and/or Service exercise or mission event.

FORTUNE events are Positioning, Navigation, and Timing (PNT) vulnerability field assessments and are small scale technical risk assessments or can be risk reduction events for larger GYPSY events.

GYPSY events are larger than FORTUNE PNT related events and involve other coalition partners, and multiple US services in direct support of Geographic Combatant Command requirements.

JNWC uses the Major Range and Test Facility Base (MRTFB) program, administered by USD (AT&L). Requirements dictate which MRTFB facility will be contracted to host a GYPSY or FORTUNE event.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>					Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>		
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67A011: <i>Space Analysis and Application Development</i>	-	6.247	0.500	0.498	0.000	0.498	0.499	0.499	0.499	0.509	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Prior to the FY20 PB cycle, The Space Analysis and Application Development Program was reported under PE 1201921F, WSC 67A011. Beginning in FY20, the program will be reported under the newly created PE 1202140F, USSPACECOM. Leaving only the Data Integration and Fusion Center being reported in WSC/BPAC 67A011, PE 1201921F

A. Mission Description and Budget Item Justification

The USSTRATCOM Data Integration and Fusion Center (DIFC) is an innovative organization developing and experimenting innovative concepts designed to validate both material and non-material methodologies to overcome data isolation in order to enable kill chains in the Joint Battlespace. Funds are necessary to update current government-owned software to ingest and disseminate new data sources from Title 10 and Title 50 sensors. The DIFC efforts at COCOM sponsored experimentation events will inform service acquisition decisions, capability gaps, intelligence gaps and tactics, techniques and procedures (TTP) development and implementation to mitigate effects on warfighter operations.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Data Integration and Fusion Center	0.800	0.500	0.498	0.000	0.498
Description: USSTRATCOM/J8 Data Integration and Fusion Center (DIFC) is an innovative organization developing and experimenting innovative concepts designed to validate both material and non-material methodologies to overcome data isolation in order to enable kill chains in the Joint Battlespace. The DIFC will work to update current government-owned software to ingest and disseminate new data sources from Title 10 and Title 50 sensors. The DIFC efforts at COCOM sponsored experimentation events will inform service acquisition decisions, capability gaps, intelligence gaps and tactics, techniques and procedures (TTP) development and implementation to mitigate effects on warfighter operations.					
FY 2020 Plans: The DIFC will continue to investigate, experiment, and disseminate various Title 10 and Title 50 data sources from collection through dissemination to tactical platforms using machine to machine solutions to move data more efficiently and affect kill chain timelines.					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<p>No OCO Requested</p> <p>FY 2021 Base Plans: The DIFC will continue to investigate, experiment, and disseminate various Title 10 and Title 50 data sources from collection through dissemination to tactical platforms using machine to machine solutions to move data more efficiently and affect kill chain timelines.</p> <p>FY 2021 OCO Plans: No OCO requested</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: Decrease from FY19 to FY20 is related to the standup of USSPACECOM. The Space Modeling and Simulation funding moved out of PE 1201921F and into PE1202140F. The DIFC remained in PE 1201921F. No fluctuation between FY20 and FY21...the DIFC is a steady state program funded at \$500K per year.</p>					
<p>Title: Space Analysis and Application Development</p> <p>Description: The Space Analysis and Application Development program (Space Modeling and Simulation) transferred into the new USSPACECOM PE 1202140F.</p> <p>FY 2020 Plans: Beginning in FY20 the RDT&E funding portfolio for the Space Analysis and Application Development program within USSTRATCOM transfers to the newly created PE 1202140F, USSPACECOM.</p> <p>FY 2021 Base Plans: See write-up in PE 1202140F</p> <p>FY 2021 OCO Plans: No OCO requested</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>	5.447	0.000	0.000	0.000	0.000
Accomplishments/Planned Programs Subtotals	6.247	0.500	0.498	0.000	0.498

C. Other Program Funding Summary (\$ in Millions)
N/A

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

C. Other Program Funding Summary (\$ in Millions)

Remarks

Space Campaign Modeling and Simulation funding moved to the newly created USSPACECOM PE 1202140F beginning in FY20. All that will remain in BPAC 67A011 PE 1201921F is the Data Integration and Fusion Center RDT&E funding. It will be an on-going program. Cost to complete is N/A

D. Acquisition Strategy

Any new projects funded in this program will be awarded using competitive procedures to the maximum extent possible.

Best value to the government selected contractors, universities, government facilities, federally funded research and development centers, laboratories, or other organizations

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Model Space effects and evaluate current campaign models to determine feasibility to incorporate into space architectures	TBD	TBD : TBD	-	5.447	Oct 2018	-		-		-		-	Continuing	Continuing	-
Data Integration and Fusion Center	C/Various	Multiple Gov/Civ Agencies : Schriever AFB, CO	-	0.800	Oct 2018	0.500	Jan 2020	0.498	Jan 2021	-		0.498	Continuing	Continuing	-
Subtotal			-	6.247		0.500		0.498		-		0.498	Continuing	Continuing	N/A

Remarks
Best value to the government selected contractors, universities, government facilities, federally funded research and development centers, laboratories, or other organizations

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	6.247	0.500	0.498	-	0.498	Continuing	Continuing	N/A

Remarks
Beginning in FY20 the RDT&E funding in the USSTRATCOM Space Analysis and Application Development program is transferring into the newly created PE 1202140F, USSPACECOM

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Data Integration and Fusion Center																												
Continue to develop concepts to overcome data isolation	██████████																											
On-going effort to develop concepts to overcome data isolation in order to enable kill chains in the Joint Battlespace					██████████																							
Experimentation with current government owned software to inject and disseminate new data sources from Title 10 and Title 50 sensors									██████████																			
Continue to investigate, experiment, and disseminate various Title 10 and Title 50 data sources from collection through dissemination to tactical platforms													██████████															
Continue to investigate, develop, experiment and disseminate Title 10 and Title 50 data sources from collection through distribution to tactical platforms																	██████████											
Continue to investigate, develop, experiment and disseminate Title 10 & Title 50 sources from collection through distribution to the Warfighter in the field																					██████████							
Continue experimentation with current government owned software, continue to investigate, develop, and disseminate data sources from collection through distribution to the users in the field																									██████████			

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1201921F / <i>Service Support to STRATCOM - Space Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Data Integration and Fusion Center</i>				
Continue to develop concepts to overcome data isolation	1	2019	4	2019
On-going effort to develop concepts to overcome data isolation in order to enable kill chains in the Joint Battlespace	1	2020	4	2020
Experimentation with current government owned software to inject and disseminate new data sources from Title 10 and Title 50 sensors	1	2021	4	2021
Continue to investigate, experiment, and disseminate various Title 10 and Title 50 data sources from collection through dissemination to tactical platforms	1	2022	4	2022
Continue to investigate, develop, experiment and disseminate Title 10 and Title 50 data sources from collection through distribution to tactical platforms	1	2023	4	2023
Continue to investigate, develop, experiment and disseminate Title 10 & Title 50 sources from collection through distribution to the Warfighter in the field	1	2024	4	2024
Continue experimentation with current government owned software, continue to investigate, develop, and disseminate data sources from collection through distribution to the users in the field	1	2025	4	2025

Note

Beginning in FY20 the funding portfolio for the Space Analysis Modeling and Simulation program within USSTRATCOM will transfer to the newly created PE 1202140F, USSPACECOM

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	11.863	8.999	0.000	8.999	9.179	9.307	9.548	15.215	Continuing	Continuing
672486: <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>	-	0.000	7.467	7.500	0.000	7.500	7.572	7.709	7.847	11.462	Continuing	Continuing
67A011: <i>Space Analysis and Application Development</i>	-	0.000	4.396	1.499	0.000	1.499	1.607	1.598	1.701	3.753	Continuing	Continuing

Note
 Prior to the FY20 PB cycle, The Space Analysis and Application Development Program (WSC 67A011) and the Joint Navigation and Warfare Center (WSC 672486) were reported under PE 1201921F, Service Support to STRATCOM - Space Activities. Beginning in FY20, the programs will be reported under the newly created PE 1202140F, Service Support to U.S. SPACECOM Activities

A. Mission Description and Budget Item Justification

The Space Analysis and Application Development program integrates space based effects into Department's 'Model of Record' for joint campaign analysis. Current modeling and simulation (M&S) models are inadequate to represent the contribution that U.S space capabilities make to the air, sea, and land fight and do not accurately portray current and future space threats. This line of effort integrates effects of space capabilities into the Synthetic Theater Operations Research Model (STORM) and other mission and campaign-level M&S tools. Enhanced space M&S will enable the DoD to make informed decisions regarding the direction of U.S. Space Doctrine, Tactics, Techniques, Procedures, and Resource Decisions. The DoD requires the ability to conduct campaign-level analysis to quantify the holistic operational impacts of adversary space actions on military campaigns and U.S. global operations.

Navigation Warfare (NAVWAR) is deliberate defensive and offensive action to assure positioning, navigation, and timing (PNT) information through coordinated employment of space, cyberspace, and electronic warfare (EW) operations. Funds are used to create and maintain NAVWAR knowledge. NAVWAR expertise is developed in part by execution of PNT Operational Field Assessments (POFAs). GYPSY POFA's are linked to Combatant Commander's (CCMD) Tier 1 exercises (USSTRATCOM's Global Lightning and Global Thunder are examples) and provide operational realistic threat-representative, GPS-contested environments for analytical assessment of air, ground, maritime, space & cyberspace mission capability. FORTUNE POFAs are PNT capability and vulnerability assessments associated with a Service exercise or mission event. PRISM POFAs encompass all Operations, Actions, and Activities (OAAs) associated with events outside of specific CCMD and/or service exercises or mission events. Assessments inform service acquisition decisions, capability gaps, intelligence gaps and tactics, techniques and procedures (TTP) development and implementation to mitigate effects on warfighter operations in the anticipated theater NAVWAR threat environments. JNWC assesses Department wide PNT posture through the PNT Annual assessment IAW DoDI 4650.08.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	11.863	9.014	0.000	9.014
Current President's Budget	0.000	11.863	8.999	0.000	8.999
Total Adjustments	0.000	0.000	-0.015	0.000	-0.015
• 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	-0.015	0.000	-0.015

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1202140F / Service Support to SPACECOM Activities				Project (Number/Name) 672486 / JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672486: JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES	-	0.000	7.467	7.500	0.000	7.500	7.572	7.709	7.847	11.462	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY20 all funding from RDT&E funding from PE 1201921F Service Support to STRATCOM - Space Activities, moved to PE 1202140F - Service Support to U.S. SPACECOM Activities

A. Mission Description and Budget Item Justification

Navigation Warfare (NAVWAR) is deliberate defensive and offensive action to assure positioning, navigation, and timing (PNT) information through coordinated employment of space, cyberspace, and electronic warfare (EW) operations. Funds are used to create and maintain NAVWAR knowledge. NAVWAR expertise is developed in part by execution of PNT Operational Field Assessments (POFAs). GYPSY POFA's are linked to Combatant Commander's (CCMD) Tier 1 exercises (USSTRATCOM's Global Thunder and Global Lightning are examples) and provide operational realistic threat-representative, GPS-contested environments for analytical assessment of air, ground, maritime, space & cyberspace mission capability. FORTUNE POFAs are PNT capability and vulnerability assessments associated with a Service exercise or mission event. PRISM POFAs encompass all Operations, Actions, and Activities (OAAs) associated with events outside of specific CCMD and/or service exercises or mission events. Assessments inform service acquisition decisions, capability gaps, intelligence gaps and tactics, techniques and procedures (TTP) development and implementation to mitigate effects on warfighter operations in the anticipated theater NAVWAR threat environments. JNWC assesses department wide PNT posture through the PNT Annual assessment IAW DoDI 4650.08.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: PNT Operational Assessments	0.000	7.467	7.500	0.000	7.500
Description: The JNWC will investigate, operationally assess, and simulate potential threats and mitigation strategies for denial of blue force PNT capabilities as well as preventing the hostile use of PNT information. Major Performers - Best value to the government selected contractors, universities, government facilities, federally funded research and development centers, laboratories, or other organizations					
FY 2020 Plans: Operational assessments - Simulate potential threats and mitigation strategies for potential denial of blue force PNT capabilities - Continuing development to prevent the hostile use of Positioning, Navigation and Timing (PNT) information.					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
No OCO requested					
<i>FY 2021 Base Plans:</i> Continuing Operational assessments - Modeling and simulation equipment, to simulate potential threats (Red force vs Blue Force capabilities)and develop mitigation strategies for potential denial of blue force PNT capabilities.					
Continued development, scenario build, specialized equipment, to prevent the hostile use of Positioning, Navigation and Timing (PNT) information.					
Planned exercises - GYPSY x2 for Combatant Command objectives, Fortune exercises x4 are for Service objectives, and PRISM events (undetermined) are for all others.					
<i>FY 2021 OCO Plans:</i> No OCO requested					
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> increase between FY20 and FY21 is due to inflation					
Accomplishments/Planned Programs Subtotals	0.000	7.467	7.500	0.000	7.500

C. Other Program Funding Summary (\$ in Millions) N/A
Remarks Prior to the FY20 PB cycle, The Joint Navigation Warfare Center was reported under PE 1201921F, WSC 672486. Beginning in FY20, the program will be reported under the newly created PE 1202140F, Service Support to U.S. SPACECOM Activities
D. Acquisition Strategy New contracts will be awarded using competitive procedures to the maximum extent possible.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202140F / Service Support to SPACECOM Activities	Project (Number/Name) 672486 / JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Position Navigation and Timing Operational Field Assessments	PO	Multiple, Kirtland AFB NM : Kirtland, NM	-	-		7.467	Oct 2019	7.500	Oct 2020	0.000		7.500	Continuing	Continuing	-
Subtotal			-	-		7.467		7.500		0.000		7.500	Continuing	Continuing	N/A

Remarks
Prior to the FY20 PB cycle, The Joint Navigation and Warfare Center (JNWC) was reported under PE 1201921F, WSC 672486. Beginning in FY20, the program will be reported under the newly created PE 1202140F, Service Support to U.S. SPACECOM Activities

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-	7.467	7.500	0.000	7.500	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

Navigation Warfare (NAVWAR)	
NAVWAR Operational Field Assessments - Continuing	[REDACTED]
Create / Maintain NAVWAR Knowledge - Continuing	[REDACTED]
NAVWAR Operational and CONOPS Events - Continuing	[REDACTED]

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>	Project (Number/Name) 672486 / <i>JOINT NAVWAR CENTER (JNWC) SPACE ACTIVITIES</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Navigation Warfare (NAVWAR)</i>				
NAVWAR Operational Field Assessments - Continuing	1	2020	4	2025
Create / Maintain NAVWAR Knowledge - Continuing	1	2020	4	2025
NAVWAR Operational and CONOPS Events - Continuing	1	2020	4	2025

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>				Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>				
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67A011: <i>Space Analysis and Application Development</i>	-	0.000	4.396	1.499	0.000	1.499	1.607	1.598	1.701	3.753	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Prior to the FY20 PB cycle, The Space Analysis and Application Development Program was reported under PE 1201921F, WSC 67A011. Beginning in FY20, the program will be reported under the newly created PE 1202140F, Service Support to U.S. SPACECOM Activities

This is NOT a new start.

A. Mission Description and Budget Item Justification

The Space Analysis and Application Development program Integrates space based effects into Department's 'Model of Record' for joint campaign analysis. Current modeling and simulation (M&S) models are inadequate to represent the contribution that U.S space capabilities make to the air, sea, and land fight and do not accurately portray current and future space threats. This line of effort integrates effects of space capabilities into the Synthetic Theater Operations Research Model (STORM) and other mission and campaign-level M&S tools. Enhanced space M&S will enable the DoD to make informed decisions regarding the direction of U.S. Space Doctrine, Tactics, Techniques, Procedures, and Resource Decisions. The DoD requires the ability to conduct campaign-level analysis to quantify the holistic operational impacts of adversary space actions on military campaigns and U.S. global operations.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Title: Space Campaign Modeling and Simulation, Development/Modification/Verification/Validation	0.000	4.396	1.499	0.000	1.499
Description: Developed, modifies, verifies, and validates new models for Space mission areas and modifies existing models to portray new capabilities					
FY 2020 Plans:					
- In coordination with HAF A/9 (HQ Air Force Studies, Analysis, and Assessments), develop schedule to identify requirements toward implementation of approved change requests and instantiation of space and contested space capabilities in STORM					
- Coordinate and update Blue space order of battle data, Red counter-space order of battle data, and Red counter-space CONOPS to support integration of contested space into mission and campaign-level M&S					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<ul style="list-style-type: none"> - Continue development of software and tools to model Red on Blue contested space (one versus one, many versus many, and space campaign-level) - Update likelihood assessment data for Red counter-space capability (likelihood to employ, and likelihood to be effective) to inform counter-space risk assessment and enterprise-level modeling - Review and update JMT consequence assessment used to inform risk analyses and enterprise level modeling - Utilize updated tools and data to support analytical efforts of new Space Analysis Consortium, and collaborate with partners to inform senior leader forums and decisions on space investments, requirements, acquisition, and operational risk decisions - Support cost benefit analyses of Space Control activities with quantifiable impacts to warfighter operations - Provide analysis support to inform Air Force Space Command's Space Enterprise Vision (SEV) <p>No OCO Requested</p> <p><i>FY 2021 Base Plans:</i> FY 2021 Base Plans:</p> <ul style="list-style-type: none"> - Continue priority integration of 22 Joint Mission Threads, space-based capabilities, and counter-space effects on the Warfighter in STORM - Continue to develop change request proposals and submit to STORM Configuration Control Board (CCB) to improve instantiation of potential future and denied/degraded space-based capabilities and their effects on the Warfighter in STORM - In coordination with HAF A/9 (HQ Air Force Studies, Analysis, and Assessments), develop schedule to identify requirements toward implementation of approved change requests and instantiation of space and contested space capabilities in STORM 					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>
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B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
<ul style="list-style-type: none"> - Develop and modify user-friendly, front-end campaign-level M&S software and tools supporting sufficiently accurate and very timely exploratory analytics to optimize more costly campaign-level STORM M&S, operational planning, gaming, and concept development - Continue development of software and tools to model Red on Blue contested space (one versus one, many versus many, and space campaign-level) and analyze/assess results to determine impact/effects on U.S. military campaigns and global operations - Coordinate and update current and future Blue space order of battle data, Red counter-space order of battle data, Red counter-space CONOPS, future Blue and Red CONOPS to support integration of contested space into mission and campaign-level M&S - Continue updates to software, tools, models, and data at the mission- and campaign-level to inform senior leaders evolving inquiries and decisions on space investments, requirements, acquisition, operational COAs, operational risk, and future planning - Assess and integrate enterprise-level model data for SATCOM capabilities into campaign-level modeling - In coordination with European Command, Indo-Pacific Command, other combatant commands, and respective USSPACECOM Integrated Planning Elements; explore improved integrated risk analysis with new campaign-level M&S capabilities - Utilize updated tools and data to support analytical efforts in support of SPACECOM activities, new Space Analysis Consortium, and evolving space analytical capabilities; and collaborate with partners to inform senior leader forums and decisions on space investments, requirements, acquisition, and operational risk decisions - Support cost benefit analyses of Space Control activities with quantifiable impacts to warfighter operations - Provide analysis support to inform Air Force Space Command's Space Enterprise Vision (SEV) <p>FY 2021 OCO Plans: No OCO requested</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p>					

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
FY20 to FY21 decrease was a planned reduction of RDT&E funding due to previously developed programs transitioning to an operational capability.					
Accomplishments/Planned Programs Subtotals	0.000	4.396	1.499	0.000	1.499

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

Prior to the FY20 PB cycle, The Space Analysis and Application Development Program was reported under PE 1201921F, WSC 67A011. Beginning in FY20, the program will be reported under the newly created PE 1202140F, Service Support to U.S. SPACECOM Activities

D. Acquisition Strategy

Any new projects funded in this program will be awarded using competitive procedures to the maximum extent possible.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Model Space effects for two mission tasks and integrate into STORM for joint campaign analysis	C/CPAF	TBD : TBD	-	0.000	Oct 2019	4.396	Oct 2019	1.499	Oct 2020	0.000		1.499	Continuing	Continuing	-
Subtotal			-	0.000		4.396		1.499		0.000		1.499	Continuing	Continuing	N/A

Remarks
Prior to the FY20 PB cycle, The Space Analysis and Application Development Program was reported under PE 1201921F, WSC 67A011. Beginning in FY20, the program will be reported under the newly created PE 1202140F, USSPACECOM

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000	4.396	1.499	0.000	1.499	Continuing	Continuing	N/A

Remarks
Prior to the FY20 PB cycle, The Space Analysis and Application Development Program was reported under PE 1201921F, WSC 67A011. Beginning in FY20, the program will be reported under the newly created PE 1202140F, USSPACECOM

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202140F / <i>Service Support to SPACECOM Activities</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Space Analysis Modeling and Simulation</i>				
Complete Mission-level modeling and analysis for 22 Joint Mission Threads	1	2020	4	2020
Complete priority integration of 22 Joint Mission Threads, space-based capabilities, and counter-space effects on the Warfighter in STORM	1	2021	4	2021
Run Improved STORM model and update integrated risk analysis with Combatant Commands	1	2022	4	2022
Identify and develop 10 additional Joint Mission Threads for integration into mission and campaign level modeling	1	2023	4	2023
Develop software and tools to model Red on Blue contested space environment. Develop space playbook to define Red counter-space threat	1	2024	4	2024
Update mission and campaign level M&S to inform senior leaders evolving inquiries and decisions on innovation, space investments, rapid acquisition, operational COAs, risk, and planning	1	2025	4	2025

Note

Prior to the FY20 PB cycle, The Space Analysis and Application Development Program was reported under PE 1201921F, WSC 67A011. Beginning in FY20, the program will be reported under the newly created PE 1202140F, USSPACECOM

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1202247F / AF TENCAP
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	31.986	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
670001: <i>Air Force TENCAP</i>	-	31.986	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2020, PE 1202247F, Air Force TENCAP efforts were transferred to PE 0207247F, Air Force TENCAP, in order to return program to the Major Force Program for General Purpose Forces.

A. Mission Description and Budget Item Justification

Air Force TENCAP increases warfighter effectiveness through the exploitation of national capabilities and promotes cross-domain integration of these capabilities into military operations/training and intelligence, surveillance and reconnaissance (ISR) activities.

AF TENCAP exploits existing air, space, cyber, national and global ISR, and Non-Traditional ISR (NTISR) for operational and tactical applications by rapidly prototyping and providing capability demonstrations. Projects are designed to transition to warfighters or national intelligence agencies for operational use, and to appropriate acquisition Programs of Record for sustainment and further development. AF TENCAP projects influence the design and operation of current and future air, space, cyber, national and global ISR, and NTISR systems while providing situational awareness to warfighters, national intelligence agency organizations, and units.

The program consists of multiple small projects supporting one of the Air Force Core Function Mission Areas (CFMAs). Projects are executed to provide continued support to Special Operations Forces and the warfighter, with impacts at the national, operational, and tactical levels.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver AF TENCAP 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 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force				Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1202247F / AF TENCAP				
B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	
Previous President's Budget	31.986	0.000	0.000	0.000	0.000	
Current President's Budget	31.986	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	
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2019	FY 2020	FY 2021
Title: Exploitation Applications				17.428	0.000	0.000
Description: Exploiting existing air, space, cyber, national and global ISR, and Non-Traditional ISR (NTISR) for operational and tactical applications by rapidly prototyping and demonstrating capabilities. Activities also influence the design and operation of future space, cyber, national and global ISR, and NTISR systems for tactical users.						
FY 2020 Plans: N/A						
N/A						
FY 2021 Plans: Exploiting existing air, space, cyber, national and global ISR, and Non-Traditional ISR (NTISR) for operational and tactical applications by rapidly prototyping and demonstrating capabilities. Activities also influence the design and operation of future space, cyber, national and global ISR, and NTISR systems for tactical users.						
Title: Talon SPITBALL				5.797	0.000	0.000
Description: Talon SPITBALL is a technology prototype to develop jam-resistant antenna for next-generation aircraft. Talon SPITBALL will enable uninterrupted tactical communications and intelligence information for advanced aircraft operating in denied environments.						
FY 2020 Plans:						

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1202247F / AF TENCAP
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
N/A			
FY 2021 Plans: Talon SPITBALL is a technology prototype to develop jam-resistant antenna for next-generation aircraft. Talon SPITBALL will enable uninterrupted tactical communications and intelligence information for advanced aircraft operating in denied environments.			
Title: Talon PIKE Description: Talon PIKE is a technology prototype to develop a counter-Unmanned Aerial System (UAS) capability for tactical users by leveraging national technical means. Talon PIKE will protect ground forces from UAS threats in hostile environments.	5.000	0.000	0.000
FY 2020 Plans: N/A FY 2021 Plans: Talon PIKE is a technology prototype to develop a counter-Unmanned Aerial System (UAS) capability for tactical users by leveraging national technical means. Talon PIKE will protect ground forces from UAS threats in hostile environments.			
Title: Talon Tactical Mobile Over-the-Horizon Radar (TACMOR) Description: Talon TACMOR is a technology prototype to expand air domain awareness and maritime domain awareness over the Western Pacific region. TACMOR is an FY17 Joint Capability Technology Demonstration project.	3.761	0.000	0.000
FY 2020 Plans: N/A FY 2021 Plans: Talon TACMOR is a technology prototype to expand air domain awareness and maritime domain awareness over the Western Pacific region. TACMOR is an FY17 Joint Capability Technology Demonstration project.			
Accomplishments/Planned Programs Subtotals	31.986	0.000	0.000

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTE 07 0207247F: AF TENCAP	0.000	21.365	21.683	-	21.683	22.134	22.536	22.941	-	Continuing	Continuing
Remarks	N/A										

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force Date: February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1202247F / AF TENCAP
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E. Acquisition Strategy
Projects are selected based upon needs identified by the program's customers - DOD Departments, Combatant Commands, Components, MAJCOMs, and/or National Intelligence Agencies. Many projects are executed via existing contracts maintained by other agencies; others are executed via AF TENCAP contracts established with vendors responding to annual Broad Agency Announcements. The U.S. Government organization sponsoring a project is responsible for assuming acquisition, deployment, logistics, sustainment and budgetary responsibilities for the developed capability after it has been successfully demonstrated by AF TENCAP.

AF TENCAP projects typically use an incremental acquisition strategy. AF TENCAP utilizes a disciplined systems engineering approach that allows program teams to solve problems through a series of segments. Each increment has to be successful to pursue the following segment which mitigates cost and schedule risk.

Contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202247F / AF TENCAP	Project (Number/Name) 670001 / Air Force TENCAP
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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 TENCAP Projects																												
FY 2018 Exploitation Applications Developed, Evaluated, and Released																												
FY 2019 Exploitation Applications Developed, Evaluated, and Released																												
Talon SPITBALL Developed																												
Talon SPITBALL Integrated/Tested																												
Talon PIKE Developed																												
Talon PIKE Integrated/Tested																												
Talon TACMOR System Design/Software Development																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1202247F / AF TENCAP	Project (Number/Name) 670001 / Air Force TENCAP
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
AF TENCAP Projects				
FY 2018 Exploitation Applications Developed, Evaluated, and Released	1	2019	3	2019
FY 2019 Exploitation Applications Developed, Evaluated, and Released	1	2019	3	2020
Talon SPITBALL Developed	1	2019	3	2019
Talon SPITBALL Integrated/Tested	1	2019	2	2020
Talon PIKE Developed	1	2019	2	2019
Talon PIKE Integrated/Tested	1	2019	1	2020
Talon TACMOR System Design/Software Development	1	2019	2	2020

Note

Most project selection activities occur approximately per the timelines shown, but some projects are initiated on a rolling basis throughout each year in response to time-sensitive operational requirements.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	26.251	58.582	195.288	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	280.121
672490: <i>Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)</i>	26.251	58.582	16.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.833
673035: <i>Presidential and National Voice Conferencing</i>	0.000	0.000	65.911	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.911
673040: <i>Force Element Terminal</i>	0.000	0.000	113.377	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	113.377

Program MDAP/MAIS Code: 199

A. Mission Description and Budget Item Justification

In FY2021, PE 1203001F, Family of Advanced BLoS Terminals efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203001SF, Family of Advanced BLoS Terminals from Appropriation 3600, Budget Activity 7 due to the creation of a new Appropriation for Space Force.

The FAB-T project replaces legacy Milstar terminals and will provide Extremely High Frequency (EHF), protected high data rate communication for nuclear and conventional forces to include Presidential and National Voice Conferencing (PNVC). FAB-T will provide the new, highly secure, state-of-the-art capability for DoD platforms to include strategic platforms and airborne/ground command posts via Milstar, and AEHF Satellites. FAB-T terminals will also support the critical command and control (C2) of the Milstar and AEHF satellite constellations. The Air Force will continue development of the FAB-T Command Post Terminal(CPT), performing activities to meet current and future emerging SATCOM requirements.

The Force Element Terminal (FET) project provides secure, protected, and survivable communications for the strategic and tactical warfighter through airborne based MILSATCOM terminals. The FET will provide the B-52, and RC-135 aircraft with worldwide nuclear and non-nuclear survivable, anti-jam Low Probability of Detect (LPD)/ Low Probability of Intercept (LPI), data and voice communications. The FET will be interoperable with Milstar, AEHF, Enhanced Polar Systems - Recapitalization (EPS-R), and Evolved Strategic SATCAM (ESS) Satellite constellations utilizing both Low Data Rate (LDR) and Extended Data Rate (XDR) waveforms.

The PNVC capability is a critical element of the Nuclear Command, Control, and Communications (NC3) System. PNVC is the Survivable Emergency Conferencing Network (SECN) replacement capability which provides anti-jam, anti-scintillation, survivable, and endurable voice communications through the AEHF satellite system for national and strategic users. There are several components being developed and procured by other organizations that must be synchronized to expeditiously field the capability. The PNVC Integrator is responsible for end-to-end integration of these components, to include requirements traceability, end-to-end system testing, configuration and checkout activities, training and technical manuals, network transition support, identification of deficiencies in overall PNVC system capability, enterprise and life cycle support for PNVC components. The AFPEO-SP approved entry into the acquisition lifecycle as post MS-A ACAT III Program of Record in January 2016. Starting in December 2018 PNVC Integrator is responsible for all program elements' requests for funding related to the Defense Information Systems and Agency (DISA) components of the PNVC System in accordance with FY 2018 National Defense Authorization Act, Sec. 1661.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>
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In February 2019 the AFPEO/NC declared the PNVC Integrator an ACAT II Program based on the updated approved budget request.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver FAB-T weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

This program is in Budget Activity 7, Operational System 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.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	60.168	197.388	0.000	0.000	0.000
Current President's Budget	58.582	195.288	0.000	0.000	0.000
Total Adjustments	-1.586	-2.100	0.000	0.000	0.000
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-2.100			
• 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	-1.586	0.000			

Change Summary Explanation

FY 2020: -\$5M Congressional mark due to underexecution.

FY 2021: -\$246M Funds transferred from RDT&E, Air Force to RDT&E, Space Force

FY 2020 received a -\$5M Congressional mark decrease for underexecution. The FY 2020 total in this document is incorrect in the data base. The correct total for FY 2020 should be \$192.388M.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1203001F / Family of Advanced BLoS Terminals (FAB-T)				Project (Number/Name) 672490 / Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
672490: Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)	26.251	58.582	16.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	100.833
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2021, PE 1203001F, Family of Advanced BLoS Terminals efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203001SF, Family of Advanced BLoS Terminals from Appropriation 3600, Budget Activity 7 due to the creation of a new Appropriation for Space Force.

In FY 2020 PE 1203001F, Project 672490, transferred to PE 1203001F, Project 673035 for PNVC and Project 673040 for FET for program transparency.

The FAB-T program replaces legacy Milstar terminals and will provide Extremely High Frequency (EHF), protected high data rate communication for nuclear and conventional forces to include Presidential and National Voice Conferencing (PNVC). FAB-T will provide this new, highly secure, state-of-the-art capability for DoD platforms to include strategic platforms and airborne/ground command posts via Milstar, AEHF, and Enhanced Polar System (EPS) satellites. FAB-T terminals will also support the critical command and control (C2) of the Milstar, AEHF and EPS satellite constellations. The Air Force will continue development of the FAB-T Command Post Terminal (CPT), performing systems engineering, architecture studies, development & operational test efforts, FAB-T terminal interoperability with the full AEHF satellite constellation activities, and other program activities to meet current and future emerging SATCOM requirements.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: FAB-T CPT Development	10.085	16.000	0.000
Description: The FAB-T program will provide EHF voice and data MILSATCOM for nuclear and conventional forces as well as airborne and ground command posts with connectivity to Milstar, AEHF, and EPS satellites.			
FY 2020 Plans: The FAB-T program will continue to provide EHF voice and data MILSATCOM for nuclear and conventional forces as well as airborne and ground command posts with connectivity to Milstar, AEHF, and EPS satellites. Additional development will be for National Security Agency (NSA) AEHF terminal certification.			
Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.			
FY 2021 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / Family of Advanced BLoS Terminals (FAB-T)	Project (Number/Name) 672490 / Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Title: PNVC Integrator Description: PNVC is the SECN replacement capability which provides anti-jam, anti-scintillation, survivable, and endurable voice communications through the AEHF satellite system for national and strategic users. The PNVC capability consists of constituent programs being developed and produced by other organizations. This program will integrate test and support configuration of hardware from these other programs. PNVC components will be installed at ground fixed and mobile command locations, as well as three aircraft platforms. FY 2020 Plans: N/A FY 2021 Plans: N/A	26.361	0.000	0.000
Title: FAB-T FET Description: Funding ensures the continued development of Force Element Terminals. Development activities related to FET design, development and qualification testing will be executed. FY 2020 Plans: N/A FY 2021 Plans: N/A	22.136	0.000	0.000
Accomplishments/Planned Programs Subtotals	58.582	16.000	0.000

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021			FY 2022	FY 2023	FY 2024	FY 2025	Cost To	
			Base	OCO	Total					Complete	Total Cost
• APAF 05 FBLOST: FAB-T	14.280	9.610	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	23.890
• SPAF 01 FBLOST: FAB-T	22.268	32.105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	54.373
• SPAF 01 PNVC: PNVC	0.000	1.915	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.915
• SPAF 01 FAB-T: FAB-T	6.134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.134

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>	Project (Number/Name) 672490 / <i>Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)</i>

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021			FY 2022	FY 2023	FY 2024	FY 2025	Cost To	
			Base	OCO	Total					Complete	Total Cost
• SPAF 02 SSPARE Spares and Repair....: <i>FAB-T</i>	15.568	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.625

Remarks

D. Acquisition Strategy

FAB-T Acquisition Strategy: In FY 2012, the government restructured the FAB-T development program to introduce competition into the acquisition strategy in order to reduce risk in delivering this capability as well as to drive down production costs. To ensure the best value to the government, the Air Force awarded production contracts in September 2013 to both contractors (Boeing and Raytheon). The production contracts began with production planning for both contractors. In June 2014, the Air Force down-selected to Raytheon. Development and production of FAB-T Command Post Terminals continued with Raytheon. The first Production contract options to produce CPT terminals were exercised after a successful Milestone C decision was approved September 1, 2015.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / Family of Advanced BLoS Terminals (FAB-T)	Project (Number/Name) 672490 / Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
FAB-T CPT Prime Contract	C/Various	Raytheon : Marlboro, MA	0.029	3.027	Feb 2019	13.174	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
FAB-T CPT Technical Mission Analysis	Various	MITRE : Various, MA	1.424	5.907	Feb 2019	1.250	Jan 2020	0.000		-		0.000	Continuing	Continuing	-
FAB-T CPT GFE	Various	TBD: TBD : Various, MA	0.000	-		0.376	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
FAB-T FET Prime Contracts	Various	Various : Various, MA	2.296	13.480	Dec 2018	-		-		-		-	0.000	15.776	-
FAB-T FET Technical Mission Analysis	Various	Various : Various, MA	1.519	5.769	Apr 2019	-		-		-		-	0.000	7.288	-
PNVC Prime Contract	Various	Various : Various, MA	12.210	14.044	Apr 2019	-		-		-		-	0.000	26.254	-
PNVC Technical Mission Analysis	Various	Various : Various, MA	2.300	4.167	Apr 2019	-		-		-		-	0.000	6.467	-
PNVC Enterprise SE&I	Various	Various : Various, MA	2.500	1.437	Jun 2019	-		-		-		-	0.000	3.937	-
PNVC GFE/GFP	Various	Various : Various, MA	0.200	2.935	Apr 2019	-		-		-		-	0.000	3.135	-
Subtotal			22.478	50.766		14.800		0.000		-		0.000	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
PNVC Support	C/Various	Various : Various	0.000	0.100	Oct 2019	-		-		-		-	0.000	0.100	-
Subtotal			0.000	0.100		-		-		-		-	0.000	0.100	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / Family of Advanced BLoS Terminals (FAB-T)	Project (Number/Name) 672490 / Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)
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Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FAB-T CPT Test	PO	Various : Various	0.116	0.930	Feb 2019	0.000	Dec 2019	-		-		-	Continuing	Continuing	-
FAB-T FET Test and Evaluation	PO	Various : Various	0.000	0.015	Aug 2019	-		-		-		-	0.000	0.015	-
PNVC Government Test and LDTO Support	PO	Various : Various	0.000	1.153	Jun 2019	-		-		-		-	0.000	1.153	-
Subtotal			0.116	2.098		0.000		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FAB-T CPT FFRDC	Various	Various : TBD	0.204	0.177	May 2019	-		-		-		-	Continuing	Continuing	-
FAB-T FET Other Support	Various	Various : MA	0.057	0.048	Nov 2018	-		-		-		-	0.000	0.105	-
FAB-T FET A&AS	Various	Various : MA	1.721	2.788	Feb 2019	-		-		-		-	0.000	4.509	-
PNVC FFRDC	MIPR	Various : CA	0.100	0.618	Mar 2019	-		-		-		-	0.000	0.718	-
PNVC A&AS	Various	Various : TBD	0.500	1.408	Nov 2018	-		-		-		-	0.000	1.908	-
PNVC Other Support	Various	Various : MA	1.000	0.499	Nov 2018	-		-		-		-	0.000	1.499	-
FAB-T CPT Other Support	Various	Various : MA	0.075	0.080	Oct 2018	1.200	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
Subtotal			3.657	5.618		1.200		0.000		-		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
	Project Cost Totals		26.251	58.582	16.000	0.000	-	0.000	Continuing	Continuing

Remarks
Prior Years funding, FY 2016/FY 2017 \$95.229M was executed in PE 0303001F. Prior to FY 2016, \$180.602M was executed in PE 0303601F.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>	Project (Number/Name) 672490 / <i>Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

<i>FAB-T</i>	
FAB-T CPT Raytheon Development Contract	
FAB-T CPT Government Test Support	
FAB-T CPT AEHF Terminal Certification	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>	Project (Number/Name) 672490 / <i>Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>FAB-T</i>				
FAB-T CPT Raytheon Development Contract	1	2019	2	2020
FAB-T CPT Government Test Support	1	2019	2	2020
FAB-T CPT AEHF Terminal Certification	2	2020	2	2020

Note
FAB-T Raytheon Development Contract actual award date 4Q 2012, completion is 2Q 2020.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1203001F / Family of Advanced BLoS Terminals (FAB-T)					Project (Number/Name) 673035 / Presidential and National Voice Conferencing		
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
673035: Presidential and National Voice Conferencing	0.000	0.000	65.911	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	65.911
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

In FY2021, PE 1203001F, Family of Advanced BLoS Terminals efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203001SF, Family of Advanced BLoS Terminals from Appropriation 3600, Budget Activity [07] due to the creation of a new Appropriation for Space Force.

In FY 2020 PE 1203001F, the PNVC effort in Project 672490 transferred to PE 1203001F, Project 673035, PNVC, for additional transparency.

The PNVC capability is a critical element of the Nuclear Command, Control, and Communications (NC3) System. PNVC is the Survivable Emergency Conferencing Network (SECN) replacement capability which provides anti-jam, anti-scintillation, survivable, and endurable voice communications through the AEHF satellite system for national and strategic users. There are several components being developed and procured by other organizations that must be synchronized to expeditiously field this capability. The PNVC Integrator is responsible for end-to-end integration of these components, to include requirements traceability, end-to-end system testing, configuration and checkout activities, training and technical manuals, network transition support, identification of deficiencies in overall PNVC system capability, enterprise and life cycle support for PNVC components. The AFPEO/SP approved entry into the acquisition lifecycle as a post MS-A ACAT III Program of Record in January 2016. In February 2019 the AF PEO/NC declared the PNVC Integrator an ACAT II Program based on updated approved budget request.

Starting in December 2018, PNVC Integrator is responsible for all program elements' requests for funding related to the Defense Information Systems Agency (DISA) components of the PNVC System in accordance with FY 2018 National Defense Authorization Act, Sec. 1661.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver PNVC weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: PNVC Integrator	0.000	65.911	0.000
Description: PNVC is the SECN replacement capability which provides anti-jam, anti-scintillation, survivable, and endurable voice communications through the AEHF satellite system for national and strategic users. The PNVC capability consists of constituent programs being developed and produced by other organizations. This program will integrate test and support configuration of hardware from these other programs. PNVC components will be installed at ground fixed and mobile command locations as well as three aircraft platforms.			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>	Project (Number/Name) 673035 / <i>Presidential and National Voice Conferencing</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>FY 2020 Plans: PNVC Integrator government team will conduct Phase 1 Developmental Test for ground based systems, with prime contractor support. In parallel, prime contractor and component contractors will identify and resolve hardware and software deficiencies identified during risk reduction testing, and conduct regression and interoperability testing post-disposition using both contractor and government test laboratories. Prime contractor will also be conducting Phase 2 risk reduction and contractor test for two airborne and a SMART-T nodes, and executing integration and checkout of PNVC systems at ground fixed locations world-wide. Finally, government and contract teams will conduct technical order verification and conducting user training across all nodes and sites.</p> <p>Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, experimentation, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>			
Accomplishments/Planned Programs Subtotals	0.000	65.911	0.000

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
			Base	OCO	Total						
• RDTE 07 672490: <i>PNVC</i>	23.961	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	23.961
• APAF 05 FBLOST: <i>FAB-T</i>	14.280	9.610	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	23.890
• SPAF 01 FBLOST: <i>FAB-T</i>	22.268	32.105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	54.373
• SPAF 01 <i>PNVC: PNVC</i>	0.000	1.915	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	1.915
• APAF 06 Aircraft Spares and Repa...: <i>FAB-T</i>	6.134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.134
• SPAF 02 SSPARE Spares and Repair...: <i>FAB-T</i>	15.568	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.625

Remarks
In FY 2020, PE 1203001F, PE Family of Advanced Beyond Line-of-Sight Terminals, Project 673035, Presidential and National Voice Conferencing efforts were transferred from PE 1203001F, PE Family of Advanced Beyond Line-of-Sight Terminals, Project 672490, Family of Advanced Beyond Line-of-Sight Terminals.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>	Project (Number/Name) 673035 / <i>Presidential and National Voice Conferencing</i>

D. Acquisition Strategy

PNVC Acquisition Strategy: On May 15, 2015 the Deputy Secretary of Defense assigned the PNVC End-to-End Integration responsibility to the Air Force; effective May 16, 2015, SAF/AQ designated the AFPEO/SP. In February 2019 the AF PEO/NC declared the PNVC Integrator an ACAT II Program based on updated approved budget request. The PNVC End-to-End Integrator program is responsible for requirements traceability, End-to-End system testing, site configuration activities, training and technical manuals, network transition support, identifying deficiencies in the PNVC capability, and enterprise and life cycle support for all PNVC components. Starting in December 2018 PNVC Integration is responsible for all program elements' requests for funding related to the Defense Information Systems and Agency (DISA) components of the PNVC System in accordance with FY 2018 National Defense Authorization Act, Sec. 1661.

Beginning in FY2020, all PNVC funds were transferred from DISA to BPAC 673035, for execution.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / Family of Advanced BLoS Terminals (FAB-T)	Project (Number/Name) 673035 / Presidential and National Voice Conferencing
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
PNVC Prime Contract	Various	Various : Various, MA	0.000	-		48.781	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
PNVC Technical Mission Analysis	Various	Various : Various, MA	0.000	-		5.430	Dec 2019	0.000		-		0.000	Continuing	Continuing	-
PNVC Enterprise SE&I	Various	Various : Various, MA	0.000	-		2.900	Dec 2019	0.000		-		0.000	Continuing	Continuing	-
PNVC GFE/GFP	Various	Various : Various, MA	0.000	-		-		-		-		-	Continuing	Continuing	-
Subtotal			0.000	-		57.111		0.000		-		0.000	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
PNVC FFRDC	MIPR	TBD : TBD	0.000	-		2.000	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
PNVC A&AS	Various	Various : Various TBD	0.000	-		1.600	Dec 2019	0.000		-		0.000	Continuing	Continuing	-
PNVC Other Support	Various	Various : MA	0.000	-		5.200	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
Subtotal			0.000	-		8.800		0.000		-		0.000	Continuing	Continuing	N/A

Project Cost Totals	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
	0.000	-	65.911	0.000	-	0.000	Continuing	Continuing	N/A

Remarks
 In FY 2020, PE 1203001F, PE Family of Advanced Beyond Line-of-Sight Terminals, Project 673035, Presidential and National Voice Conferencing efforts were transferred from PE 1203001F, PE Family of Advanced Beyond Line-of-Sight Terminals, Project 672490, Family of Advanced Beyond Line-of-Sight Terminals.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>	Project (Number/Name) 673035 / <i>Presidential and National Voice Conferencing</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>PNVC Integrator</i>	
Phase I Ground Development Test 1	██████████
Test, Integration, & Check Out	██████████
Deficiency Workoff	██████████

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>	Project (Number/Name) 673035 / <i>Presidential and National Voice Conferencing</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>PNVC Integrator</i>				
Phase I Ground Development Test 1	2	2020	3	2020
Test, Integration, & Check Out	4	2019	1	2020
Deficiency Workoff	3	2019	1	2020

Note

FAB-T / FET was started in prior year BPAC 672490.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / Family of Advanced BLoS Terminals (FAB-T)	Project (Number/Name) 673040 / Force Element Terminal
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
673040: Force Element Terminal	0.000	0.000	113.377	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	113.377
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY2021, PE 1203001F, Family of Advanced BLoS Terminals efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203001SF, Family of Advanced BLoS Terminals from Appropriation 3600, Budget Activity [07] due to the creation of a new Appropriation for Space Force.

In FY 2020, PE 1203001F, Family of Advanced Beyond Line-of-Sight Terminals, Project 673040, Force Element Terminal efforts were transferred from PE 1203001F, PE Family of Advanced Beyond Line-of-Sight Terminals, Project 672490, Family of Advanced Beyond Line of Sight Terminals to provide program transparency.

The Force Element Terminal (FET) program provides secure, protected, and survivable communications for the strategic and tactical warfighter through airborne based MILSATCOM terminals. The FET will provide the B-52, and RC-135 aircraft with worldwide nuclear and non-nuclear survivable, anti-jam, Low Probability of Detect (LPD)/Low Probability of Intercept (LPI), data and voice communications. The FET will be interoperable with Milstar, AEHF, Enhanced Polar Systems - Recapitalization (EPS-R), and Evolved Strategic SATCOM (ESS) Satellite constellations utilizing both Low Data Rate (LDR) and Extended Data Rate (XDR) waveforms.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver FAB-T FET weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605831F.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: FAB-T FET	0.000	113.377	0.000
Description: Description: Continue development of Force Element Terminals. Development activities include, but are not limited to, FET design, development and qualification testing.			
FY 2020 Plans: Funding is for the continued development of Force Element Terminals. Design activities will include, but not limited to, the conduct of design reviews including a Systems Requirement Review, Preliminary Design Review, and Critical Design Review. FET development activities will include nuclear hardness parts analysis and testing, performance of reliability growth testing, and fabrication of prototypes and test assets to support terminal environmental and functional qualification and flight testing.			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>	Project (Number/Name) 673040 / <i>Force Element Terminal</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc. Planning and support activities will include qualification test planning, logistics support planning, risk reduction activities, technical analysis and studies, and platform integration support.			
FY 2021 Plans: N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	0.000	113.377	0.000

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u>	<u>Total Cost</u>
			<u>Base</u>	<u>OCO</u>	<u>Total</u>					<u>Complete</u>	
• RDTE 04 672490: <i>FET</i>	22.100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	22.100
• APAF 05 FBLOST: <i>FAB-T</i>	14.280	9.610	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	23.890
• SPAF 01 FBLOST: <i>FAB-T</i>	22.268	32.105	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	54.373
• RDTE 07 PNVC: <i>PNVC</i>	26.261	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	26.261
• APAF 06 Aircraft Spares and Repa...: <i>FAB-T</i>	6.134	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	6.134
• SPAF 02 SSPARE Spares and Repair...: <i>FAB-T</i>	15.568	0.057	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.625

Remarks

D. Acquisition Strategy

FET Acquisition Strategy: Per the Acquisition Strategy Panel briefed to SAF/AQ on February 7, 2019, FET is pursuing a Rapid Prototyping development Section 804 approach of the National Defense Authorization Act for FY 2016 (Public Law 114-92). FET will award a development effort in FY 2020 leading to a production decision in FY 2023. The development effort includes system design and build of sufficient test assets to allow for expeditious development, testing, qualification and integration support of the FET capability. FET will meet B-52 and RC-135 platform requirements to support USSTRATCOM's Strategic Nuclear Command Control and Communication (NC3) mission.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)					Project (Number/Name)						
3600 / 7				PE 1203001F / Family of Advanced BLoS Terminals (FAB-T)					673040 / Force Element Terminal						
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
FAB-T FET Development Contracts	Various	TBD : TBD, MA	0.000	-		89.937	Dec 2019	0.000		-		0.000	Continuing	Continuing	-
FAB-T FET Technical Mission Analysis	Various	TBD : TBD, MA	0.000	-		15.420	Dec 2019	0.000		-		0.000	Continuing	Continuing	-
Subtotal			0.000	-		105.357		0.000		-		0.000	Continuing	Continuing	N/A
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
FAB-T FET Test & Evaluation and Assets	PO	Multiple Agencies : TBD	0.000	-		1.550	Jan 2020	0.000		-		0.000	Continuing	Continuing	-
Subtotal			0.000	-		1.550		0.000		-		0.000	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Management Services	C/CPAF	Not specified. : TBD	0.000	-		-		-		-		-	0.000	0.000	-
FAB-T FET Other Support	Various	Various : Various, MA	0.000	-		1.100	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
FAB-T FET A&AS	Various	Various : Various, MA	0.000	-		5.370	Jan 2020	0.000		-		0.000	Continuing	Continuing	-
Subtotal			0.000	-		6.470		0.000		-		0.000	Continuing	Continuing	N/A
Project Cost Totals			0.000	-		113.377		0.000		-		0.000	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force							Date: February 2020			
Appropriation/Budget Activity 3600 / 7			R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>			Project (Number/Name) 673040 / <i>Force Element Terminal</i>				
	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	

Remarks
 In FY 2020, PE 1203001F, PE Family of Advanced Beyond Line-of-Sight Terminals, Project 673040, Force Element Terminal efforts were transferred from PE 1203001F, PE Family of Advanced Beyond Line-of-Sight Terminals, Project 672490, Family of Advanced Beyond Line of Sight Terminals.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>	Project (Number/Name) 673040 / <i>Force Element Terminal</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

FET	
FAB-T Force Element Terminal Development	████████████████████
FAB-T FET Parts Hardness Testing	████
FAB-T FET Design, Fabrication and Development of Prototypes and Test Assets	████████████████████

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203001F / <i>Family of Advanced BLoS Terminals (FAB-T)</i>	Project (Number/Name) 673040 / <i>Force Element Terminal</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
FET				
FAB-T Force Element Terminal Development	1	2020	4	2020
FAB-T FET Parts Hardness Testing	1	2020	1	2020
FAB-T FET Design, Fabrication and Development of Prototypes and Test Assets	1	2020	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203110F / <i>Satellite Control Network (SPACE)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	26.374	57.891	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
673276: <i>Satellite Control Network</i>	-	26.374	57.891	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 FY2021, PE 1203110F, Satellite Control Network (SPACE) efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203110SF Satellite Control Network (SPACE) from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

FY 2020 received a Congressional mark that reduces DCO-S by -\$5M for unjustified request. That reduction was not accounted for correctly in the database and reflected a -\$4M reduction. The correct total for AFSCN in FY 2020 is \$56.891M, not \$57.891M.

The Air Force Satellite Control Network (AFSCN) is a satellite ground terminal network comprised of two communication nodes (Schriever AFB & Vandenberg AFB) and 15 antenna systems. The antennas are distributed around the globe at seven locations -- Vandenberg Tracking Station (VTS), Diego Garcia Station (DGS), Guam Tracking Station (GTS), Hawaii Tracking Station (HTS), New Hampshire Tracking Station (NHS), Thule Tracking Station (TTS) and Telemetry and Commanding Station (TCS) at RAF Oakhanger, England -- to ensure global coverage for over 170 satellites in various orbits. The AFSCN conducts an average of 450 satellite contacts per day supporting Positioning, Navigation and Timing (PNT), Intelligence, Surveillance and Reconnaissance (ISR), Missile Warning, Communications, Weather, Launch Vehicle Support, and Research and Development (R&D) in support of Department of Defense (DoD), Intelligence Community (IC), and National Aeronautics and Space Administration (NASA) operations. While most of the 490 satellite contacts/day are routine command and control activities, the AFSCN is also used for satellite emergencies (e.g. tumbling satellite) because its high power antennas are often the only earthbound assets that can contact a non-responsive satellite to re-establish command & control. During FY 2019 the AFSCN supported 11 space vehicle emergencies resulting in the preservation of \$4.1B worth of satellites. In addition to routine and emergency satellite operations C2, the AFSCN provides support to launch vehicle and early orbit operations, ensuring worldwide antennas receive telemetry as the rocket travels through the atmosphere and transmit commands to a newly orbiting satellite to initiate early orbit checkout. In FY 2019, the AFSCN supported 19 launches delivering \$13.7B worth of satellites to their operational orbits. Finally, the AFSCN provides Factory Compatibility Testing (FCT) to ensure satellites and rockets can communicate via the AFSCN before the satellite is launched. These funds are used to develop next-generation tools to improve the AFSCN and ensure the capability is available to support DoD, Intelligence Community, and civil users. These efforts support cyber hardening, Defensive Cyberspace Operations (DCO-S) and and Systems Engineering & Integration (SE&I) activities for the space enterprise, as well as align with the evolving future space domain demands through Resilient Enterprise Ground (REG) to include transmit and receive, and data transport.

AFSCN Deficiency Resolution: Provides test, cyber security, requirements management, and system architecture support to the AFSCN.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203110F / <i>Satellite Control Network (SPACE)</i>
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Resilient Enterprise Ground (REG): Provides the means to communicate with all future spacecraft through diverse communication networks. The program is pursuing more capable ground based antennas, space based communication links, augmenting the existing ASFCN with commercial and civil antennas, upgrading satellite scheduling to commercial standards, and developing infrastructure for long haul communications driven by increase in antennas, cyber security and resilience requirements.

In FY 2021, Defensive Cyber Operations Space (DCO-S) funds in PE 1203614F JSpOC Mission System moved to PE 1203110F Satellite Control Network to consolidate Air Force Space DCO-S development activities.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program /project priorities according to an integrated unclassified /classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose capabilities.

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

Funding in this exhibit was previously budgeted in PE 0305110F Satellite Control Network.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	26.440	61.891	16.167	0.000	16.167
Current President's Budget	26.374	57.891	0.000	0.000	0.000
Total Adjustments	-0.066	-4.000	-16.167	0.000	-16.167
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-5.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.066	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	1.000	-16.167	0.000	-16.167

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1203110F / <i>Satellite Control Network (SPACE)</i>		
Change Summary Explanation FY 2020: -\$5M Congressional reduction for DCO-S unjustified growth FY 2021: Funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force				
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
Title: AFSCN Deficiency Resolution		0.211	2.752	-
Description: Provides test, cyber security, requirements management, and system architecture support to the AFSCN. Additionally, the Air Force is investigating multiple cyber defense tools for integration onto the AFSCN baseline.				
FY 2020 Plans: Address AFSCN deficiencies in the Remote Tracking Stations, Enhanced High Power Amplifiers, AFSCN Scheduling System and other infrastructure. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.				
FY 2020 to FY 2021 Increase/Decrease Statement: N/A				
Title: Satellite Operations Transmit and Receive		22.177	10.196	-
Description: Provide enterprise transmit, receive and resource management solutions to enable continuous satellite operations (SATOPS) during contested, degraded and operationally denied environment.				
FY 2020 Plans: Continue risk reduction and technology maturation activities for phased array Multi-Band Multi-Mission antennas. Continue development of Commercial Augmentation Services (CAS) activities. Field AFSCN Scheduling Tool (AST) to replace Electronic Schedule Dissemination 2.7. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.				
FY 2020 to FY 2021 Increase/Decrease Statement: N/A				
Title: Defensive Cyberspace Operations - Space (DCO-S)		0.000	42.000	-
Description: FY 2020 received a Congressional mark that reduces DCO-S by -\$5M for unjustified request. That reduction was not accounted for correctly in the database and reflected a -\$4M reduction. The correct total for DCO-S in FY 2020 is \$41M, not \$42M.				

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1203110F / <i>Satellite Control Network (SPACE)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Funding supports cyber hardening and Defensive Cyberspace Operations for Space (DCO-S) activities for the space enterprise. Provides space enterprise defensive cyber solutions to counter advanced persistence cyber threats, through rapid fielding of operational prototypes using agile development methods.</p> <p>This effort implements a combined Development/Security/Operations (DEVSECOPS) framework which incorporates methodologies, technologies, and tools to deeply embed security best practices into the modern development workflow and tool-chain. This effort will institute four product lines: Manticore (detect), Pegasus (protect), Chimera (identify), and Kraken (respond). The DCO-S capabilities are developed and deployed as an agile program, leveraging a DEVSECOPS framework to facilitate rapid and timely fielding to operations.</p> <p>FY 2020 Plans: Enhance Defensive Cyber Operations for Space (DCO-S) enterprise-wide, through development and integration of Defensive Cyber Operations tools, including Manticore, Pegasus, Chimera, and Kraken product lines. Manticore will develop, integrate and field endpoint and network data collection, and data extraction and fusion analytic capabilities. Pegasus will address hardware and software supply chain risk management (HW/SW SCRMM), enterprise cryptography, and cyber hardening activities. Chimera will develop threat identification through system characterization, vulnerability mapping, and cyber/intelligence integration. Kraken will develop capability for incident management, forensics, and tailored response. Collectively these tool capabilities will fill cyber deficiencies across the space enterprise.</p> <p>Plan and deploy DCO-S product line capabilities to the following mission systems: AFSCN, Global Positioning System Operational Control Segment(GPS OCS), Advanced Extremely High Frequency (AEHF)satellite program, Enterprise Ground Services (EGS), REG, and Eastern/Western Ranges. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: Enterprise Systems Engineering and Integration</p> <p>Description: SE&I manages the government controlled system and subsystem level baseline requirements including analysis of future changes to the fielded baseline. SE&I provides "government as the integrator" engineering support to ensure multiple separate modernizations and the sustainment baselines are synchronized. SE&I will develop and recommend investment strategies to keep the AFSCN operating well beyond the Future Years Defense Plan.</p> <p>FY 2020 Plans:</p>		3.986	2.943	-

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203110F / <i>Satellite Control Network (SPACE)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Continue Program Office support and independent SE&I efforts as required to integrate development and modernization across the AFSCN. Provide systems and subsystem level definition, baseline, architecture, integration planning and support for the AFSCN. Additionally, SE&I will provide support to Space & Missile Systems Center (SMC) initiatives supporting Resilient Enterprise Ground activities. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	26.374	57.891	-

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• SPAF 01 Line Item AFSCOM: <i>AF Satellite Comm System</i>	35.326	56.298	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• RDTE 07 1203182F: <i>Spacelift Range System (SPACE)</i>	20.168	20.837	0.000	-	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks
Procures the mission critical electronics and telecommunications equipment to upgrade the aging AFSCN Range and Network Operations segments.

E. Acquisition Strategy
RDT&E efforts focus on completing upgrades as well as future architectures and studies to ensure the best use of investment funding. The SE&I contractor maintains the DoD Architecture Framework (DoDAF) architecture and requirements baseline for Government approval and may perform studies to determine Government options. Limited RDT&E will be applied to the Consolidated AFSCN Modifications, Maintenance, and Operations (CAMMO) contract when sustaining engineering expertise is needed to finalize Government-approved architectures. Federally Funded Research and Development Corporation technical depth and breadth will be leveraged to ensure AFSCN modernization efforts are compatible with mission rules and do not pose a risk to safe and cost-effective satellite contacts.

Resilient Enterprise Ground (REG) activities will leverage existing prototypes and risk reduction activities. The Air Force plans to pursue the use of Other Transaction Authority for Resilient Enterprise Ground for Multi Band Multi Mission (MBMM) and Commercial Augmentation Segmentation (CAS).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203110F / <i>Satellite Control Network (SPACE)</i>	Project (Number/Name) 673276 / <i>Satellite Control Network</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Resilient Enterprise Ground Scheduling	Various	Stottler-Henke : Colorado Springs, CO	-	5.155	Apr 2019	2.000	Jan 2020	-		-		-	Continuing	Continuing	-
AFSCN Deficiency Resolution	Various	Various : Colorado Springs, CO	-	0.211	Jul 2019	2.752	Jul 2020	-		-		-	Continuing	Continuing	-
Resilient Enterprise Ground Commercial Augmentation	MIPR	AFRL : Kirtland AFB, NM	-	10.000	Dec 2019	-		-		-		-	Continuing	Continuing	-
Resilient Enterprise Ground Multi-Band Multi-Mission	MIPR	DIU : Mountain View, CA	-	5.183	Nov 2019	5.057	Aug 2020	-		-		-	Continuing	Continuing	-
Defensive Cyberspace Operations - Space (DCO-S)	Various	TBD : Colorado Springs	-	-		42.000	Dec 2019	-		-		-	Continuing	Continuing	-
Enterprise Systems Engineering and Integration	C/CPIF	ENSCO : Colorado Springs, CO	-	3.986	Nov 2018	2.943	Nov 2019	-		-		-	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA	-	0.570	Oct 2018	1.417	Oct 2019	-		-		-	Continuing	Continuing	-
Subtotal			-	25.105		56.169		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
FFRDC	Various	Aerospace Corp. : El Segundo, CA	-	0.847	Apr 2019	0.873	Apr 2020	-		-		-	Continuing	Continuing	-
A&AS	Various	Gartner : Colorado Springs, CO	-	0.422	Apr 2019	0.531	Apr 2020	-		-		-	Continuing	Continuing	-

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203110F / <i>Satellite Control Network (SPACE)</i>	Project (Number/Name) 673276 / <i>Satellite Control Network</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
AFSCN				
AFSCN Deficiency Resolution	1	2019	4	2020
REG Satellite Operations Transmits and Receive	1	2019	4	2020
REG Defensive Cyberspace Operations for Space (DCO-S)	1	2020	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development	R-1 Program Element (Number/Name) PE 1203165F I NAVSTAR Global Positioning System (Space and Control Segments)
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	8.610	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
67A025: GPS Enterprise Integrator	-	8.610	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 FY2021, PE 1203165F, NAVSTAR Global Positioning System (Space and Control Segments) efforts were transferred to Appropriation 3620F, Research, Development, Test & Evaluation, Space Force, PE 1203165SF, NAVSTAR Global Positioning System (Space and Control Segments) from Appropriation 3600F, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

Detailed information on this effort remains classified and will be provided on a need-to-know basis.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021 Base</u>	<u>FY 2021 OCO</u>	<u>FY 2021 Total</u>
Previous President's Budget	8.937	0.000	1.985	0.000	1.985
Current President's Budget	8.610	0.000	0.000	0.000	0.000
Total Adjustments	-0.327	0.000	-1.985	0.000	-1.985
• 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	-0.327	0.000			
• Other Adjustments	0.000	0.000	-1.985	0.000	-1.985

Change Summary Explanation

FY 2021: \$1.985M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

C. Accomplishments/Planned Programs (\$ in Millions)	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u>
Title: Classified Effort	8.610	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203165F / NAVSTAR Global Positioning System (Space and Control Segments)
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Description: Classified effort FY 2020 Plans: N/A FY 2021 Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	8.610	0.000	0.000

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203165F / NAVSTAR Global Positioning System (Space and Control Segments)	Project (Number/Name) 67A025 / GPS Enterprise Integrator

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Test Event	
Classified Effort	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203165F / NAVSTAR Global Positioning System (Space and Control Segments)	Project (Number/Name) 67A025 / GPS Enterprise Integrator

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Test Event				
Classified Effort	1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	69.785	4.566	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
67A014: <i>R&D Space & Missile Operations</i>	-	9.041	4.566	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
673140: <i>Enterprise Ground Services EGS</i>	-	60.744	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Note

In FY2020, funding for the Enterprise Ground Services (EGS) Project 673140 was transferred to a dedicated Program Element (1206770F). In FY2021, PE 1203173F, Space and Missile Test and Evaluation Center efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203173SF Space and Missile Test and Evaluation Center from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

A. Mission Description and Budget Item Justification

The Research and Development Space and Missile Operations (RDSMO) program, executed by the Innovation and Prototyping Directorate at Kirtland AFB, NM, conducts space and missile Research and Developmental Test and Evaluation (RDT&E) and Initial Operational Test and Evaluation (IOT&E) in support of prototype experimental, demonstration, and operational satellites at the RDT&E Support Complex (RSC) and the Mobile Range Flight (MRF) at Kirtland, NM and at Schriever AFB, CO. The RDSMO program develops, acquires, delivers, integrates, tests, operates and sustains the Multi-Mission Satellite Operations Center (MMSOC) satellite command and control (C2) Ground System Enterprise (GSE) and fixed/deployable telemetry, tracking, and commanding (TT&C) antenna systems in support of AF and DoD missions. The RDSMO program is responsible for transitions of designated satellite missions to the operational command upon user needs. In addition, RDSMO supports the deployment and sustainment of Enterprise Ground Services (EGS) in multiple locations as AFSPC transitions to an Enterprise-based ground C2. Funds in the General Information Technology (Space) line procures Information Technology products to support RDSMO.

The primary objective of the MMSOC C2/GSE environment is to develop the capability to rapidly support R&D, prototype and operational systems and to transition R&D space vehicle technology with residual military utility to operational status for immediate warfighter support. MMSOC is a multiple mission operation system that uses standard hardware and software infrastructure to (1) perform satellite C2 in support of launch requirements; (2) develop and test tactics, techniques, procedures and concepts to conduct satellite operations; (3) provide a satellite C2 incremental block evolution resource for RDT&E of new satellite and C2 systems and concepts; and (4) deliver operational flexibility for new and legacy satellite missions. A secondary objective of MMSOC is to provide a foundational C2 platform and product line for the Enterprise Ground Services (EGS) effort to build upon and to meet the evolving initiatives of the current and future space enterprise.

Space acquisition must respond with speed and agility to emerging adversary threats. Space and Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified /classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanism to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>
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new, or repurpose capabilities.

This program may include necessary civilian pay expenses required to manage, execute, and deliver warfighting space 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 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	79.935	4.566	4.398	0.000	4.398
Current President's Budget	69.785	4.566	0.000	0.000	0.000
Total Adjustments	-10.150	0.000	-4.398	0.000	-4.398
• 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	-7.400	0.000			
• SBIR/STTR Transfer	-2.750	0.000			
• Other Adjustments	0.000	0.000	-4.398	0.000	-4.398

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 673140: *Enterprise Ground Services EGS*

Congressional Add: *Space Enterprise Defense Implementation*

Congressional Add Subtotals for Project: 673140

Congressional Add Totals for all Projects

	FY 2019	FY 2020
	19.312	-
	19.312	-
	19.312	-

Change Summary Explanation

FY 2019: $-\$7.400\text{M}$ reflects the net change of a $-\$10.000\text{M}$ decrease for the Next-Generation Overhead Persistent Infrared (Next-Gen OPIR) Above Threshold Reprogramming and a $\$2.600\text{M}$ Below Threshold Reprogramming for RSC modernization.

FY 2021: $-\$4.397\text{M}$; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>				Project (Number/Name) 67A014 / <i>R&D Space & Missile Operations</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67A014: <i>R&D Space & Missile Operations</i>	-	9.041	4.566	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY2021, PE 1203173F, Space and Missile Test and Evaluation Center efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203173SF Space and Missile Test and Evaluation Center from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

A. Mission Description and Budget Item Justification

The Research and Development Space and Missile Operations (RDSMO) program, executed by the Innovation and Prototyping Directorate at Kirtland AFB, NM, conducts space and missile Research and Developmental Test and Evaluation (RDT&E) and Initial Operational Test and Evaluation (IOT&E) in support of prototype experimental, demonstration, and operational satellites at the RDT&E Support Complex (RSC) and the Mobile Range Flight (MRF) at Kirtland, NM and at Schriever AFB, CO. The RDSMO program develops, acquires, delivers, integrates, tests, operates and sustains the Multi-Mission Satellite Operations Center (MMSOC) satellite command and control (C2) Ground System Enterprise (GSE) and fixed/deployable telemetry, tracking, and commanding (TT&C) antenna systems in support of AF and DoD missions and transitions designated satellite missions to the operational command upon user needs. In addition, RDSMO supports the deployment and sustainment of Enterprise Ground Services (EGS) in multiple locations as US Space Force (USSF) HQ transitions to an Enterprise-based ground C2. Funds in the General Information Technology (Space) line in appropriation 3021, Space Procurement Air Force, procures Information Technology products to support RDSMO.

The primary objective of the MMSOC C2/GSE environment is to develop the capability to rapidly support R&D, prototype and operational systems and to transition R&D space vehicle technology with residual military utility to operational status for immediate warfighter support. MMSOC is a multiple mission operation system that uses standard hardware and software infrastructure to (1) perform satellite C2 in support of launch requirements; (2) develop and test tactics, techniques, procedures and concepts to conduct satellite operations;(3) provide a satellite C2 incremental block evolution resource for RDT&E of new satellite and C2 systems and concepts; and (4) deliver operational flexibility for new and legacy satellite missions. A secondary objective of MMSOC is to provide a foundational C2 platform and product line for the Enterprise Ground Services (EGS) effort to build upon and to meet the evolving initiatives of the current and future space enterprise.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: MMSOC Development	9.041	4.566	0.000
Description: Evolution of the Ground Services Architecture (GSA) through the Multi-Mission Satellite Operations Center (MMSOC). Development, integration, and test of common services for space vehicle prototype and operational capabilities, including shared orbital analysis and mission planning tools, data distribution and dissemination, cyber defense, cloud computing, multi-security level operations, and enhanced ground entry points for geosynchronous proto-ops.			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>	Project (Number/Name) 67A014 / <i>R&D Space & Missile Operations</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p><i>FY 2020 Plans:</i> Continue providing capability to US Space Force (USSF) HQ for reduced cost of operations and maintenance through evolution of MMSOC C2 architecture and automated processes and integrate EGS backwards functionality into MMSOC C2. Decommission and dispose of this MMSOC 2.0 baseline. Continue LDPE-1 mission C2 and provide backup to EGS mission schedule. Begin support to the AFSPC-12 payload, Navigation Technology Satellite 3 (NTS-3) and Tetra prototyping projects. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p><i>FY 2021 Plans:</i> N/A</p> <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> N/A</p>			
Accomplishments/Planned Programs Subtotals	9.041	4.566	0.000

C. Other Program Funding Summary (\$ in Millions)												
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>	
• SPAF 01 GNRLIT: <i>General Information Tech - Space</i>	1.361	1.894	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Remarks
In FY2021, P-1 Line Item GNRLIT/General Information Technology efforts were transferred to Appropriation 3022F, Procurement, Space Force, from Appropriation 3021F due to the creation of a new Appropriation for Space Force.

D. Acquisition Strategy
Modernize ground system capabilities and leverage MMSOC sustainment as a test bed for new ground service development, integration testing and operationalization. This includes integration and testing of early EGS prototypes for the Space Based Infra-Red System (SBIRS) Highly Elliptical Orbit (HEO) Migration to EGS (HOME), Operationally Responsive Space (ORS)-5, Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) Augmented Geostationary Laboratory Experiment (EAGLE), Mycroft, Long Duration Propulsive ESPA (LDPE), AFSPC-12 payload, NTS-3 and Tetra prototyping projects, the Space Force competitively awarded the new Engineering, Development, Integration, and Sustainment (EDIS) Contract to support MMSOC, MRF and EGS activities. Additionally, MMSOC is using a competitively awarded Space Test and Engineering Contract (STEC) and uses Advisory & Assistance Support (A&AS) contracts. These contracts are all managed by Space and Missile Systems Center (SMC).

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>	Project (Number/Name) 67A014 / <i>R&D Space & Missile Operations</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Ground Services R&D Engineering, Development, Integration, and Test	C/Various	Various : TBD	-	1.175	Jan 2019	1.449	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
RSC Modernization	Various	Various : TBD	-	4.884	Apr 2019	-		-		-		-	Continuing	Continuing	-
LDPE Development, Integration, and Test	Various	Various : TBD	-	1.164	Jun 2019	-		-		-		-	Continuing	Continuing	-
Core Services Development and Configuration	MIPR	Various : TBD	-	0.395	Oct 2018	1.100	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
Service Bus Architecture Standards	MIPR	NASA Goddard : Greenbelt, MD	-	0.050	May 2019	0.050	May 2020	0.000		-		0.000	Continuing	Continuing	-
Information Assurance Engineering	MIPR	SAF/FMBIB : Albuquerque, NM	-	0.123	Jan 2019	0.250	Jan 2020	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	7.791		2.849		0.000		-		0.000	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Space Test and Engineering Contract (STEC) (MMSOC)	C/CPAF	LINQUEST : Kirtland, AFB, NM	-	0.246	Nov 2018	0.400	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	0.246		0.400		0.000		-		0.000	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS- METIS	Various	Various : Kirtland, AFB, NM	-	1.004	Mar 2019	1.317	Mar 2020	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	1.004		1.317		0.000		-		0.000	Continuing	Continuing	N/A

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force							Date: February 2020				
Appropriation/Budget Activity 3600 / 7			R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>				Project (Number/Name) 67A014 / <i>R&D Space & Missile Operations</i>				
	Prior Years	FY 2019	FY 2020		FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals	-	9.041	4.566		0.000	-	0.000	Continuing	Continuing	N/A	

Remarks
 In FY2021, PE 1203173F, Space and Missile Test and Evaluation Center efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203173SF Space and Missile Test and Evaluation Center from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>	Project (Number/Name) 67A014 / <i>R&D Space & Missile Operations</i>
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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 Duration Propulsive ESPA (LDPE)- Tetra																												
AFSPC-12 Payload Support																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>	Project (Number/Name) 67A014 / <i>R&D Space & Missile Operations</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>MMSOC Development</i>				
MMSOC Ground Services Architecture (GSA) Evolution	1	2019	4	2020
GSA Backwards Compatibility, Test, and Mission Schedule Relief	2	2019	4	2020
Core Services Development and Configuration	1	2019	4	2020
MMSOC Space Test Program Satellite-2 (STPSat-2)	1	2019	4	2020
MMSOC Space Test Program Satellite-3 (STPSat-3) (Customer Funded)	1	2019	4	2020
MMSOC CloudSat Supt (Customer Funded)	1	2019	4	2020
MMSOC Green Propellant Infusion Mission (GPIM) Support (Customer Funded)	1	2019	4	2020
MMSOC Demonstration and Science Experiment (DSX) Support (Customer Funded)	1	2019	4	2020
MMSOC ORS-5 Support (Customer Funded)	1	2019	4	2020
Navigation Technology Satellite NTS-3	1	2020	4	2020
MMSOC Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) Augmented Geostationary Laboratory Experiment (EAGLE) Support (Customer Funded)	1	2019	4	2020
MMSOC Mycroft Support (Customer Funded)	1	2019	4	2020
MMSOC Long Duration Propulsive ESPA-1 (Customer Funded)	1	2019	4	2020
Long Duration Propulsive ESPA (LDPE)- Tetra	1	2019	4	2020
AFSPC-12 Payload Support	1	2020	4	2020

Note

Note: This schedule reflects RDSMO support to the customer funded missions and may not directly align with customer program office schedules.

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>	Project (Number/Name) 67A014 / <i>R&D Space & Missile Operations</i>

In FY2021, PE 1203173F, Space and Missile Test and Evaluation Center efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203173SF Space and Missile Test and Evaluation Center from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>				Project (Number/Name) 673140 / <i>Enterprise Ground Services EGS</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
673140: <i>Enterprise Ground Services EGS</i>	-	60.744	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2020, funding for the Enterprise Ground Services (EGS) Project 673140 was transferred to a dedicated Program Element (1206770F).

A. Mission Description and Budget Item Justification

The Enterprise Ground Services (EGS) program is part of the evolving current and future space domain demands. MMSOC capability will transition to become the EGS command and control (C2) product line. The EGS C2 product line will perform technology maturation, experiments, prototyping and operational mission transition for increased commonality and resiliency in space program ground systems. The EGS capability will become the primary ground C2 system for US Space Force (USSF) HQ and other users.

The main objective of the EGS is to provide a robust enterprise ground architecture for Air Force space systems. EGS will focus efforts on developing and integrating data centers in laboratories at three separate sites, advanced concept exploration, prototype development and demonstrations, user experience maturation, training and Concept of Operations (CONOPS) refinement, cyber operations and operational mission training support. These efforts will require support such as systems engineering, integration and test, standards and interface development, architecture development, enhanced cybersecurity development and implementation.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Enterprise Ground Services (EGS)	41.432	0.000	0.000
Description: Enterprise Ground Services (EGS) provides the Air Force with a robust enterprise ground architecture by creating a set of government standards and interfaces to flexibly manage and execute integrated and agile satellite operations (SATOPS) in a contested environment. EGS provides the complete operations solution for SATOPS at various classification levels with increased resiliency and capability, and improved cyber defense capabilities. EGS will enable a near-real-time common operating picture of enterprise-wide tactical health, status and 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. EGS operates as a key element of the current and future space domain, and leverages lessons learned, contracts and resources from the other elements of the Enterprise Space Battle Management Command and Control (ESBMC2) and Threat Warning and Response (TWAR).			
FY 2020 Plans:			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>	Project (Number/Name) 673140 / <i>Enterprise Ground Services EGS</i>
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
N/A			
FY 2021 Plans: N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	41.432	0.000	0.000

	FY 2019	FY 2020
Congressional Add: Space Enterprise Defense Implementation	19.312	-
FY 2019 Accomplishments: The Congressional Add funds, less \$0.688M SBIR transfer, supports EGS expanding on the prototypes to scale services to support more missions. The funds were used to develop and to field operational services consistent with incremental deliveries and agile development. Specific areas included: adding additional software developers, documenting development for mission partners to enable adoption of EGS services, transitioning services into an operational environment to prototype agile Ops Acceptance of individual services, and increased accreditation and security support to the project office.		
Congressional Adds Subtotals	19.312	-

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• RDTE 07 1206770F: <i>Enterprise Ground Services</i>	-	118.870	-	-	-	-	-	-	-	-	Continuing Continuing

Remarks
In FY 2020, funding for EGS was transferred to the new EGS Program Element (1206770F).

D. Acquisition Strategy
The EGS acquisition strategy focuses on rapidly delivering C2 prototypes and operational capabilities to warfighters, while leveraging industry best practices for agile development and continuous integration /deliver (CI/CD). One of the key tenets of the EGS acquisition strategy is to maintain government ownership of the technical baseline. As a result, EGS uses a combination of existing and new contracts, and agreements with industry and academia to procure prototypes, platform as a service (PaaS) capabilities, system engineering services, and pre-operations support for mission users. Leverage existing contracts in FY19 and continue consolidation of contracts into FY 2020.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>	Project (Number/Name) 673140 / <i>Enterprise Ground Services EGS</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Pre-Ops Support	Various	Various : Various	-	2.179	Jan 2019	-		-		-		-	Continuing	Continuing	-
H/W, S/W and Integration	Various	Various : TBD	-	5.835	Dec 2018	-		-		-		-	Continuing	Continuing	-
Technical Mission Analysis (FFRDC Aerospace Direct Costs)	MIPR	Aerospace : El Segundo, CA	-	4.177	Nov 2018	-		-		-		-	Continuing	Continuing	-
Development	Various	Various : TBD	-	17.684	Dec 2018	-		-		-		-	Continuing	Continuing	-
Space Engineering & Integration	Various	Various : Various	-	17.810	Nov 2018	-		-		-		-	Continuing	Continuing	-
Subtotal			-	47.685		-		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
FFRDC (Aerospace)	MIPR	Aerospace : Los Angeles, CA	-	6.068	Oct 2018	-		-		-		-	Continuing	Continuing	-
Other	Various	Various : Los Angeles, CA	-	0.368	Oct 2018	-		-		-		-	Continuing	Continuing	-
A&AS Support	Various	Various : Los Angeles, CA	-	6.623	Oct 2018	-		-		-		-	Continuing	Continuing	-
Subtotal			-	13.059		-		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		-	60.744	0.000	-	-	-	Continuing	Continuing	N/A

Remarks
The costs for EGS beginning in FY 2020, were transferred to the new EGS Program Element (1206770F).

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>	Project (Number/Name) 673140 / <i>Enterprise Ground Services EGS</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

EGS	
System Integration Lab (SIL)	
Space Management Battle Lab (SMBL)	
Development to Operations (DevOps)	
BAFB	
SAFB	
KAFB	
EGS Pre-Ops Support	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203173F / <i>Space and Missile Test and Evaluation Center</i>	Project (Number/Name) 673140 / <i>Enterprise Ground Services EGS</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
EGS				
System Integration Lab (SIL)	1	2019	4	2019
Space Management Battle Lab (SMBL)	1	2019	4	2019
Development to Operations (DevOps)	1	2019	4	2019
BAFB	1	2019	4	2019
SAFB	1	2019	4	2019
KAFB	1	2019	4	2019
EGS Pre-Ops Support	1	2019	4	2019

Note

The schedule for EGS beginning in FY 2020, was transferred to the new EGS Program Element (1206770F).

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203174F / <i>Space Innovation, Integration and Rapid Technology Development</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	20.250	33.292	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
67A011: <i>Space Analysis and Application Development</i>	-	20.250	33.292	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 FY 2021, PE 1203174F, Space Innovation, Integration and Rapid Technology Development efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203174SF, Space Innovation, Integration and Rapid Technology Development from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

Located at Peterson AFB, Colorado, the Space Innovation, Integration and Rapid Technology Development (SIIRTD) program develops and modifies modeling and simulation tools that Air Force Space Command's Space Analysis Center uses for operations research, military utility analyses, tradeoff studies, and other evaluations of space mission areas to guide planning, programming, requirements generation, analyses of alternatives, and other activities. Development activities incorporate changes in fielded and projected space operational capabilities, as well as technical improvements, into the group's software tools to ensure their data and technology remain current. Space Training Simulators develop and upgrades space training emulators using Standard Space Trainer (SST) to meet Space Mission Force (SMF) threat-based, advanced training requirements as well as funds connection to Distributed Mission Operations (DMO) training networks. Finally, its innovation, education, and training activities foster solutions to operational deficiencies and enhance the integration of space systems into Air Force operations, thereby enabling service and joint warfighters to realize the full potential of existing and planned space capabilities.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SIIRTD 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 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203174F / <i>Space Innovation, Integration and Rapid Technology Development</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	21.019	43.292	44.761	0.000	44.761
Current President's Budget	20.250	33.292	0.000	0.000	0.000
Total Adjustments	-0.769	-10.000	-44.761	0.000	-44.761
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-10.000			
• 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	-0.769	0.000			
• Other Adjustments	0.000	0.000	-44.761	0.000	-44.761
 Change Summary Explanation					
FY 2019: -\$0.769M SBIR transfer					
FY 2020: Received Congressional marks that included an decrease for -\$5.0M for under execution. The FY 2020 total in this document is incorrect in the data base. The correct total for FY 2020 should be \$38.292M.					
FY 2021: -\$44.764M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.					

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: Model/Tool Development and Capability Upgrades</p> <p>Description: Develops, verifies, and validates models for space mission areas and modifies existing models to portray new capabilities that meet the national senior leader intent. Advancing M&S tools to incorporate space effects at the campaign, mission and engagement levels with the goal of enhancing decision support, visualization, exercise and wargaming. Rapidly meet downward-directed guidance implementing the system resiliency and situational awareness necessary to win in a contested space domain. Activities may include, but are not limited to, acquisition, program office support, studies, technical analysis, prototyping, etc. The space M&S is used for military utility analyses, trade studies, and other space program evaluations supporting OSD, Joint Staff, Headquarters Air Force, Headquarters United States Space Force, and the Space and Missile Center.</p> <p>FY 2020 Plans: Continue to modernize space models and tools to meet recent presidential, CDRSTRATCOM, and COMAFSPC guidance. Begin developing a space campaign model to assess force structures in a contested environment to better organize USSPACECOM/ Space Force warfighting needs. Continue transforming FY 2019 activities. Key models include the Advanced Framework for Simulation, Integration, and Modeling (AFSIM). This process harnesses disparate domain capabilities into a simulation environment. Threat, Vulnerability, Timeline (TVT) is a tool underpinning key budget decisions, overlaying force structure on the</p>	7.370	7.796	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1203174F / <i>Space Innovation, Integration and Rapid Technology Development</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>given threat constructs to identify warfighting shortfalls. The Program's mission/campaign modeling suites must be updated to produce technically sound and responsive space analyses for warfighter operations in a highly-contested environment. These tools assess how well we meet national and military needs identified by the Enterprise Space Architecture Office (ESAO) and Joint Space Warfighter Forum (JSWF). The Space Surveillance Network Analysis Model (SSNAM) is a key warfighting tool supporting the JFSCC's operation centers' situational awareness. As a major warfighting domain, it is critical we establish the tool to accurately represent space.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: Model Verification</p> <p>Description: Conduct verification of model changes resulting from model development and modification efforts.</p> <p>FY 2020 Plans: Continue to modernize space models and tools to meet recent presidential, CDRSTRATCOM, and COMAFSPC guidance. Begin developing a space campaign model to assess force structures in a contested environment to better organize USSPACECOM/Space Force warfighting needs. Continue transforming FY 2018 activities. Key models include the Advanced Framework for Simulation, Integration, and Modeling (AFSIM). This process harnesses disparate domain capabilities into a simulation environment. Threat, Vulnerability, Timeline (TVT) is a tool underpinning key budget decisions, overlaying force structure on the given threat constructs to identify warfighting shortfalls. Our mission/campaign modeling suites must be updated to produce technically sound and responsive space analyses for warfighter operations in a highly-contested environment. These tools assess how well we meet national and military needs identified by the Enterprise Space Architecture Office (ESAO) and Joint Space Warfighter Forum(JSWF). The Space Surveillance Network Analysis Model (SSNAM) is a key warfighting tool supporting the JFSCC's operation centers' situational awareness. As a major warfighting domain, it is critical we establish the tool to accurately represent space.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		1.706	1.808	0.000
<p>Title: Model Validation</p>		1.600	1.694	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1203174F / <i>Space Innovation, Integration and Rapid Technology Development</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Description: Conduct validations of model changes resulting from model development and modification efforts.</p> <p>FY 2020 Plans: Develops, verifies, and validates models for space mission areas and modifies existing models to portray new capabilities that meet the national senior leader intent. Advancing M&S tools to incorporate space effects at the campaign, mission and engagement levels with the goal of enhancing decision support, visualization, exercise and wargaming. Rapidly meet downward-directed guidance implementing the system resiliency and situational awareness necessary to win in a contested space domain. Activities may include, but are not limited to, acquisition, program office support, studies, technical analysis, prototyping, etc. The space M&S is used for military utility analyses, trade studies, and other space program evaluations supporting OSD, Joint Staff, Headquarters Air Force, Headquarters Air Force Space Command, and the Space and Missile Center.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: Standardized Space Trainer Simulators</p> <p>Description: Develop/upgrade Standard Space Trainer (SST) simulators to meet Space Mission Force (SMF) threat-based, advanced training requirements as well as build connectivity to Distributed Mission Operations (DMO) training networks. Follows direction set out in USAF Operational Training Infrastructure (OTI) Flight Plan, as well as meets STRATCOM Integrated Priority List (IPL) priorities.</p> <p>FY 2020 Plans: Continue development of Geosynchronous Space Situational Awareness Program (GSSAP) SST, Upgraded Early Warning Radar (UEWR) SST, and Global Positioning System (GPS) training systems as well as begin development of threat-based advanced training capabilities for Military Satellite Communications (MILSATCOM) programs including the Defense Satellite Communications System (DSCS), Milstar-Advanced Extremely High Frequency (AEHF), and Wideband Global SATCOM (WGS) SSTs. Continue Modeling & Simulation development efforts in support of Distributed Operations - Space (DMO-S) advanced training events and enterprise mission requirements.</p> <p>Note: FY 2020 includes an -\$5.0M database error; correct total is \$26.994M</p> <p>FY 2021 Plans:</p>		9.574	21.994	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203174F / <i>Space Innovation, Integration and Rapid Technology Development</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	20.250	33.292	0.000

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• SPAF 01 GNRLT: <i>General IT</i>	1.064	1.350	-	-	-	-	-	-	-	0.000	2.414

Remarks
Funding and content procures equipment for the SIIRTD AFSPC Virtual Analysis Capability (AVAC) system. Supports space and cyber modeling and analysis using a variety of Linux and Windows based hardware and software suites. Also procures Information Technology (IT) hardware & software infrastructure for the Distributed Communications Architecture for ACC.

E. Acquisition Strategy
Any new projects funded in this program will be awarded using competitive procedures to the maximum extent possible.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force											Date: February 2020				
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 1203174F / <i>Space Innovation, Integration and Rapid Technology Development</i>				Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>							

Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Develop/modify models & tools software	C/CPFF	SigmaTek : Colorado Springs, CO	-	0.303	Mar 2019	0.310	Mar 2020	0.000		-		0.000	Continuing	Continuing	-
Develop/modify software tools/models	C/CPFF	Perduco Group : Colorado Springs, CO	-	10.373	Jan 2019	10.988	Jan 2020	0.000		-		0.000	Continuing	Continuing	-
Space Training Simulator Development	C/CPFF	Sonalysts Inc : San Diego, CA	-	9.574	Dec 2018	21.994	Dec 2020	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	20.250		33.292		0.000		-		0.000	Continuing	Continuing	N/A

Remarks

Note: FY 2020 includes an -\$5.0M database error; correct total Space Training Simulator Development for FY 2020 is \$26.994M

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	20.250	33.292	0.000	-	0.000	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203174F / <i>Space Innovation, Integration and Rapid Technology Development</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
SIIRTD																												
Model development/modification, verification, and validation																												
Space Training Simulators																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203174F / <i>Space Innovation, Integration and Rapid Technology Development</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
SIIRTD				
Model development/modification, verification, and validation	1	2019	4	2025
Space Training Simulators	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203179F / <i>Integrated Broadcast Service (IBS)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	9.887	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
674779: <i>Integrated Broadcast Service (IBS)</i>	-	9.887	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note
In FY2020, Integrated Broadcast Service PE1203179F effort transfer to PE0305179F due to realignment to Major Force Program for Intelligence and Communications.

A. Mission Description and Budget Item Justification

The IBS fulfills the warfighter's requirements for worldwide threat warning and situational awareness information with timely production and simultaneous dissemination of Intelligence, Surveillance, and Reconnaissance (ISR) derived combat information. It also provides target tracking data to support threat avoidance, targeting, force protection, and situational awareness. This information is continually refined in near real time by strategic, operational and tactical sensors.

- IBS is comprised of the following:
- A Common Interactive Broadcast (CIB) on UHF (Ultra High Frequency) satellite channel using a Common Message Format (CMF) and a Military Standard (MIL-STD) Demand Assigned Multiple Access (DAMA) compliant waveform and Line of Sight (LOS) using the Wideband Networking Waveform (WNW) and Joint Tactical Terminal (JTT).
 - IBS-Network Services (IBS-NS) includes two Global IBS Network Servers (GINS) and four Theater Interface Nodes (TINs) to support the geographic Combatant Commanders (COCOMs), all built to validated warfighter requirements.
 - Two GINS receive data from each theater and integrate this data into a worldwide picture available to all network/broadcast users.
 - Four regional TINs allow local and out-of-theater users (not directly receiving IBS broadcast) to receive the CIB information broadcast. Additionally, the TIN will receive and inject data into the CIB for producers without access to the theater CIB.

This PE funds:
- Development/upgrades of IBS (IBS-NS, CIB, and CMF)

This project will identify and implement an open, scalable system architecture that will accommodate growth as the virtual world grows and cyber operations change.

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

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203179F / <i>Integrated Broadcast Service (IBS)</i>
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This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	8.568	0.000	0.000	0.000	0.000
Current President's Budget	9.887	0.000	0.000	0.000	0.000
Total Adjustments	1.319	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	1.319	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Development/upgrades of the Integrated Broadcast Service (IBS-NS, CIB, and CMF) Description: Development/upgrades of the IBS (IBS-NS, CIB, and CMF). FY 2020 Plans: N/A FY 2021 Plans: Development/upgrades of the IBS (IBS-NS, CIB, and CMF).	7.978	0.000	0.000
Title: Enterprise Systems Engineering Description: Enterprise Systems Engineering/CMF Integration/CIB Integration. FY 2020 Plans: N/A FY 2021 Plans: Enterprise Systems Engineering/CMF Integration/CIB Integration.	0.919	0.000	0.000
Title: Test & Evaluation Description: Tests & Evaluates the IBS system.	0.990	0.000	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203179F / <i>Integrated Broadcast Service (IBS)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
FY 2020 Plans: N/A			
FY 2021 Plans: Tests & Evaluates the IBS system.			
Accomplishments/Planned Programs Subtotals	9.887	0.000	0.000

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• OPAF 03 Line Item 832070: <i>Intelligence Comm Equipment</i>	0.000	16.743	17.134	-	17.134	17.341	17.667	17.985	-	Continuing	Continuing
• SPAF 01 IBS000: <i>INTEG BROADCAST SERV</i>	16.445	-	-	-	-	-	-	-	-	0.000	16.445

Remarks

E. Acquisition Strategy

IBS is in the PEO Battle Management portfolio and executed by AFLCMC/HBG.

IBS uses an Adaptive Life-cycle approach that provides incremental improvement and new capability in 90-day cycles.

For contracting efforts, a Single Award IDIQ contract with multiple task orders was awarded to CACI International Inc.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
3600 / 7				PE 1203179F / Integrated Broadcast Service (IBS)				674779 / Integrated Broadcast Service (IBS)								
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-	
IBS (IBS-NS, CIB, and CMF) Development/ Upgrades	Various	CACI International Inc/Other Government Agency : Various	-	7.877	Oct 2018	-		-		-		-	Continuing	Continuing	-	
Subtotal			-	7.877		-		-		-		-	Continuing	Continuing	N/A	
Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-	
Interoperability and Development Testing	MIPR	JITC : Ft Huachuca, AZ	-	0.600	Oct 2018	-		-		-		-	Continuing	Continuing	-	
Responsible Test Organization (RTO)	PO	46th Test Squadron : Eglin AFB, FL	-	0.350	Oct 2018	-		-		-		-	Continuing	Continuing	-	
Subtotal			-	0.950		-		-		-		-	Continuing	Continuing	N/A	
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-	
Program Management/ Engineering Support	C/FFP	Creedence : Warner Robins, GA	-	0.160	Nov 2018	-		-		-		-	Continuing	Continuing	-	
Enterprise Engineering/ CMF Integration/CIB Integration	SS/CPFF	L3 Comm, IS : Greenville, TX	-	0.900	Nov 2018	-		-		-		-	Continuing	Continuing	-	
Subtotal			-	1.060		-		-		-		-	Continuing	Continuing	N/A	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203179F / <i>Integrated Broadcast Service (IBS)</i>	Project (Number/Name) 674779 / <i>Integrated Broadcast Service (IBS)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
IBS-NS				
Continue development of the IBS Thin Client	1	2019	1	2019
Continue development of the CIB MUOS Group Integration - Many to Many	1	2019	1	2019
Continue to upgrade and transition of current classified dissemination path to new architecture and enabling SCI-level dissemination of data	1	2019	4	2020
Continue to upgrade the uplink sites to handle operational surge increases	1	2019	4	2020
Continue to develop the monitoring and control tools to assist in assured dissemination	1	2019	4	2020
Continue to integrate CMF updates into IBS-NS	1	2019	4	2020
Enterprise Systems Engineering of IBS (IBS-NS, CIB, and CMF)	1	2019	4	2020
Testing and Evaluation of IBS (IBS-NS, CIB, and CMF)	1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203182F / <i>Spacelift Range System (SPACE)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	20.168	5.837	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
674137: <i>Launch and Test Range System (LTRS) Modernization</i>	-	20.168	5.837	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 FY2021, PE 1203182F, Spacelift Range System,(Space) efforts were transferred to Appropriations 3620, Research, Development, Test & Evaluation, Space Force, PE 1203182SF Spacelift Range System (Space) from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriations for Space Force.

FY 2020 received a Congressional mark that increases by \$10M for space launch services. That increase and enacted request was not accounted for correctly in the database and reflected a -\$15M overall reduction. The correct total for LTRS in FY 2020 is \$20.837M, not \$5.837M.

The Spacelift Range System (SLRS), also known as the Launch and Test Range System (LTRS), provides public safety and assured access to space. LTRS operates at the Eastern Range (ER) at Patrick AFB/Cape Canaveral AFS, FL and the Western Range (WR) at Vandenberg AFB, CA. LTRS provides tracking, telemetry, communications, flight safety, and other capabilities to support launch of national security space (NSS), civil and commercial space payloads, Intercontinental and Sea Launched ballistic missile and missile defense evaluations, and aeronautical and guided weapon tests. LTRS enables national security, civil, and commercial spacelift operations to be conducted safely; together with national security space launch capability, LTRS provides assured access to space for the nation. The ER and WR are designated as Department of Defense Major Range and Test Facility Bases (MRTFB).

LTRS is comprised of twelve subsystems that together provide this capability to the ranges. The Range Safety and Command Destruct subsystems provide the capability to destroy an errant rocket, if necessary to protect public safety. These subsystems rely on the Telemetry, Radar, and Optics subsystems to provide tracking data. The Weather and Surveillance subsystems allow range operators and customers to determine if conditions are safe for launch. The Communications, Data Handling, and Timing & Sequencing subsystems ensure critical data is expeditiously routed from remote sensors (e.g. radars, optics) to range operators and customers. Finally, the Planning and Scheduling subsystem ensures all assets are available when needed for a launch or test operation.

The Air Force requires RDT&E funds to conduct digital data processing and transport prototype and proof of concept projects supporting Range of the Future (ROTF) launch operations. Funds will provide engineering and analysis to develop promising technology and validate LTRS architecture ability to meet the accelerating National launch requirement and introduce advanced data transport formats. These include demonstration of virtualized and remote data processing as well as dispersed and disaggregated flight tracking.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships,

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203182F / <i>Spacelift Range System (SPACE)</i>
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and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

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

Funding in this exhibit was previously budgeted in PE 0305182F, Space Lift Range System.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	20.168	10.837	11.023	0.000	11.023
Current President's Budget	20.168	5.837	0.000	0.000	0.000
Total Adjustments	0.000	-5.000	-11.023	0.000	-11.023
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	10.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	-15.000	-11.023	0.000	-11.023

Congressional Add Details (\$ in Millions, and Includes General Reductions)

Project: 674137: *Launch and Test Range System (LTRS) Modernization*

Congressional Add: *Launch Range Services and Capability*

	FY 2019	FY 2020
Congressional Add Subtotals for Project: 674137	10.000	0.000
Congressional Add Totals for all Projects	10.000	0.000

Change Summary Explanation

FY2020: +\$10M Congressional addition for space launch services and capability

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1203182F / <i>Spacelift Range System (SPACE)</i>		
FY2021: \$11,020M; funds starting in FY2021 were transferred from RDT&E, Air Force to RDT&E Space Force.				
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Title: LTRS Range Technology Integration</p> <p>Description: Provides Advisory and Assistance Services (A&AS) support of the operational baseline (all twelve subsystems) to include configuration management of all range assets, requirements analyses, and special studies. Provides support for Systems Program Office operations, Systems Engineering and Technical Assistance (SETA), and Federally Funded Research and Development Centers (FFRDC). Strategically executes experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.</p> <p>FY 2020 Plans: Continue to manage the baseline (all twelve subsystems) to include configuration management and all range assets, requirements, analysis and special studies. Fund Multi-Band Multi-Mission (MBMM) antenna prototyping effort to meet both Launch and Test Range and Air Force Satellite Control Network (AFSCN) requirements. MBMM is described in the AFSCN R-doc, PE 1203110F.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		6.260	2.237	0.000
<p>Title: Enterprise Systems Engineering and Integration to Support Government-Controlled Baseline</p> <p>Description: SE&I manages the government controlled system and subsystem level baseline requirements including analysis of future changes to the fielded baseline. SE&I provides "government as the integrator" engineering support to ensure multiple separate modernizations and the sustainment baseline are synchronized. SE&I will develop and recommend investment strategies to keep the Eastern and Western Ranges operating well beyond the FYDP.</p> <p>FY 2020 Plans: Continue program office support and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement:</p>		3.908	3.600	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203182F / <i>Spacelift Range System (SPACE)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
N/A			
Accomplishments/Planned Programs Subtotals	10.168	5.837	0.000

	FY 2019	FY 2020
Congressional Add: Launch Range Services and Capability	10.000	0.000
FY 2019 Accomplishments: N/A		
FY 2020 Plans: N/A		
Congressional Adds Subtotals	10.000	0.000

D. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• SPAF 01 Line Item SPRNGE: <i>Spacelift Range System Space</i>	117.637	118.140	-	-	-	-	-	-	-	-	Continuing
• RDTE 07 1203110F: <i>Satellite Control Network (SPACE)</i>	26.374	56.891	-	-	-	-	-	-	-	-	Continuing

Remarks

SPAF 01 3021F SPRNGE Spacelift Range System Space Procurement document for FY19-FY21 is a United States Space Force document located in IDECS.

SPAF 01 3022F SPRNGE Spacelift Range System Space Procurement document for FY21-FY25 is a United States Space Force document located in CXE.

RDTE 07 3620F Spacelift Range System Space RDT&E document for FY21-FY25 is a United States Space Force document located in CXE.

E. Acquisition Strategy

Due to fielded LTRS age and obsolescence issues, many systems need to be replaced (e.g. communications systems at ER and WR). These major modifications will be competed, typically among small business contractors, and selected through best value source selections. The competitively-selected SE&I contractor manages government controlled requirements and processes as well as provide support to the "government as the integrator" between LTRS Integrated Support Contract (LISC) and separately competed modernization projects. FFRDC provides mission assurance oversight to ensure capabilities meet operational need.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203182F / <i>Spacelift Range System (SPACE)</i>	Project (Number/Name) 674137 / <i>Launch and Test Range System (LTRS) Modernization</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Enterprise Systems Engineering and Integration	C/FPIF	ENSCO INC : Falls Church, VA	-	3.908	Oct 2018	3.600	Oct 2019	-		-		-	Continuing	Continuing	-
LTRS Range of the Future (ROTF) Technology Integration	C/Various	Various : TBD	-	0.636	May 2019	1.552	May 2020	-		-		-	Continuing	Continuing	-
MBMM Prototyping	MIPR	Defense Innovation Unit : Mountain View, CA	-	4.731	Mar 2019	-		-		-		-	Continuing	Continuing	-
Launch Range Services and Capability	MIPR	NASA : Wallops, VA	-	9.771	Mar 2019	0.000	Mar 2020	-		-		-	Continuing	Continuing	-
Subtotal			-	19.046		5.152		-		-		-	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test and Evaluation	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
TEST AND EVALUATION (WS)	Various	MIT, 17th Test Squad, NAVAIR : Various	-	0.665	Apr 2019	-		-		-		-	Continuing	Continuing	-
Subtotal			-	0.665		-		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
FFRDC	RO	Aerospace : El Segundo, CA	-	0.457	Nov 2018	0.471	Nov 2019	-		-		-	Continuing	Continuing	-
OTHER SUPPORT	PO	Various : El Segundo, CA	-	-		0.214	Nov 2019	-		-		-	Continuing	Continuing	-

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203182F / <i>Spacelift Range System (SPACE)</i>	Project (Number/Name) 674137 / <i>Launch and Test Range System (LTRS) Modernization</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
LTRS				
Range Technology Integration	1	2019	4	2020
Enterprise SE&I	1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203265F / <i>GPS III Space Segment</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	3,181.079	136.998	42.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3,360.517
67A011: <i>Space Analysis and Application Development</i>	19.326	67.084	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	86.410
67A019: <i>GPS III</i>	3,161.753	69.914	42.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3,274.107

Program MDAP/MAIS Code: 292

A. Mission Description and Budget Item Justification

In FY2021, PE 1203265F, GPS III Space Segment efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203265SF GPS III Space Segment from Appropriation 3600, Budget Activity 7 due to the creation of a new Appropriation for Space Force.

The Global Positioning System (GPS) is a space-based navigation system that fills validated Joint Service requirements for worldwide, accurate, common-grid three-dimensional positioning/navigation for military aircraft, ships, and ground personnel. The consistent accuracy, unaffected by location or weather and available in real time, significantly improves effectiveness of reconnaissance, weapons delivery, mine countermeasures, and rapid deployment for all services. GPS must comply with Title 10 United States Code (USC) Sec. 2281, which requires that the Secretary of Defense ensure continued sustainment and operations of GPS for military and civilian purposes, and 51 USC Sec. 50112, which requires that GPS comply with certain standards and facilitate international cooperation.

The system is composed of three segments: User Equipment (funded under Program Element (PE) 1203164F), Space (funded under this PE and PE 1203269F) and a Control Network (funded under PE 1203165F and PE 1206423F). The satellites broadcast high-accuracy data using precisely synchronized signals that are received and processed by user equipment installed in military platforms. The user equipment computes the platform position and velocity and provides steering vectors to target locations or navigation waypoints. The control segment provides daily updates to the navigation messages broadcast from the satellites to maintain system precision in three dimensions to 16 meters (spherical error probable) worldwide. Additionally, GPS supports the United States Nuclear Detonation (NUDET) Detection System (USNDS) mission and provides strategic and tactical support to the following Department of Defense (DoD) missions: Joint Operations by providing capabilities for Positioning, Navigation, and Timing (PNT); Command, Control, Communications, and Intelligence (C3I); Special Operations; Military Operations in Urban Terrain (MOUT); Defense-Wide Mission Support; Air Mobility; and Space Launch Orbital Support.

GPS III is the next generation Space Vehicle (SV) supporting the GPS constellation and is funded in PE 1203265F. GPS III SVs will deliver significant enhancements, including a new international civil (L1C) Galileo-compatible signal, and enhanced anti-jam power. GPS III SVs 03-10 are in the Production and Deployment Phase.

PE 1203265F funds GPS III and supports the Research, Development, Test, and Evaluation (RDT&E) of GPS III SVs 01-02 and risk-reducing simulators through a systems engineering approach that matures and delivers SVs for launch. This PE includes SVs 01-02 engineering studies and analyses, trade studies, system development, test and evaluation efforts, integrated logistics support products, on-orbit support, and mission operations support for civil and military applications that

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force Date: February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203265F / <i>GPS III Space Segment</i>
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protect United States (U.S.) military and allied use of GPS. The program also includes Contingency Operations (COps) as a bridge capability to fly GPS III SVs until the delivery of the GPS Next Generation Operational Control System (OCX).

Starting in Fiscal Year (FY) 2019, PE 1203269F funded the RDT&E of GPS IIIF (SVs 11-12), which included Non-Recurring Engineering (NRE) support efforts. GPS IIIF includes design activity, risk-reducing simulators, and systems engineering associated with delivering the new capabilities required of GPS IIIF SVs, including backward compatibility, dual band Telemetry, Tracking, and Control (TT&C), integration of Government Furnished Equipment (GFE) hosted payloads, a new international civil (L1C) Galileo-compatible signal, and the Regional Military Protection (RMP) capability that provides the ability to deliver high-power regional Military Code (M-Code) signals in specific areas of intended effect.

Mission Readiness Campaign (MRC) activities include launch preparation, planning, mission readiness testing to validate space-ground-user interfaces, mission crew exercises and rehearsals, launch vehicle integration, and On-Orbit Checkout activities to validate performance prior to and after launch. Newly certified launch vehicles must be incorporated into the GPS III launch baseline. Integration requires the development of plans and procedures and procurement of special support equipment.

GPS supports the early deployment of Global M-Code to meet the congressional mandate limiting user equipment purchases to M-Code-capable receivers starting in FY 2017. Funds in this PE will cover the M-Code Early Use (MCEU) program and support development costs associated with the GPS control segment software to provide core M-Code capabilities to the warfighter, as well as the ability to command and control, process, and monitor the M-Code signal. MCEU mitigates delays with OCX, supports Military Global Positioning System User Equipment (MGUE) testing, and allows for early M-Code operations. M-Code provides greater security to protect navigation and timing in electronically contested environments.

Impacts of the M-Code deployment include:

- Compliance with The Air Force Space Command Commander's mandate to provide global monitoring necessary for early M-Code operational use and verification of Navigation Warfare (NAVWAR) effects.
- Direction to improve the resiliency of the GPS capability.
- Confirmation that Enterprise modernization efforts are integrated and properly deployed.
- Testing and Verification of M-Code capability on MGUE/GPS III solution and early M-Code use tied to MGUE fielding.

The feasibility studies and preliminary engineering analyses that are funded by this budget item will determine whether an initiative to host GPS M-Code augmentation payloads on other satellite systems is practical and beneficial. The primary goal is to provide additional mission assurance through redundant systems not directly connected with the current U.S. GPS satellite constellation.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203265F / <i>GPS III Space Segment</i>
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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 PE encompasses the GPS III (SVs 01-10), COps, MCEU, M-Code Hosted Payload, and prior to FY 2019, GPS III Follow-On (GPS IIIF) Production Readiness efforts.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	141.892	42.440	10.780	0.000	10.780
Current President's Budget	136.998	42.440	0.000	0.000	0.000
Total Adjustments	-4.894	0.000	-10.780	0.000	-10.780
• 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	-4.894	0.000			
• Other Adjustments	0.000	0.000	-10.780	0.000	-10.780

Change Summary Explanation

FY 2019: \$2.182M to pay cancelled GPS bill

FY 2021: -\$10.780M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1203265F / GPS III Space Segment				Project (Number/Name) 67A011 / Space Analysis and Application Development			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67A011: <i>Space Analysis and Application Development</i>	19.326	67.084	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	86.410
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Space Analysis and Application Development M-Code Hosted Payload will provide additional mission assurance through redundant systems not directly connected with the current GPS satellite constellation. The feasibility studies and preliminary engineering analyses funded in this project will determine whether an initiative to host GPS M-Code augmentation payloads on other satellite systems is practical and beneficial. The primary goal is to provide additional mission assurance and resiliency through redundant systems not directly connected with the current GPS satellite constellation. This augmentation to the GPS constellation enables future rapid technology on-ramps with minimal risk.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: M-Code Hosted Payload	67.084	0.000	0.000
Description: The initial studies, prototyping, and experiments will explore size, weight, power, and cost (SWAP-C) requirements of potential payloads, the level of broadcast power as received on the ground, advanced signal capabilities, the needed modifications that will allow current and future GPS ground control systems to communicate with these payloads, and how best to upgrade GPS user equipment with minimal impact on cost and downtime to existing GPS users.			
FY 2020 Plans: N/A			
FY 2021 Plans: N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals			0.000

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203265F / <i>GPS III Space Segment</i>	Project (Number/Name) 67A011 / <i>Space Analysis and Application Development</i>

D. Acquisition Strategy

Hosted payload studies and engineering analysis to be conducted by Federally Funded Research and Development Centers (FFRDCs), GPS satellite vendors, and contractors involved with user equipment development.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203265F / GPS III Space Segment	Project (Number/Name) 67A011 / Space Analysis and Application Development
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
M-Code Hosted Payload	Various	Various : Various	8.958	59.971	Nov 2018	-		-		-		-	0.000	68.929	-
Enterprise SE&I	C/CPAF	SAIC : El Segundo, CA	0.717	1.052	May 2019	-		-		-		-	0.000	1.769	-
Department of Homeland Security/ Transportation	MIPR	Various : Various	9.649	-		-		-		-		-	0.000	9.649	-
Subtotal			19.324	61.023		-		-		-		-	0.000	80.347	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FFRDC	MIPR	Various : Various	0.002	1.246	Dec 2018	-		-		-		-	0.000	1.248	-
A&AS	Various	Various : Various	0.000	4.750	Mar 2019	-		-		-		-	0.000	4.750	-
Other Support	Various	Various : El Segundo, CA	0.000	0.065	Oct 2018	-		-		-		-	0.000	0.065	-
Subtotal			0.002	6.061		-		-		-		-	0.000	6.063	N/A

Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract			
Project Cost Totals			19.326	67.084	0.000	-	-	-	0.000	86.410	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203265F / GPS III Space Segment	Project (Number/Name) 67A011 / Space Analysis and Application Development

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

Hosted Payload	
Hosted Payload Preliminary Design Review (PDR) level design	██████████
Hosted Payload User Equipment Study	████

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203265F / GPS III Space Segment	Project (Number/Name) 67A011 / Space Analysis and Application Development

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Hosted Payload				
Hosted Payload Preliminary Design Review (PDR) level design	1	2019	4	2019
Hosted Payload User Equipment Study	2	2019	2	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1203265F / GPS III Space Segment				Project (Number/Name) 67A019 / GPS III			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67A019: GPS III	3,161.753	69.914	42.440	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3,274.107
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

GPS III is the next-generation SV supporting the GPS constellation and is funded in PE 1203265F. GPS III SVs will deliver significant enhancements, including a new international civil (L1C) Galileo-compatible signal, and enhanced anti-jam power. GPS III SVs 03-10 are in the Production and Deployment Phase.

PE 1203265F funds GPS III and supports RDT&E of GPS III SVs 01-02 and risk-reducing simulators through a systems engineering approach that matures and delivers SVs for launch. This program includes SVs 01-02 engineering studies and analyses, trade studies, system development, test and evaluation efforts, integrated logistics support products, on-orbit support, and mission operations support for civil and military applications that protect U.S. military and allied use of GPS. The program also includes Contingency Operations (COps) as a bridge capability to fly GPS III SVs until the delivery of the GPS OCX program.

Mission Readiness Campaign (MRC) activities include launch preparation, planning, mission readiness testing to validate space-ground-user interfaces, mission crew exercises and rehearsals, launch vehicle integration, and On-Orbit Checkout activities to validate performance prior to launch and post launch. Newly certified launch vehicles must be incorporated into the GPS III launch baseline. Integration requires the development of plans and procedures and procurement of special support equipment.

GPS supports the early deployment of Global M-Code to meet a congressional mandate limiting user equipment purchase to M-Code capable receivers starting in FY 2017. The funds will cover the M-Code Early Use (MCEU) program and support development costs associated with the GPS control segment software to provide core M-Code capabilities to the warfighter, as well as the ability to command and control, process, and monitor the M-Code signal. MCEU mitigates delays with GPS OCX, supports MGUE testing, and allows for early M-Code operations. M-Code provides greater security to protect navigation and timing in electronically contested environments.

Impacts of the M-Code deployment include:

- Compliance with The Air Force Space Command Commander's mandate to provide global monitoring necessary for early M-code operational use and verification of NAVWAR effects.
- Direction to improve the resiliency of the GPS capability.
- Confirmation that Enterprise modernization efforts are integrated and properly deployed.
- Testing and Verification of M-Code capability on MGUE/GPS III solution and early M-Code use tied to MGUE fielding.

The feasibility studies and preliminary engineering analyses that are funded by this budget item will determine whether an initiative to host GPS M-Code augmentation payloads on other satellite systems is practical and beneficial. The primary goal is to provide additional mission assurance through redundant systems not directly connected with the current U.S. GPS satellite constellation.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203265F / GPS III Space Segment	Project (Number/Name) 67A019 / GPS III		
This PE encompasses the GPS III (SVs 01-10), COps, MCEU, M-Code Hosted Payload, and prior to FY2019, GPS III Follow-On (GPS IIIF) Production Readiness efforts.				
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Title: GPS III SVs 01-02</p> <p>Description: Development, test, and evaluation of GPS III SVs 01-02 and associated simulators, engineering studies and analyses, trade studies, system development, test and evaluation efforts, and integrated logistics support products.</p> <p>FY 2020 Plans: Continue on-orbit activities and engineering support for GPS III SV 01 and SV 02 for validated performance.</p> <p>In addition, support SV 01 and SV 02 activities that include product development through life testing, technical mission analysis, information assurance, technical support, system engineering, and mission operations. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		39.860	24.030	0.000
<p>Title: Contingency Operations (COps)</p> <p>Description: COps is a risk-reduction activity to maintain constellation sustainment as prescribed by the GPS III Space Vehicle Acquisition Strategy to support GPS III operations until delivery of GPS OCX. COps adds to the existing Operational Control System (OCS) Architecture Evolution Plan (AEP) command, control, maneuver planning, re-programmability, navigation functionality, USNDS support, and external interfaces for GPS III SVs. COps includes integrating GPS III SV simulation modules to the GPS System Simulator (GSS) and updates to the Positional Training Emulator (PTE).</p> <p>FY 2020 Plans: N/A</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		20.941	0.000	0.000
<p>Title: Architecture Evolution Plan (AEP) M-Code Monitoring</p>		9.113	18.410	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203265F / GPS III Space Segment	Project (Number/Name) 67A019 / GPS III

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Description: The M-Code Early Use (MCEU) program initiative will cover the development costs associated with updating the legacy control segment software, AEP, with additional capabilities needed to provide M-Code operations. MCEU will provide the Combined Space Operations Center (CSpOC) with command and control (C2), processing, and integrity monitoring for the M-Code signal. The development will also include the integration of modernized Monitor Station Technology Improvement Capability (MSTIC) receivers, which are being procured separately using Operations and Maintenance (O&M) funding as a Form-Fit- Functional replacement for the legacy Monitor Station Receiver Element (MSRE) Y-Code receivers. MCEU will add a software upgrade to MSTIC receivers to allow it to process M-Code signals. Prime contract was awarded to start software development and test activities; includes insertion of Legacy Hot Start, Demilitarized Zone, and Receiver Protection Profile requirements into the MCEU baseline.</p> <p>FY 2020 Plans: Start and finish Integrated System Test; complete Fielding Readiness Review; hold Operational Test Readiness Certification and begin Operational Test and Evaluation (OT&E). Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>			
Accomplishments/Planned Programs Subtotals	69.914	42.440	0.000

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• SPAF 01 Line Item GPS III: GPS III	69.386	31.466	-	-	-	-	-	-	-	0.000	100.852

Remarks

D. Acquisition Strategy
The GPS III next generation space segment (SV 01-10) rapidly and affordably responds to warfighter capability requirements. The acquisition approach utilizes a disciplined systems engineering approach which focuses on mitigating cost and schedule risk through a lower-risk incremental delivery of mature technologies. This approach focuses on mission success and on-time delivery. The GPS III SVs will have GPS IIF capabilities plus up to a 3x-8x increase in anti-jam signal power, 3x

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203265F / <i>GPS III Space Segment</i>	Project (Number/Name) 67A019 / <i>GPS III</i>
<p>improved accuracy, 3+ year increased design life, a new international civil (L1C) signal compatible with the European Galileo system, and a satellite bus capable of supporting future SV capability additions.</p> <p>RDT&E funding for SVs 11 and 12 is in PE 1203269F and PE 1203269SF, Project GPS IIIIF. Procurement funding for SVs 13-32 is captured in PE 1203269F and PE 1203269SF, Project GPS IIIIF.</p> <p>The AF is using its research laboratories to mature an On-Orbit Reprogrammable Digital Waveform Generator (ORDWG) which provide signal flexibility to change the signal form while the satellite is on-orbit. This effort is funded with AFRL's S&T funding and PE 1203265F to increase the number of alternate navigation payloads and inform future PNT architectures.</p> <p>On 19 July 2016, PEO Space approved the Acquisition Strategy Document (ASD) for the COps effort. The strategy enables contingency constellation sustainment capability for GPS III PNT. GPS III COps is needed because GPS OCX will not deliver in time to support initial GPS III SV operations. COps operates (post-launch and check-out) GPS III SVs at the capability level of GPS IIR-M or GPS IIF using the existing AEP control segment.</p> <p>On 21 Jan 2017, PEO Space approved the Acquisition Strategy for the MCEU program. The MCEU acquisition strategy enables the GPS Enterprise to provide core M-Code capabilities to the warfighter prior to GPS OCX delivery. MCEU will also support the scheduled operational testing of MGUE. MCEU will update the GPS control segment software, AEP, to allow for command and control, processing, and integrity monitoring of the M-Code signal. MCEU acquires this capability by using the existing GPS III prime contract vehicle to modify the operational AEP software.</p> <p>The Air Force approved reinstatement of a previously deferred Key Support Area (KSA) on 10 Feb 2016. The MSTIC receivers currently under development will get a software upgrade to process M-Code data. This \$7.96M project to procure the M-MSTIC receivers was funded through both O&M and SPAF funds in FY 2016-FY 2018. Performance monitoring, integration, and test will be conducted by the MCEU program and sustained under the Global Positioning Operations Support and Sustainment Division contract with Lockheed Martin.</p>		

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203265F / GPS III Space Segment	Project (Number/Name) 67A019 / GPS III
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GPS III Development	C/CPIF	Lockheed Martin : Denver, CO	2,450.898	12.888	Dec 2018	2.200	Dec 2018	-		-		-	0.000	2,465.986	2,624.496
GPS III SV01-02 On Orbit Incentive Fee	C/CPIF	Lockheed Martin : Denver, CO	0.000	6.000	Jun 2019	12.000	Jan 2020	-		-		-	0.000	18.000	22.500
GPS III Development 11+	C/Various	Lockheed Martin : Denver, CO	41.590	-		-		-		-		-	0.000	41.590	41.590
GPS III Development_COps	C/CPIF	Lockheed Martin : Denver, CO	108.616	16.555	Feb 2019	-		-		-		-	0.000	125.171	128.863
GPS III Development_MCEU	C/CPIF	Lockheed Martin : Denver, CO	41.877	10.108	Dec 2018	12.880	Oct 2019	-		-		-	0.000	64.865	72.157
GPS III Technical Mission Analysis	MIPR	Various : Various	24.891	5.603	Dec 2018	6.614	Oct 2019	-		-		-	0.000	37.108	-
GPS III Enterprise SE&I	C/CPAF	TASC : El Segundo, CA	96.558	2.522	May 2019	1.743	Oct 2019	-		-		-	0.000	100.823	100.823
GPS III Launch Support	RO	45th : Cape Canaveral, FL	68.442	11.927	Mar 2019	-		-		-		-	0.000	80.369	-
GPS III Production SMI	C/CPFF	Various : Various	36.156	-		-		-		-		-	0.000	36.156	-
GPS III Enterprise Ground Service	C/CPAF	N/A : N/A	7.500	-		-		-		-		-	0.000	7.500	7.500
Subtotal			2,876.528	65.603		35.437		-		-		-	0.000	2,977.568	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GPS III T&E	Various	Various : TBD	36.124	-		-		-		-		-	0.000	36.124	-
Subtotal			36.124	-		-		-		-		-	0.000	36.124	N/A

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203265F / GPS III Space Segment	Project (Number/Name) 67A019 / GPS III
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
GPS III				
GPS III SV01/02 On-Orbit Engineering Support/Performance Validation	2	2019	4	2020
COps/MCEU				
COps Transition to OCS	3	2019	3	2019
COps Fielding Readiness Review (FRR)	2	2020	2	2020
COps Operational Test Readiness Certification	3	2020	3	2020
MCEU Fielding Readiness Review	4	2020	4	2020

Note

GPS III SV 02 was launched on 22 August 2019
 GPS III SV01/SV02 will perform on-going on-orbit engineering support and performance validation through FY 2025
 COps/MCEU schedule milestones adjusted to match approved Acquisition Program Baseline threshold dates

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203400F / <i>Space Superiority Intelligence</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	16.278	14.428	16.810	0.000	16.810	18.343	18.265	17.744	8.467	Continuing	Continuing
67A051: <i>Space Superiority - Advanced Intelligence Systems</i>	-	16.278	14.428	16.810	0.000	16.810	18.343	18.265	17.744	8.467	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Superiority Intelligence program provides Intelligence, Surveillance, and Reconnaissance (ISR) and Electronic Support (ES) for key find, fix, track, target, engage and assess (F2T2EA) requirements supporting Space Superiority activities meeting Combatant Command (CCMD) needs. SSI funds developmental intelligence activities to support new space superiority capability acquisition and development. Funds associated developmental ISR Planning and direction, Collection, Processing and exploitation, Analysis and production, Dissemination and integration (PCPAD) capabilities providing Battlespace Awareness and Space Domain Awareness (SDA) in support of Space Superiority and Space Control. This includes funding for fixed and transportable intelligence collection, Processing/Exploitation and Dissemination (PED), analysis and production capabilities that are modular (plug-and-play), meet Risk Management Framework Accreditation requirements and can keep pace with technological advances and emerging threats. It provides intelligence support systems for SDA activities that provide the requisite current and predictive knowledge of space events and threat conditions and intelligence support to Space Security and Defense Programs (SSDP) by providing architectural survivability analysis of critical mission assets for mission assurance, as well as network analysis. It also supports specialized/tailored, phased threat system analysis and studies (A&S), test support, lab equipment, and Material Acquisition and Exploitation (MAE) for system development, vulnerability, susceptibility assessments to support tactics, techniques and procedures (TTP) development and future threat technology studies necessary for mission area success and achievement of space superiority, and to preserve the US space advantage across all domains.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203400F / <i>Space Superiority Intelligence</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	16.278	14.428	16.841	0.000	16.841
Current President's Budget	16.278	14.428	16.810	0.000	16.810
Total Adjustments	0.000	0.000	-0.031	0.000	-0.031
• 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	-0.031	0.000	-0.031

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Advanced Intelligence Systems for Space Superiority	16.278	14.428	16.810
Description: Develops transportable and fixed PCPAD capabilities.			
FY 2020 Plans: Continue Space Superiority RDT&E through transformation of collection and production activities by developing and fielding fixed and transportable intelligence architectures capable of front-end collection and analysis of new technologies in near real-time. This capability will be expanded across the Special Missions Enterprise to allow access to sensitive information from each point of presence providing production analysts the ability to rapidly exploit known vulnerabilities and develop new capabilities to counter adversary technological advances. Intelligence, Surveillance, and Reconnaissance (ISR) capabilities will be further developed to enhance automation and respond more quickly to ISR for Space needs.			
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 2021 Plans: Continues Space Superiority RDT&E through transformation of collection and production activities by developing and fielding fixed and transportable intelligence architectures capable of front-end collection and analysis of new technologies in near real-time. This capability will be expanded across the Special Missions Enterprise to allow access to sensitive information from each point of presence providing production analysts the ability to rapidly exploit known vulnerabilities and develop new capabilities to counter adversary technological advances. ISR capabilities will be further developed and fielded to replace legacy systems, enhance automation and respond more quickly to ISR for Space needs.			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203400F / <i>Space Superiority Intelligence</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
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. <i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> FY2021 increased compared to FY2020 by \$2.407M. FY20 was reduced for execution rephase into FY22 and FY23. FY21 funding represents normal baseline.			
Accomplishments/Planned Programs Subtotals	16.278	14.428	16.810

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

All contracts funded in this program will be awarded using competitive procedures to the maximum extent possible.

Space Superiority and R&D Intelligence Development: Single Delivery, CPFF, advisory and assistance contractor supporting development efforts. Prime contractor is Macaulay-Brown.

Architecture upgrades to SDA, SSDP, and Space Superiority: Multiple Delivery, CPFF integration contract. Prime contractor is BITSYSTEMS Data Analysis

Production development for R&D: Multiple Delivery, CPFF production contract supporting vulnerabilities analysis. Prime Contractor is Booz-Allen Hamilton Intelligence systems

Testing and data collection: Multiple Delivery, CPFF production contract providing independent validation and verification of new capability development. Prime contractor is Booz-Allen Hamilton.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203400F / <i>Space Superiority Intelligence</i>	Project (Number/Name) 67A051 / <i>Space Superiority - Advanced Intelligence Systems</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Space Superiority and R&D intelligence Development	C/CPFF	Various : TBD	-	1.531	Nov 2018	0.406	Apr 2020	0.605	Nov 2020	-		0.605	Continuing	Continuing	-
Architecture upgrades to SDA, SSDP, and Space Superiority	C/CPFF	Various : TBD	-	9.087	Nov 2018	9.040	Jan 2020	10.028	Dec 2020	-		10.028	Continuing	Continuing	-
Data analysis and product development for R&D	C/CPFF	Various : TBD	-	3.157	Nov 2018	2.870	Nov 2019	3.828	Nov 2020	-		3.828	Continuing	Continuing	-
Intelligence systems testing and data collection	C/CPFF	Various : TBD	-	1.517	Nov 2018	1.662	Feb 2020	1.578	Feb 2021	-		1.578	Continuing	Continuing	-
Subtotal			-	15.292		13.978		16.039		-		16.039	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS	C/CPFF	Various : TBD	-	0.836	Nov 2018	0.300	Apr 2020	0.771	Nov 2020	-		0.771	Continuing	Continuing	-
Mission Support	Various	Not specified. : TBD	-	0.150		0.150		-		-		-	Continuing	Continuing	-
Subtotal			-	0.986		0.450		0.771		-		0.771	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	16.278	14.428	16.810	-	16.810	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203400F / <i>Space Superiority Intelligence</i>	Project (Number/Name) 67A051 / <i>Space Superiority - Advanced Intelligence Systems</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

<i>Space Superiority Intelligence</i>	
Architecture upgrade for SDA, SSDP, and Space Superiority	
Data analysis and product development for R&D intelligence	
Deployment for testing and data collection	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203400F / <i>Space Superiority Intelligence</i>	Project (Number/Name) 67A051 / <i>Space Superiority - Advanced Intelligence Systems</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>Space Superiority Intelligence</i>				
Architecture upgrade for SDA, SSDP, and Space Superiority	1	2019	4	2025
Data analysis and product development for R&D intelligence	1	2019	4	2025
Deployment for testing and data collection	1	2019	4	2025

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203614F / <i>JSpOC Mission System</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	95.158	43.108	89.760	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
67A030: <i>Infrastructure</i>	20.478	4.659	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	25.137
67A031: <i>Mission Applications</i>	23.792	6.825	1.999	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	32.616
67A035: <i>Enterprise Space BMC2</i>	50.888	31.624	87.761	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

Program MDAP/MAIS Code: N82

Note

In FY 2019, Projects 67A030 and 67A031, Joint Space Operations Mission System (JMS) Infrastructure and Mission Applications, were completed.

A. Mission Description and Budget Item Justification

In FY2021, PE1203614F, Joint Space Operations Center (JSpOC) Mission System, Project 67A035, Enterprise Space BMC2 efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, Budget Activity 08, PE 1208248SF, Space C2 from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force and a new Budget Activity for Software and Digital Technology Pilot Programs.

The Air Force is developing a Space Command and Control (Space C2) and Space Situational Awareness (SSA) capability for the Joint Force Space Component Commander (JFSCC). The enterprise-wide system will provide a common government infrastructure and standards for rapid prototyping of dynamic SSA and Battle Management Command and Control (BMC2) applications to address the evolving and dynamic threat. The system will provide a collaborative environment that will enhance and modernize SSA and BMC2 capabilities; create decision-relevant views of the space environment; rapidly detect, track and characterize objects of interest; identify / exploit traditional and non-traditional sources; perform space threat analysis; and enable efficient distribution of data across the Space Surveillance Network (SSN). Funding includes technical studies, development, experimentation, integration and related support costs.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

This Program Element may include necessary civilian pay expenses required to manage, execute, and deliver Space C2 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203614F / <i>JSpOC Mission System</i>
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This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	70.383	72.762	103.870	0.000	103.870
Current President's Budget	43.108	89.760	0.000	0.000	0.000
Total Adjustments	-27.275	16.998	-103.870	0.000	-103.870
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-2.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	5.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-25.000	0.000			
• SBIR/STTR Transfer	-2.275	0.000			
• Other Adjustments	0.000	13.998	-103.870	0.000	-103.870

Change Summary Explanation

FY 2019: \$25.000M decrease due to higher Air Force priorities

FY 2020: Received Congressional marks that included +\$5M increase for commercial capability and a -\$2M reduction for prior year unobligated balances. The FY 2020 total in this document is incorrect. The correct total for FY 2020 should be \$75.761M.

FY 2021: -\$103.870M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System				Project (Number/Name) 67A030 / Infrastructure			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67A030: <i>Infrastructure</i>	20.478	4.659	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	25.137
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2019, Project 67A030, JMS Infrastructure, was completed.

A. Mission Description and Budget Item Justification

Infrastructure provides a Service Oriented Architecture (SOA), net-centric collaborative information environment at the Unclassified, Secret, and Top Secret / Sensitive Compartmented Information (TS/SCI) levels. Efforts incorporate net-centric enterprise services and integrating incremental space mission applications services. Priority is migration off the legacy SPADOC hardware and services into a sustainable infrastructure. Effort integrates components of SSA mission applications and C2 capabilities into the JSpOC to create timely, actionable knowledge necessary for maintaining space superiority and exercising command and control of space forces.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Increment 2	4.659	0.000	0.000
Description: Pursues and integrates a collaborative net-centric, SOA information environment.			
FY 2020 Plans: N/A			
FY 2021 Plans: N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals			0.000

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• SPAF 01 SPCMOD: <i>Space Mods</i>	20.366	11.368	-	-	-	-	-	-	-	31.734	63.468

Remarks

Replaces JMS components and provides an operational, sustainable environment to maintain capabilities that fuse data from space intelligence, surveillance, reconnaissance, and environmental sources. This modification will procure commercial hardware, software licenses, and warranties to upgrade the operational environment enclaves (2 Secret / 2 TS/SCI), as well as keep up to date development/operational testing locations.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / <i>JSpOC Mission System</i>	Project (Number/Name) 67A030 / <i>Infrastructure</i>

D. Acquisition Strategy

The JMS overarching Acquisition Strategy, approved by the Milestone Decision Authority on April 15, 2012, provided for a multi-increment program to develop, integrate, test, and deliver JMS capability. The acquisition strategy reflected new principles that addressed the speed, agility, and adaptability required for successful Information Technology (IT) acquisition resulting in a tailored incremental acquisition approach to deliver early and often by leveraging mature industry capabilities and taking advantage of previous Government investments in Federally Funded Research and Development Center (FFRDC) and Government lab prototyping efforts.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System	Project (Number/Name) 67A030 / Infrastructure
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JMS Enterprise SEI	Various	Various : Various	19.305	2.067	Nov 2018	-		-		-		-	0.000	21.372	43.165
Subtotal			19.305	2.067		-		-		-		-	0.000	21.372	N/A

Remarks
 Cost table amounts in FY2019 are incorrect in PRCP. The FY2019 reprogramming reduction reduced Project 67A030 by \$6.880M, Project 67A031 by \$2.924M and Project 67A035 by \$15.196M.

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS	Various	Various : Various	1.173	2.592	Nov 2018	-		-		-		-	0.000	3.765	3.656
Subtotal			1.173	2.592		-		-		-		-	0.000	3.765	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			20.478	4.659	0.000	-	-	-	0.000	25.137	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System	Project (Number/Name) 67A030 / Infrastructure
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

JMS Infrastructure	
Service Pack 9 Limited Ops Acceptance	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / <i>JSpOC Mission System</i>	Project (Number/Name) 67A030 / <i>Infrastructure</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>JMS Infrastructure</i>				
Service Pack 9 Limited Ops Acceptance	1	2019	1	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System				Project (Number/Name) 67A031 / Mission Applications			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67A031: Mission Applications	23.792	6.825	1.999	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	32.616
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2019, Project 67A031, Mission Applications, was completed. The \$0.001M entry in FY 2020 is the result of a database error.

A. Mission Description and Budget Item Justification

This effort ends in FY 2019.

Mission applications provides space services to enhance the accuracy, sustainability, and responsiveness of space surveillance capabilities by providing the knowledge environment necessary to enable the Joint Force Space Component Commander to make rapid, responsive decisions for the protection of space assets from proliferating threats (adversary as well as orbiting debris). The system provides a high accuracy space catalog (knowledge of space objects), increased observation verification and capabilities, and improved event processing. Research, development, and system design provides SSA space catalog applications, services, space surveillance observation processing, and sensor tasking. Funding includes technical studies, development, and integration.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Increment 2	6.825	1.999	0.000
Description: Services/mission applications to conduct space control/situational awareness.			
FY 2020 Plans: Effort completes in FY 2019. \$1.999M erroneous database entry.			
FY 2021 Plans: N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	6.825	1.999	0.000

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• SPAF 01 SPCMOD: Space Mods	20.366	11.368	-	-	-	-	-	-	-	0.000	31.734

Remarks

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force Date: February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / <i>JSpOC Mission System</i>	Project (Number/Name) 67A031 / <i>Mission Applications</i>
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D. Acquisition Strategy

The JMS overarching Acquisition Strategy, approved by the Milestone Decision Authority on April 15, 2012, provided for a multi-increment program to develop, integrate, test, and deliver JMS capability. The acquisition strategy reflected new principles that addressed the speed, agility, and adaptability required for successful IT acquisition resulting in a tailored incremental acquisition approach to deliver early and often by leveraging mature industry capabilities and taking advantage of previous Government investments in Federally Funded Research and Development Center (FFRDC) and Government lab prototyping efforts.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System	Project (Number/Name) 67A031 / Mission Applications
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
JMS Enterprise SEI	Various	Various : Various	3.384	-		-		-		-		-	0.000	3.384	5.583
JMS Technical Mission Analysis (WS)	Various	Various : Various	0.358	0.182	Dec 2018	-		-		-		-	0.000	0.540	1.475
JMS COTS hardware, software purchase and engineering support	Various	Various : Various	17.450	1.980	Nov 2018	-		-		-		-	0.000	19.430	13.710
Subtotal			21.192	2.162		-		-		-		-	0.000	23.354	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Combined Developmental Test / Operational Test	Various	Various : Various	0.551	0.923	Feb 2019	-		-		-		-	0.000	1.474	2.016
Combined Test Facility	Various	Various : Various	1.135	0.560	Dec 2018	-		-		-		-	0.000	1.695	1.820
Subtotal			1.686	1.483		-		-		-		-	0.000	3.169	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS	Various	Various : Various	0.000	0.030	Nov 2018	-		-		-		-	0.000	0.030	1.788
FFRDC	Various	Various : Various	0.798	2.395	Nov 2018	-		-		-		-	0.000	3.193	1.598
Other Support	Various	Various : Various	0.116	0.755	Oct 2018	-		-		-		-	0.000	0.871	0.175
(Incorrect database entry)	Various	Various : Various	0.000	-		1.999	Jan 2020	-		-		-	0.000	1.999	-
Subtotal			0.914	3.180		1.999		-		-		-	0.000	6.093	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			23.792	6.825	1.999	-	-	-	0.000	32.616	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System	Project (Number/Name) 67A031 / Mission Applications
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FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

JMS Mission Applications	
Service Pack 9 Limited Operational Acceptance	

UNCLASSIFIED

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / <i>JSpOC Mission System</i>	Project (Number/Name) 67A031 / <i>Mission Applications</i>
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>JMS Mission Applications</i>				
Service Pack 9 Limited Operational Acceptance	1	2019	1	2019

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System				Project (Number/Name) 67A035 / Enterprise Space BMC2			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67A035: Enterprise Space BMC2	50.888	31.624	87.761	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 Enterprise provides a SSA & BMC2 System that allows JFSCC to meet dynamic and emerging threats. Continuously develop capabilities that include, but are not limited to, SSA, battle space awareness, dynamic planning and tasking, create an interactive modeling and simulation environment to support training and exercises, collaborative data sharing, and Course of Action (COA) development and assessment. Funding includes technical studies, development, experimentation, systems engineering, integration and related support costs.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Enterprise Space BMC2	31.624	87.761	0.000
<p>Description: This program delivers a robust and responsive Space Situational Awareness (SSA) and Battle Management Command and Control (BMC2) capability to meet emerging threats. The program will deliver capability for decision makers trying to prevent a conflict from extending to space, or winning it if it does. Capabilities and associated infrastructure include, but are not limited to, SSA, Indications & Warning (I&W), Transmit/Receive, Space Control, Tactical Operations and Common Platforms and Infrastructure, Cyber and Threat Warning. Other activities include dedicated Systems Engineering & Integration (SE&I), Test & Evaluation (T&E), Model Based Systems Engineering (MBSE) and prototype Validation & Verification to support these efforts.</p> <p>FY 2020 Plans: Plan and develop architecture which is Open Mission Standard (OMS) and Unmanned Aerospace Systems Command and Control (C2) Standards Initiative (UCI) compliant to support both the SSA and Battle Management Command and Control (BMC2) missions to meet dynamic emerging threats. The architecture and infrastructure will modernize and deliver new capabilities in the National Space Defense Center, Combined Space Operations Center and other operations centers supporting SSA and BMC2. In addition to the OMS and UCI architectural efforts, SMC will continue developmental, system engineering and contracting efforts to integrate best in breed commercial, contractor and government applications for the OMS and UCI based ESBMC2 foundational architecture through the release of multiple incremental software capability drops throughout FY 2021. 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, experimentation, prototyping, etc.</p> <p>NOTE: FY 2020 includes a \$12M database error; correct total is \$75.761M.</p> <p>FY 2021 Plans:</p>			

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System	Project (Number/Name) 67A035 / Enterprise Space BMC2
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B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
NA			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i>			
NA			
Accomplishments/Planned Programs Subtotals	31.624	87.761	0.000

C. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• SPAF 01 SPCMOD: <i>Space Mods</i>	20.366	11.368	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	31.734

Remarks

D. Acquisition Strategy

The Air Force is employing agile software development practices such as flexible requirements, frequent user interaction, and rapid delivery and deficiency retirement. This strategy focuses on rapidly delivering capability to warfighters, leveraging commercial, industry and government partners. Currently there are multiple competitive contractors and no prime contractor, a prime contractor is to be determined.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System	Project (Number/Name) 67A035 / Enterprise Space BMC2
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
ESBMC2 Tools	Various	Various : Various	4.286	6.409	Dec 2018	-		0.000		-		0.000	0.000	10.695	-
ESBMC2 Government Capability Development	Various	Various : Various	22.666	7.573	Oct 2018	-		0.000		-		0.000	0.000	30.239	-
ESBMC2 Enterprise Systems Engineering & Integration	Various	Various : Various	9.015	9.660	Nov 2018	12.400	Dec 2019	0.000		-		0.000	0.000	31.075	-
ESBMC2 Technical Mission Analysis (WS)	MIPR	Various : Various	1.668	0.832	Oct 2018	1.271	Nov 2019	0.000		-		0.000	0.000	3.771	-
Catalyst Campus/PaaS	C/TBD	Not specified. : TBD	0.000	-		20.820	Jan 2020	0.000		-		0.000	0.000	20.820	-
Commercial Capability	C/Various	Not specified. : TBD	0.000	-		9.778	Dec 2019	0.000		-		0.000	0.000	9.778	-
Dynamic SSA Integration	C/TBD	Not specified. : TBD	0.000	-		5.000	Nov 2019	0.000		-		0.000	0.000	5.000	-
Weapon System Integration	C/TBD	Not specified. : TBD	0.000	-		5.303	Feb 2020	0.000		-		0.000	0.000	5.303	-
Subtotal			37.635	24.474		54.572		0.000		-		0.000	0.000	116.681	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Civilian Reimbursable Budget Authority	Various	SMC : El Segundo, CA	0.000	0.176	Jan 2019	0.352	Jan 2020	0.000		-		0.000	0.000	0.528	-
Database error	C/CPAF	Not specified. : TBD	0.000	-		12.000		-		-		-	0.000	12.000	-
Subtotal			0.000	0.176		12.352		0.000		-		0.000	0.000	12.528	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Test	Various	Various : Various	0.000	-		1.300	Mar 2020	0.000		-		0.000	0.000	1.300	-
Subtotal			0.000	-		1.300		0.000		-		0.000	0.000	1.300	N/A

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System	Project (Number/Name) 67A035 / Enterprise Space BMC2
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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

ESBMC2	
Platform/Infrastructure	
Program Increment 4-7	
Program Increment 8-11	
Data Management	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203614F / JSpOC Mission System	Project (Number/Name) 67A035 / Enterprise Space BMC2

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
ESBMC2				
Platform/Infrastructure	1	2019	4	2020
Program Increment 4-7	3	2019	4	2020
Program Increment 8-11	4	2020	4	2020
Data Management	1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force / BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203620F / <i>National Space Defense Center</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	53.305	2.653	2.687	0.000	2.687	2.751	2.800	0.000	0.000	Continuing	Continuing
670004: <i>OTHER STRATCOM ACTIVITIES</i>	-	53.305	2.653	2.687	0.000	2.687	2.751	2.800	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

This \$2.687M FY21 budget request for NSDC in Appropriation Research, Development, Test & Evaluation, Air Force, PE 1203620F, should have been requested in PE 1203620SF, Appropriation Research, Development, Test & Evaluation, Space Force. Funds will be transferred to Space Force in the next year's budget request.

This program will develop, upgrade and field the National Space Defense Center's (NSDC) operational infrastructure integrating mission partner networks, data and other hardware and software solutions into NSDC's technical baseline. Additionally, this program will provide for agile requirement development, and operational and developmental test activities supporting software Development in Operations (DevOps). The NSDC allows the national security space community to effectively respond to potential future space threat events and will have the capability to develop, test, and integrate new space system tactics, techniques and procedures (TTPs) in support of both DoD and Intelligence Community operations.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver NSDC 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 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203620F / <i>National Space Defense Center</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	55.309	2.653	2.692	0.000	2.692
Current President's Budget	53.305	2.653	2.687	0.000	2.687
Total Adjustments	-2.004	0.000	-0.005	0.000	-0.005
• 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	-2.004	0.000			
• Other Adjustments	0.000	0.000	-0.005	0.000	-0.005

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1203620F / <i>National Space Defense Center</i>				Project (Number/Name) 670004 / <i>OTHER STRATCOM ACTIVITIES</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
670004: <i>OTHER STRATCOM ACTIVITIES</i>	-	53.305	2.653	2.687	0.000	2.687	2.751	2.800	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program develops Battle Management and Command and Control (BMC2) applications for the Joint Task Force - Space Defense (JTF-SD)(component for the National Space Defense Center (NSDC)). This includes developing hardware and software prototypes to support JNET developed with the US Strategic Command Joint Emergent Operational Need (ST-0006) and will continue to contribute towards developing hardware and software for an Accelerated BMC2 capability. The JTF-SD (and NSDC) allows the national security space community to effectively respond to potential future space threat events and will have the capability to develop, test, and integrate new space system tactics, techniques and procedures (TTPs) in support of both DoD and Intelligence Community operations.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
Title: Application Development	53.305	2.653	2.687
Description: Develop and field Space Battle Management Command and Control capabilities.			
FY 2020 Plans: FY2020 Plans: Continue to analyze and assess mission partner and Intelligence Community networks and achieve authorization to connect to NSDC infrastructure. Partner with test agency to perform developmental and operational test activities to support agile DevOps environment. 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, experimentation, prototyping, etc.			
FY 2021 Plans: FY2021 Plans: Complete Spiral 2 development. Continue to analyze and assess mission partner and Intelligence Community networks and achieve authorization to connect to JTF-SD infrastructure. Partner with test agency to perform developmental and operational test activities and shadow operations for agile DevOps environment. 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, experimentation, prototyping, etc.			
FY 2020 to FY 2021 Increase/Decrease Statement: FY 2021 increased compared to FY 2020. Justification for this increase is described in the plans above.			
Accomplishments/Planned Programs Subtotals	53.305	2.653	2.687

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203620F / <i>National Space Defense Center</i>	Project (Number/Name) 670004 / <i>OTHER STRATCOM ACTIVITIES</i>

C. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

D. Acquisition Strategy

NSDC plans to provide funds to other AF/DoD organizations to execute on their contracts. Additionally NSDC will initiate and utilize commercial consortiums to develop capabilities.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203620F / National Space Defense Center	Project (Number/Name) 670004 / OTHER STRATCOM ACTIVITIES
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
SHADOW OPERATIONS CENTER DEVELOPMENT	Various	Various : Colorado Springs, CO	-	23.965	Jan 2019	-		0.180	Jan 2021	-		0.180	0.000	24.145	-
BMC2 APPLICATION DEVELOPMENT	Various	Various: : Colorado Springs, CO	-	20.158	Oct 2018	1.000	Jan 2020	1.006	Jan 2021	-		1.006	Continuing	Continuing	-
SYSTEM ENGINEERING	Various	Various: : Colorado Springs, CO	-	6.000	Oct 2018	-		-		-		-	0.000	6.000	-
Subtotal			-	50.123		1.000		1.186		-		1.186	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
A&AS	Various	Various: : Colorado Springs, CO	-	0.500	Oct 2018	0.500	Jan 2020	0.502	Jan 2021	-		0.502	Continuing	Continuing	-
FFRDC	Various	Various: : Colorado Springs, CO	-	2.682	Oct 2018	1.153	Dec 2019	0.999	Dec 2020	-		0.999	Continuing	Continuing	-
Subtotal			-	3.182		1.653		1.501		-		1.501	Continuing	Continuing	N/A

Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
-	53.305	2.653	2.687	-	2.687	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203620F / <i>National Space Defense Center</i>	Project (Number/Name) 670004 / <i>OTHER STRATCOM ACTIVITIES</i>

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
NSDC INFRASTRUCTURE																												
SUSTAINMENT/SUPPORT																												
BMC2 APPLICATION DEVELOPMENT																												
SPIRAL 2 APPLICATION DEVELOPMENT																												
SHADOW OPERATIONS CENTER																												
SHADOW OPERATIONS CENTER IOC																												
SHADOW OPERATIONS APPS																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203620F / <i>National Space Defense Center</i>	Project (Number/Name) 670004 / <i>OTHER STRATCOM ACTIVITIES</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>NSDC INFRASTRUCTURE</i>				
SUSTAINMENT/SUPPORT	2	2019	4	2023
<i>BMC2 APPLICATION DEVELOPMENT</i>				
SPIRAL 2 APPLICATION DEVELOPMENT	4	2019	4	2023
<i>SHADOW OPERATIONS CENTER</i>				
SHADOW OPERATIONS CENTER IOC	3	2019	3	2019
SHADOW OPERATIONS APPS	3	2019	2	2021

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203873F / <i>Ballistic Missile Defense Radars</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	15.881	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.881
674820: <i>Sensor Development</i>	-	0.000	15.881	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	15.881
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

In FY 2021, PE 1203873F, Ballistic Missile Defense Radars efforts were transferred to Appropriation 3620, Research Development, Test & Evaluation, Space Force, PE 1203873SF Ballistic Missile Defense Radars from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

COBRA DANE (CD) is a 40+ year old radar located on Eareckson AS, AK (Shemya Island, AK), executing two missions: Missile Defense (MD) and Space Domain Awareness(SDA). SDA mission supports New Foreign Launches (NFLs) and Space Catalog maintenance to include space debris tracking. CD will acquire through design, development, Integration, and test a modern architecture to enhance mission capability providing Warfighter and Stakeholder customers direct operational benefit. CD utilizes Federally Funded Research and Development Centers (FFRDC), Systems Engineering and Integration (SE&I), University Affiliated Research Center (UARC) and Assistance and Advisory Services (A&AS) Contractors to support programmatic and technical activities. Activities include studies and analysis to support both current program planning and execution and future program planning. Specifically, the Automated Data Processing Equipment (ADPE) Rehost program upgrades the CD system's radar back end mission data processing, radar management and control, and signal processing capabilities to a modern architecture that facilitates long term mission resiliency, cyber security, system viability, high operational availability, and rapid hardware and software development and deployment capability. FY17 Above Threshold Reprogramming (ATR) RDT&E funds were provided to the Missile Defense Agency (MDA) to accelerate the joint Air Force and MDA modernization program of the CD radar which opens the door for a non-traditional acquisition approach using an Other Transaction Authority (OTA) agreement through the OSD Defense Innovation Unit (DIU) Organization. This program element may include necessary civilian pay expenses required to manage, execute, and deliver COBRA DANE's weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605831F. In addition to funds being used to modernize this back end of the radar, these funds will also be used for out-year planning of front end component modernization including enhancement of communication elements.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203873F / <i>Ballistic Missile Defense Radars</i>
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B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	15.881	28.188	0.000	28.188
Current President's Budget	0.000	15.881	0.000	0.000	0.000
Total Adjustments	0.000	0.000	-28.188	0.000	-28.188
• 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	-28.188	0.000	-28.188

Change Summary Explanation

FY 2021: -\$28.179M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
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Title: ADPE Rehost Upgrade, Phase II	0.000	15.881	0.000
Description: The Automated Data Processing Equipment (ADPE) Rehost Phase II continues evolutionary, non-traditional prototype development funded under FY17 Congressional ATR and FY18 Missile Defense Agency funds to deliver an operational capability. FY20 funds extend the prototype development toward integration, complete a System Integration Lab and transition to operationalize prototypes procured using non-traditional acquisition methods which will evolve the COBRA DANE radar back end mission data processing, radar management and control, and signal processing capabilities to a modern open architecture. This architecture will facilitate long term mission resiliency, cyber security, system viability, high operational availability, and rapid hardware and software development and deployment capability. In addition to funds being used to modernize the back end of the radar, these funds may also be used for planning of front end component modernization including enhancement of communication elements.			
FY 2020 Plans: Planned projects include extension of systems integration lab, further capability extension of the prototype hardware and software, system integration and agile software development. In addition to funds being used to modernize the back end of the radar, these funds may also be used for planning enhancements of communication elements. This program element may include necessary civilian pay expenses required to manage, execute, and deliver COBRA DANE's weapon system capability.			
FY 2021 Plans:			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203873F / <i>Ballistic Missile Defense Radars</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Planned projects include software lab evolution and development support, continued development of system hardware and software, system integration and spiral development and testing. Initial limited capability deployments to the site to include integration hardware support. In addition to funds being used to modernize the back end of the radar, these funds may also be used for planning enhancements of communication elements. This program element may include necessary civilian pay expenses required to manage, execute, and deliver COBRA DANE's weapon system capability.</p> <p><i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> This increase is due to ramping up developing and integration efforts and the initiation of test and operational assessment activities.</p>			
Accomplishments/Planned Programs Subtotals	0.000	15.881	0.000

D. Other Program Funding Summary (\$ in Millions)

N/A

Remarks

E. Acquisition Strategy

This acquisition strategy will continue to use a non-traditional approach to modernize and enhance existing capabilities adding a deployment phase to one of the program's currently awarded efforts through the Defense Innovation Unit (DIU) Other Transaction Authority (OTA) Agreement. This approach will provide an extension of system service life to ensure warfighter capability thru at least 2030. This evolutionary migration to a current open system approach also provides foundation for adaptable system sustainment and addition of future capabilities.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203873F / <i>Ballistic Missile Defense Radars</i>	Project (Number/Name) 674820 / <i>Sensor Development</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Product Development	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
ADPE Phase II, Development; S/W & H/W integration	TBD	Various : TBD	-	0.000		11.966	Jan 2020	-		-		-	Continuing	Continuing	-
Subtotal			-	0.000		11.966		-		-		-	Continuing	Continuing	N/A

Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Support (integration)	C/CPAF	various : TBD	-	-		1.233	Feb 2020	-		-		-	Continuing	Continuing	-
Subtotal			-	-		1.233		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
Program Management Support	TBD	Various : TBD	-	-		2.682	Mar 2020	-		-		-	Continuing	Continuing	-
Subtotal			-	-		2.682		-		-		-	Continuing	Continuing	N/A

			Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			-	0.000	15.881	-	-	-	Continuing	Continuing	N/A

Remarks

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203873F / <i>Ballistic Missile Defense Radars</i>	Project (Number/Name) 674820 / <i>Sensor Development</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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

ADPE Rehost Phase II	
Prototype Phase I completion MDA Funded RDT&E	
Prototype Phase 2 Requirements, Infrastructure & Early Development	
Phase 2 Hardware/Software Development	

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203873F / <i>Ballistic Missile Defense Radars</i>	Project (Number/Name) 674820 / <i>Sensor Development</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>ADPE Rehost Phase II</i>				
Prototype Phase I completion MDA Funded RDT&E	1	2019	1	2020
Prototype Phase 2 Requirements, Infrastructure & Early Development	3	2020	4	2020
Phase 2 Hardware/Software Development	3	2020	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203906F / NCMC - TW/AA System
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	6.990	0.000	6.990	9.985	0.000	0.000	0.000	0.000	16.975
67A051: <i>Space Superiority - Advanced Intelligence Systems</i>	-	0.000	0.000	6.990	0.000	6.990	9.985	0.000	0.000	0.000	0.000	16.975
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

Note
 This program, BA 7, PE 1203906F, project 67A051, ITW/AA C2 Integration of C2BMC Feeds, is a new start.

A. Mission Description and Budget Item Justification

This program element supports development activities for the NORAD Cheyenne Mountain Complex - Integrated Tactical Warning Attack Assessment (NCMC-ITW/AA) system that provides timely, unambiguous, and continuous warning and attack assessment of air, missile and space threats to North America, and geographical theaters. This system integrates and correlates missile launch and air surveillance information from certified sources to assess the nature of an enemy launch/attack and issue warnings to the President of the United States, Canadian (national leadership), United States Secretary of Defense, National military Command center and war-fighting Combatant Commanders (C2). NCMC-ITW/AA and Legacy Space C2 systems provide NORAD/NORTHCOM, USSTRATCOM and SPACECOM command structures with the information management, decision aids and connectivity required to monitor, assess, plan, and execute assigned strategic, space operations, and missile defense missions. It provides Nuclear C2 and detonation detection.

The Combatant Commanders Integrated Command and Control System (CCIC2S) is a unique, integrated C2 "system of systems", providing data communication between external sensors and end users; mission processing for air and missile warning mission and system operations functions. The system supports national strategic objectives with Integrated Tactical Warning/Attack Assessment (ITW/AA) and provides missile and air warning, cueing and engagement information to theater combatant commanders. The system consists of terrestrial and space-based sensor outputs, C2 nodes, and communications and dissemination links, connecting the US and Canadian defense information networks.

This program is in Budget Activity 7, Operational System 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.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force				Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1203906F / NCMC - TW/AA System				
B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	
Previous President's Budget	0.000	0.000	0.000	0.000	0.000	
Current President's Budget	0.000	0.000	6.990	0.000	6.990	
Total Adjustments	0.000	0.000	6.990	0.000	6.990	
• 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	6.990	0.000	6.990	
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2019	FY 2020	FY 2021
Title: ITW/AA C2 Integration of C2BMC Feeds				-	-	6.990
Description: Obtain and assess non-ITW/AA (Global Defense Integration) and non-traditional data sources (C2BMC and theater) for integration into CCIC2S and Processing and Display System Migration (PDSM) to display a more complete event picture. Improve source data accuracy for Missile Warning mission and translate for integration into CCIC2S that will enhance mission displays and improve impact prediction. Create multiple display options for the operator and reduce ambiguity between missile defense and missile warning displays. Provides program office support and other related support activities, including but not limited to technical analysis, prototyping, user evaluations, and independent certification testing.						
FY 2021 Plans: Funds the integration, processing and display of high fidelity data from non-ITW/AA and non-traditional sensors sources, resolving ambiguity and improving prediction accuracy, thus increasing the time critical National Command Authorities nuclear response decision space. Addresses emergent missile threats and other capability gaps identified in the Global Threat Characterization Assessment recommendations. Integrates missile defense and missile warning information supporting a common operating picture. Harmonizes the displays between Strategic Missile Warning, Theater Missile Warning and Missile Defense. Integrates non-traditional source data to provide a seamless event-tracking and common operating picture.						

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203906F / NCMC - TW/AA System
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Begin to leverage/integrate new data sources that come on line and correlate with missile defense and missile warning display changes to meet emerging adversary threat.			
<i>FY 2020 to FY 2021 Increase/Decrease Statement:</i> New Start - Funding to begin effort initiated in FY21 PB Cycle.			
Accomplishments/Planned Programs Subtotals	-	-	6.990

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
The effort will be competitive award from an existing software services IDIQ contract. An Acquisition Strategy Panel will be conducted in 3rd quarter 2020. The contract is slated to be awarded late 2nd quarter 2021 that will provide incremental deliveries to the ITW/AA sustainment provider for incorporation into the operational system over 2 years.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020			
Appropriation/Budget Activity 3600 / 7				R-1 Program Element (Number/Name) PE 1203906F / NCMC - TW/AA System				Project (Number/Name) 67A051 / Space Superiority - Advanced Intelligence Systems							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development of ITW/AA C2 Integration of C2BMC Feeds	C/CPIF	TBD : TBD, CO	-	-		-		6.490	Jan 2021	-		6.490	Continuing	Continuing	-
Subtotal			-	-		-		6.490		-		6.490	Continuing	Continuing	N/A
Support (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Office Support	C/CPIF	A&AS : Colorado Springs, CO	-	-		-		0.500	Jan 2021	-		0.500	Continuing	Continuing	-
Subtotal			-	-		-		0.500		-		0.500	Continuing	Continuing	N/A
Project Cost Totals			-	-		0.000		6.990		-		6.990	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203906F / NCMC - TW/AA System	Project (Number/Name) 67A051 / Space Superiority - Advanced Intelligence Systems

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
C2 Integration of C2BMC Feeds				
C2 Integration Prime Contract	2	2021	2	2023
- Ingest GDI data into CCIC2S in TDF and CMAFS w/ user evaluation	2	2021	2	2022
- C2BMC Connectivity	3	2021	3	2022
- C2BMC Use and Display Data	3	2021	2	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203913F / <i>NUDET Detection System (SPACE)</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	21.578	49.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.878
672808: <i>Nuc Detonation Det Sys (sensors)</i>	-	21.578	49.300	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	70.878
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

In FY2021, PE1203913F, NUDET Detection System (SPACE) efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203913F, NUDET Detection System (SPACE) from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

The United States Nuclear Detonation (NUDET) Detection System (USNDS) provides a near real-time worldwide, highly survivable/endurable capability to detect, locate, and report any nuclear detonations in the earth's atmosphere or in near space. USNDS supports NUDET detection requirements across five mission areas: Integrated Tactical Warning and Attack Assessment (ITW/AA), Nuclear Force Management (NFM), Space Control (SC), Treaty Monitoring (TM), and a classified mission.

The USNDS program is jointly sponsored and funded by the Department of Defense (DoD), through the Air Force (AF), and the Department of Energy (DOE), through the National Nuclear Security Administration (NNSA) and its Nuclear Detonation Detection (NA-22) office, respectively. NNSA/NA-22 supplies USNDS space sensors as Government Furnished Equipment (GFE) to the AF's USNDS Program Office, which is responsible for all acquisition and Systems Engineering, Integration and Test (SEI&T) activities on Space Vehicles (SVs), to include Global Positioning System (GPS) and additional hosts, and their supporting ground control segments. The AF directly funds the development of the USNDS ground segment (described below).

DoD funds their contribution to the USNDS program in Program Element (PE) 1203913F with Research, Development, Test and Evaluation (RDT&E), Space Procurement, Air Force (SPAF), and Operations and Maintenance (O&M).

USNDS consists of space sensors and complex ground segments. The space segment sensors, funded by DOE, consists of three nuclear detection sensor payloads: the Radiation Detection Capability (RADEC) payload for Defense Support Program (DSP) satellites, the Global Burst Detection (GBD) payload for Medium Earth Orbit (MEO) platforms (GPS satellites), and the Space Atmospheric Burst Reporting System (SABRS) payload for Geosynchronous Earth Orbit (GEO) platforms (classified GEO host) and Space Test Platform (STP) 3. Together, these sensors and associated communications capability provided by the host satellites comprise the global NUDET space segment detection capability for the USNDS. Space sensors communicate NUDET indications to the fixed ground segment, the RADEC Data Processor (RDP), and the Integrated Correlation and Display System (ICADS), the five deployable mobile ground segment survivable Ground Nuclear Detonation Detection System Terminals (GNTs), and the survivable/endurable Universal Ground NDS Terminals (UGNTs), when fielded. The ground segment provides ground receiving analysis and reporting capabilities to national authorities, commands, and forward users as well as Department of State (DOS) for the Treaty Monitoring and Verification mission. The ground control segment is being modernized and continuously improved through an incremental, evolutionary acquisition approach.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203913F / <i>NUDET Detection System (SPACE)</i>
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The upgrades to the GNTs are the survivable/endurable UGNT which are funded with RDT&E in this PE. The UGNT provides NUDET Detection Reports to end users through survivable/endurable USNDS communications via Milstar/Advanced Extremely High Frequency (AEHF) circuits. The GNT supports ITW/AA and NFM missions. The UGNT program modifies the baseline of the GNT program and deploys as an integral part of the Space Based Infrared System Survivable (SBIRS) / Endurable Evolution (S2E2) Mobile Ground System (SMGS) units also in support of ITW/AA and NFM. The UGNT, when integrated with the SMGS, will perform NUDET event processing with fused NDS data from GPS and DSP. SMGS capability refers to the result of the S2E2 upgrade program for the Mobile Ground System (MGS) mission processing capability, including the integration of UGNT. The intended end state of UGNT integration is delivery of enhanced NUDET detection capabilities which meet survivable/ endurable attack assessment requirements directed by the President, Secretary of Defense (SECDEF), Joint Staff, and USSTRATCOM, delivering long-term, cost effective, multi-role, multi-mission space effects to the war fighter across the range of military operations.

This budget line includes systems engineering, research and development, on-orbit and field testing and end-to-end verification of USNDS space sensors, ground analysis and reporting systems in support of the five USNDS mission areas. Sensor integration for GPS III and GPS IIIF are funded in their respective PEs.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

This PE may include necessary civilian pay expenses required to manage, execute, and deliver NUDET Detection System (SPACE) weapon system capability. The use of such program funds is in addition to the civilian pay expenses budgeted in PEs 1206392F and 1206398F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	19.778	49.300	14.162	0.000	14.162
Current President's Budget	21.578	49.300	0.000	0.000	0.000
Total Adjustments	1.800	0.000	-14.162	0.000	-14.162
• 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	1.800	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-14.162	0.000	-14.162

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1203913F / <i>NUDET Detection System (SPACE)</i>		
<p>Change Summary Explanation FY2019: +\$1.800M Reprogramming to align with SBIRS S2E2 Integration FY 2021: -\$14.162M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.</p>				
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Title: Universal Ground NDS Terminals (UGNT) Description: The five UGNT trailers provide NUDET Detection Reports to end users through survivable/endurable USNDS communications via Milstar/AEHF circuits. The UGNT program modifies the baseline of the GNT program and deploys as an integral part of the SMGS units also in support of ITW/AA and NFM. UGNT delivers NUDET detection capabilities that meet survivable/endurable tactical warning and attack assessment requirements directed by the President, SECDEF, Joint Staff and USSTRATCOM delivering long-term, cost effective, multi-role, multi-mission space effects to the warfighter across the range of military operations. FY 2020 Plans: N/A FY 2021 Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		3.815	0.000	0.000
<p>Title: Systems Engineering/On-Orbit Support & Testing Description: Support costs included such activities as, on-orbit USNDS sensor integration, check-out/support, testing and system engineering. FY 2020 Plans: N/A FY 2021 Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		3.240	0.000	0.000
<p>Title: Integration with SBIRS S2E2 Mobile Ground Terminals (SMGTs) and On-orbit support</p>		14.523	22.802	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1203913F / <i>NUDET Detection System (SPACE)</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Description: Support the Integration and test activities between UGNTs and the S2E2 SMGTs, which together provide NUDET Detection Reports and missile warning data to end users through survivable/endurable USNDS communications via Milstar/AEHF circuits. The UGNTs deploy as an integral part of the SBIRS S2E2 SMGS units also in support of ITW/AA and NFM. Support program scope analyzation for USNDS receiver and Integrated Data Denial (IDD) components. Additional support costs includes such activities as; receiver system engineering support, on-orbit NDS sensor integration, conceptual hardware and software design, check-out/support, testing, and system engineering.</p> <p>FY 2020 Plans: Perform series of Force Package (FPAK) High Altitude Electromagnetic Pulse (HEMP) tests on second and fifth UGNT. Conduct FPAK training activities. Support FPAK Operation Testing with FPAK unit one, two, and three. Continue to support integration activities with SBIRS S2E2 program. Support launch and checkout of USNDS payloads on GPS III Space Vehicle (SV) 02 and SV 03. Continue on-orbit system engineering analysis of the USNDS fleet. Provide SE&I, technical support and program technical support for the five USNDS mission areas. Continue Contingency Operations (COps) on-orbit support for checkout of all GPS III satellites on-orbit. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: USNDS System Engineering and Architecture Design</p> <p>Description: The future USNDS build consists of an ICADS satellite ground data processing system and UGNT trailers that accommodate the new NDS payload on GPS IIIF family of vehicles and are an upgrade to the current USNDS 6 program. USNDS ICADS reports endoatmospheric, transition and near-space nuclear detonations as detected by the USNDS sensors aboard the GPS satellites, DSP satellites and SABRS equipped satellites. ICADS processes NDS, State-of-Health (SOH), and navigation data from GPS IIIF. USNDS UGNT provide NUDET Detection Reports to end users through survivable/endurable USNDS communications via Milstar/AEHF circuits. USNDS also consists of the Integrated Data Denial (IDD). IDD is a Communications Security (COMSEC) device associated with the USNDS. IDD provides decryption of satellite position data and NDS sensor data used to detect, locate, and report nuclear detonations in earth's atmosphere or near-space in near real time. This IDD effort contains cryptographic modifications mandated by National Security Agency (NSA). In addition, parts obsolescence requires the start of a new IDD design and manufacturing effort.</p> <p>FY 2020 Plans:</p>		0.000	26.498	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203913F / <i>NUDET Detection System (SPACE)</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Support program scope analyzation for USNDS receiver and Integrated Data Denial (IDD) components. Performed database replacement evaluation and conceptual architecture design requirements. Preparation and execution of requirements definition and decomposition. Support optical algorithm study, system readiness review material development preparation and Hard Radiation Sensor (HRS), Electro Magnetic Pulse (EMP) and Spectral Imaging Geolocation Hyper-Temporal Sensor (SIGHTS) telemetry definitions. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.			
FY 2021 Plans: N/A			
FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	21.578	49.300	0.000

D. Other Program Funding Summary (\$ in Millions)											
<u>Line Item</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>FY 2021</u> <u>Base</u>	<u>FY 2021</u> <u>OCO</u>	<u>FY 2021</u> <u>Total</u>	<u>FY 2022</u>	<u>FY 2023</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• SPAF 01 Line Item NUDETS: <i>Nudet Detection Sys Space</i>	9.205	7.432	-	-	-	-	-	-	-	0.000	16.637

Remarks

E. Acquisition Strategy
The USNDS Acquisition Strategy is to develop, integrate, field and sustain USNDS satellite sensors and USNDS ground data processing and distribution hardware and software as well as mission operational and technical program support to sustain the USNDS capability on GPS, DSP, and an Alternate Host; funding is sent by Military Interdepartmental Purchase Request (MIPR) from DoD and DOE to Sandia, Lawrence Livermore, Los Alamos National Laboratories and other agencies on existing DOE/NNSA contracts.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203913F / NUDET Detection System (SPACE)	Project (Number/Name) 672808 / Nuc Detonation Det Sys (sensors)
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
USNDS ICADS, GNT/UGNT, and Integration Support	MIPR	Sandia National Laboratory : Albuquerque, NM	-	13.251	Nov 2018	12.183	Nov 2019	-		-		-	Continuing	Continuing	-
USNDS Technical Mission Analysis	MIPR	Aerospace : El Segundo, CA	-	1.942	Nov 2018	1.932	Dec 2019	-		-		-	Continuing	Continuing	-
USNDS Enterprise SE&I	C/CPAF	TASC : El Segundo, CA	-	1.140	Dec 2018	0.869	Dec 2019	-		-		-	Continuing	Continuing	-
USNDS System Engineering and Architecture	MIPR	Sandia National Labs : Albuquerque, NM	-	-		26.498	Jan 2020	-		-		-	Continuing	Continuing	-
Subtotal			-	16.333		41.482		-		-		-	Continuing	Continuing	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
USNDS Testing	Various	17th Test Squadron, JITC : Schriever AFB, CO	-	0.315	Dec 2018	0.130	Dec 2019	-		-		-	Continuing	Continuing	-
USNDS On-orbit Sensor Testing	MIPR	Various : LANL, SNL, NM	-	3.100	Dec 2018	3.915	Dec 2019	-		-		-	Continuing	Continuing	-
Subtotal			-	3.415		4.045		-		-		-	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
USNDS FFRDC	Various	Aerospace, MITRE : El Segundo, CA	-	0.761	Dec 2018	2.344	Dec 2019	-		-		-	Continuing	Continuing	-
USNDS A&AS	Various	Various : Various	-	0.989	Nov 2018	1.349	Nov 2019	-		-		-	Continuing	Continuing	-
USNDS Other Support	C/CPAF	Various : Various	-	0.080	Nov 2018	0.080	Nov 2019	-		-		-	Continuing	Continuing	-

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203913F / <i>NUDET Detection System (SPACE)</i>	Project (Number/Name) 672808 / <i>Nuc Detonation Det Sys (sensors)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<i>UGNT</i>				
Acceptance, Test, Support, Readiness Campaign, Integration UGNT 2019 1-5	1	2019	4	2020
<i>USNDS</i>				
NDS Payload Checkout and Activation	1	2019	4	2020
<i>Integration with SMGT Trailers</i>				
Integration with SMGT trailers	2	2019	4	2020
<i>USNDS System Engineering and Architecture Design</i>				
USNDS System Engineering and Architecture Design	1	2020	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203940F / <i>Space Situation Awareness Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	18.920	17.834	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
67A017: <i>Sensor Service Life Extension Program</i>	-	18.920	17.834	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 FY 2021, PE 1203940F, Space Situation Awareness Operations efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203940SF Space Situation Awareness Operations from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

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 reconnaissance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering intelligence on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities. SSA also encompasses the integration, exploitation and delivery of data sources to facilitate the battle management and command and control of space forces. This program element fields, upgrades, modifies, modernizes, operationalizes, operates and maintains Air Force sensors and information integration capabilities within the SSA Space Surveillance Network (SSN) while companion program element 1206425F, Space Situational Awareness Systems, develops new network sensors and improved information integration capabilities across the network. 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.

Service Life Extension Programs (SLEPs) are efforts to upgrade, operationalize and extend the life of operational SSA sensors. These SLEPs extend the serviceable life of assets and maintain critical capability by replacing aging and increasingly unsustainable components with modern and sustainable equipment. In addition, the SLEPs themselves may be designed to increase capabilities not currently realized. As the need arises in the execution year, funds in this project may be used to begin SLEPs on additional efforts. These efforts may include prototyping and technology demonstrations.

Global Sensor Watch (GSW) Program provides an integrated SSA Tip & Cue capability that implements a survivable architecture providing overlapping, assured, and viable surveillance options for executing event response, multiple level security processing of SSA data and automated cross-sensor tipping & cueing worldwide. Other efforts to support Battle Management Command & Control (BMC2) in space include developing & deploying advanced software algorithms to identify, acquire, characterize, and maintain custody of both space objects of interest and new foreign launches; optimizing commercial, intelligence community (IC) & Missile Defense Agency sensors to better support BMC2; developing & executing Joint Functional Space Component Command (JFSCC) exercises such as Combined Space Operations Center and National Space Defense Center Experimentation, Test and Training Initiative to test & optimize Space Control capabilities, Concept of Operations (CONOPS) development to increase probability of survival for blue assets, and refining requirements across the space enterprise; enhancing sensor performance

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203940F / <i>Space Situation Awareness Operations</i>
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to close the solar exclusion gap leveraging technologies such as optical daylight tracking and incorporating commercial & IC sensors; and improving legacy paths to support bi-directional machine-to-machine sensor communications enabling a more complete BMC2 capability.

Ground Based Radar Upgrades improves the sensitivity, search capabilities and CONOPS of existing ground-based SSA sensors to better support custody and fire control timelines.

Programs and projects in the space warfighting enterprise are evaluating ways to maximize innovation, resiliency, and our ability to rapidly respond to known and emerging threats. Space enterprise efforts aim to execute technology risk reduction efforts, integration of new or repurposed capabilities, enterprise decision-making tools, experimentation, and rapid prototyping and fielding via all appropriate acquisition authorities and contract mechanisms.

Funding for this exhibit is contained in PE 12034940F.

This program is in Budget Activity 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	19.572	17.834	30.401	0.000	30.401
Current President's Budget	18.920	17.834	0.000	0.000	0.000
Total Adjustments	-0.652	0.000	-30.401	0.000	-30.401
• 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	-0.652	0.000			
• Other Adjustments	0.000	0.000	-30.401	0.000	-30.401

Change Summary Explanation

FY 2021: -\$44.809M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force; includes \$14.408M increase for sensor upgrades for classified activity and supporting operational roll-out of capability development started in FY 2020.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Global Sensor Watch Program	18.920	12.314	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1203940F / <i>Space Situation Awareness Operations</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Description: Global Sensor Watch (GSW) Program provides an integrated SSA Tip and Cue capability that implements a survivable architecture that provides overlapping, assured, and viable surveillance options for executing event response, multiple level security processing of SSA data and automated cross-sensor tipping and cueing around the globe. Other efforts to support Battle Management Command & Control (BMC2) in space include developing & deploying advanced software algorithms to identify, acquire, characterize, and maintain custody of deep space SHIOs; optimizing intelligence community & MDA sensors to better support BMC2; developing & executing JFCC Space exercises to test & optimize Space Control capabilities, CONOPS development to increase probability of survival for blue assets, and refining requirements across space enterprise; enhancing sensor performance to close the solar exclusion gap leveraging technologies and improving legacy communication paths to support bi-directional machine-to-machine sensor communications enabling a more complete BMC2 capability.</p> <p>FY 2020 Plans: Funds US portion of bill for interruption of SST reassembly, subsystem integration, and testing as a result of Australian facility delays; finishes SST assembly in Australia, integration of SST subsystems to Australian facility, subcontractor testing, and DT/OT&E planning.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: Space Surveillance Telescope DT&E/OT&E</p> <p>Description: Space Surveillance Telescope (SST) provides rapid un-cued search, detection and tracking of dim objects in deep space and offers enhanced capabilities addressing critical space situational awareness gaps. SST relocation from White Sands Missile Range, NM to Western Australia is expected complete in FY 2021. Efforts include executing SST sensor reassembly, subsystem integration and testing subsequent to Australian facility delays. This includes completion of SST integration into a new facility, SST subsystem and system testing & Developmental Test/Operational Test and Evaluation (DT/OT&E).</p> <p>FY 2020 Plans: Funds US portion of bill for interruption of SST reassembly, subsystem integration, and testing as a result of Australian facility delays; includes facility integration, SST subsystem and system testing, and DT/OT&E. Rapidly respond and implement system resiliency and situational awareness necessary to operate in the contested space domain. RDT&E funding is required to support this transformation and enable Space Superiority end-to-end integration activities such as, but not limited to, program</p>		0.000	5.520	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203940F / <i>Space Situation Awareness Operations</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
office support, studies, technical analysis, experimentation, prototyping, architectural development, systems engineering, demonstrations, testing, command and control integration, mission partner integration, and space test/combat range events. FY 2021 Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	18.920	17.834	0.000

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks

E. Acquisition Strategy
The acquisition strategies for the Global Sensor Watch and Space Surveillance Telescope programs includes a mix of modifications to existing Air Force contracts and directing funds to other AF or DoD organizations for contract support.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203940F / <i>Space Situation Awareness Operations</i>	Project (Number/Name) 67A017 / <i>Sensor Service Life Extension Program</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GSW Operationalization	C/TBD	Multiple : Colorado Springs, CO	-	11.610	Dec 2018	7.624	Dec 2019	0.000		-		0.000	Continuing	Continuing	-
GSW SW Development 1	Various	AFRL : Various	-	2.500	Nov 2018	1.000	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
GSW SW Development 2	Various	MIT/LL : Lexington, MA	-	2.500	Nov 2018	1.000	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
GSW SW Development 3	Various	Sandia National Labs : Albuquerque, NM	-	0.500	Nov 2018	0.500	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
Space Surveillance Telescope	Various	Multiple : Exmuth Australia	-	-		5.520	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	17.110		15.644		0.000		-		0.000	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
A&AS	Various	Multiple : Colorado Springs, CO	-	0.690	Oct 2018	1.290	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
FFRDC	Various	Multiple : Colorado Springs, CO	-	1.020	Dec 2018	0.800	Dec 2019	0.000		-		0.000	Continuing	Continuing	7.788
Other Support	Various	Multiple : Colorado Springs, CO	-	0.100	Oct 2018	0.100	Oct 2019	0.000		-		0.000	Continuing	Continuing	16.626
Subtotal			-	1.810		2.190		0.000		-		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract	
Project Cost Totals		-	18.920	17.834	0.000	-	0.000	Continuing	Continuing	N/A

Remarks

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203940F / <i>Space Situation Awareness Operations</i>	Project (Number/Name) 67A017 / <i>Sensor Service Life Extension Program</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Sensor SLEP				
Global Sensor Watch (GSW) Program	1	2019	4	2020
GSW Legacy Tasking Upgrades	1	2019	4	2019
GSW Operationalization	2	2019	4	2020
GSW SW Development 1 (Operationalized)	1	2019	4	2020
GSW SW Development 2 (Legacy)	2	2020	4	2020
SST OT&E	4	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	4,013.817	491.601	445.302	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4,950.720
67A021: OCX	3,552.479	433.904	380.342	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4,366.725
67A025: <i>GPS Enterprise Integrator</i>	461.338	57.697	64.960	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	583.995

Program MDAP/MAIS Code: 456

A. Mission Description and Budget Item Justification

In FY 2021, PE 1206423F, Global Positioning System III - Operational Control Segment efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206423SF Global Positioning System III - Operational Control Segment from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

The Global Positioning System (GPS) is a space based Positioning, Navigation and Timing (PNT) distribution system which operates through all weather. GPS supports both civil and military users in air, space, sea and land operations. GPS is a satellite-based radio navigation system that serves military and civil users worldwide. GPS users process satellite signals to determine accurate position, velocity and time. GPS must comply with Title 10 United States Code (USC) Sec 2281 which requires that the Secretary of Defense (SECDEF) ensures the continued sustainment and operation of GPS for military and civilian purposes, and 51 USC Sec 50112, which requires that GPS complies with certain standards and facilitates international cooperation.

Program Element (PE) 1206423F funds Research, Development, Test and Evaluation (RDT&E) for the GPS Next Generation Operational Control System (OCX), the upgrade to OCX called OCX Block 3F to incorporate Regional Military Protection (RMP), command and control functionality for GPS III Follow-on (GPS IIIF) satellites, and the GPS Enterprise Integrator (EI). OCX acquisition was established to 1) provide command and control of legacy and GPS III satellites, 2) incorporate situational awareness to support Navigation Warfare (NAVWAR) and signal monitoring, 3) enable mission capability upgrades to support a warfighter effects-based approach to operations, and 4) integrate Department of Defense (DoD) information assurance and cybersecurity controls and capabilities. OCX Block 3F will upgrade OCX with new capabilities to synchronize with GPS IIIF Space Segment capabilities. GPS EI is responsible for architecture and system definition (the analysis and definition, management, maintenance, and evolution of the GPS Enterprise requirements and interface technical documents) as well as for the planning, execution, and fielding of the GPS Enterprise.

OCX funds support efforts such as engineering studies and analyses, architectural engineering studies, trade studies, technology needs forecasting, modernization initiatives, systems engineering, system development, resolving obsolescence issues, test and evaluation efforts, and mission operations. These activities support upgrades and product improvements for military and civil applications necessary to enable efforts to protect United States (U.S.) Military and Allies' use of GPS. Additionally, funds ensure OCX efforts meet current and future Joint Requirements Oversight Council (JROC) approved required capabilities.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	
<p>OCX Block 3F will upgrade OCX with new capabilities to synchronize with GPS IIF Space Segment and Military GPS User Equipment (MGUE) Increment 2 capabilities. This includes advanced concept development such as systems analysis, modernized control segment development, modernization/deployment of 17 monitoring stations, mission planning development, training simulators, integrated logistics support products, test resources, systems engineering required to meet the Government's obligations to the international, military and civil communities, and system requirements verification. OCX Block 3F will maintain backward compatibility and support the legacy constellation develop solutions necessary to command, control and monitor GPS IIF, to include advance collection and integration of RMP high power regional M-code signals, rapid warfighter effects and support to GPS auxiliary payloads.</p> <p>The GPS Enterprise consists of Space, Ground Control, Nuclear Detonation (NUDET) Detection System (NDS) and User Equipment Segments. The Government is responsible for the integration of the GPS Segments such that they provide worldwide GPS capability to support the warfighter and over a billion national security, civil, Allied and commercial GPS users.</p> <p>The GPS EI project includes the efforts associated with the Government's prime contract tasks necessary to accomplish critical integration functions with the three GPS enterprise material segments along with the logistics, operational and transition communities. GPS EI maintains the GPS current architecture and system definition, controls and validates interfaces, ensures compatibility of Generation II and III systems, and develops/manages plans for execution and fielding of the GPS Enterprise. Further, GPS EI provides modeling, simulation, and technical analyses of impacts for Government-directed enterprise level trades among the GPS segments leading to definition, management, maintenance, and evolution of the GPS Enterprise requirements and interface technical documents to build and ensure the integrity of the enterprise technical baseline, and perform system requirements verification.</p> <p>In addition, the GPS EI project funds the technical evolution, risk reduction, enterprise-level testing and delivery of all GPS Enterprise capabilities. Examples for Generation II include electronic protection; for Generation III, additional anti-jamming protection and additional civil signals. To accomplish this, GPS EI delivers Test and Verification capabilities, Requirements and Interface Management, and Systems Integration support across the Space, Control, and User Segments. In this capacity, GPS EI is responsible for managing this cross-program work to provide these and other capabilities.</p> <p>GPS EI's analyses guide Government decisions to ensure efficient and effective synchronization and execution across all Generation II and III GPS programs. For Enterprise-wide integration to be successful, the GPS EI: works with the GPS and NDS prime contractor teams to develop plans for early risk reduction System Integration Demonstrations to ensure system interfaces and functionality meet user and system requirements; ensures all equipment and documentation is ready when needed; integrates and analyzes enterprise schedules; and conducts formal test and verification, including Requirement Verification Plans and System Test Plans and Procedures. GPS EI performs all these efforts across all GPS programs in all acquisition phases. The Government owns the GPS Enterprise system requirements and integration, and highly leverages the GPS EI team to eliminate the need to fund a development prime contractor to perform these functions. This enhances Government control, oversight and program accountability.</p> <p>Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition</p>		

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>
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authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

This PE may include necessary civilian pay expenses required to manage, execute, and deliver OCX 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 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	509.258	445.302	487.440	0.000	487.440
Current President's Budget	491.601	445.302	0.000	0.000	0.000
Total Adjustments	-17.657	0.000	-487.440	0.000	-487.440
• 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	-17.657	0.000			
• Other Adjustments	0.000	0.000	-487.440	0.000	-487.440

Change Summary Explanation

FY 2021: -\$487.440M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A021 / OCX
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67A021: OCX	3,552.479	433.904	380.342	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	4,366.725
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

GPS is a space-based PNT distribution system which operates through all weather. This project funds the research and development for OCX. This includes, but is not limited to, advanced concept development, systems engineering and analysis, modernized control segment and mission planning development, modernization/ deployment of 17 monitoring stations, training simulators, integrated logistics support products, and test resources.

OCX acquisition was established to: 1) provide command and control of legacy and GPS III satellites; 2) incorporate situational awareness to support NAVWAR and signal monitoring; 3) enable mission capability upgrades to support a warfighter effects-based approach to operations; and 4) integrate DoD information assurance and cybersecurity controls and capabilities. OCX funds will support efforts such as engineering studies and analyses, architectural engineering studies, trade studies, technology needs forecasting, technology development, systems engineering, system development, test and evaluation efforts and mission operations in support of upgrades and product improvements for military and civil applications necessary to support efforts to protect U.S. military and Allied use of GPS. Additionally, funds will ensure efforts to meet current and future JROC approved required capabilities.

OCX Block 0 (through Iteration 1.5) is the Launch and Control System (LCS) intended to conduct Launch and Early Orbit (LEO) operations and the on-orbit checkout of all GPS III satellites. OCX Block 0 is a subset of OCX Block 1.

OCX Block 1 (adds Iterations 1.6, 1.7 and 2.1 to Block 0) fields the operational capability to control all legacy satellites and civil signals (L1C/A), military signals (L1P(Y), L2P(Y)) as well as the GPS III satellites and the modernized civil signal (L2C) and the aviation safety-of-flight signal (L5). In addition, Block 1 will field the basic operational capability to control the modernized military signals (L1M and L2M M-Code), and the globally compatible signal (L1C). It also fully meets information assurance/cyber defense requirements.

OCX Block 2 fields the advanced operational capability to control the advanced features of the modernized military signals (L1M and L2M M-Code). Blocks 1 & 2 are being delivered concurrently as a result of the Oct 2016 Nunn-McCurdy review.

OCX Block 3F will modify OCX Blocks 1 and 2 to field new capabilities in support of the GPS III Follow-On (GPS IIIF) production program and incorporate Regional Military Protection (RMP) to handle future threats. OCX Block 3F will upgrade OCX with new capabilities to synchronizes with GPS IIIF Space Segment and Military GPS User Equipment (MGUE) Increment 2 capabilities. OCX Block 3F will maintain backward compatibility with the existing capabilities to support the legacy GPS constellation and integrate into Block 1 and 2 and future efforts to support GPS IIIF. The OCX Block 3F effort will develop solutions necessary to command, control, and monitor GPS IIIF spacecraft and include advance collection and integration of RMP high-power regional Military Code (M-Code) signals, rapid warfighter effects, and support to GPS IIIF auxiliary payloads (including Search and Rescue (SAR), Nuclear Detonation (NUDET) Detection System (NDS)).

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A021 / <i>OCX</i>

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>Title: OCX Development</p> <p>Description: Development of GPS OCX system to launch GPS III, operate a mixed GPS II and GPS III constellation, and provide for a robust Information Assurance system.</p> <p>FY 2020 Plans: Continue Iteration 1.7 and 2.1 integration and test activities. Continue contractor support of the Block 0 baseline that is supporting GPS III satellite launch and checkout. Complete system level Factory Qualification Testing (FQT) and Site Acceptance Testing (SAT). Continue system maturity demonstrations, known as Transition Risk Reduction Operations (TRROs), in support of transition from the legacy Operational Control Segment (OCS) to OCX. Complete OCX Monitor Station Receiver Equipment (OMSRE) Positioning Signal Integrity Continuity Assurance (PSICA) data collecting and Network Interface Module (NIM) tuning. Submit Authorization to Operate (ATO) packages for the Block 0 and Operational Block 1. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. This includes OCX Block 3F design and impact assessments associated with supporting new capabilities under development by GPS IIIF production program. Begin software and hardware obsolescence remediation and replacement of obsolete IBM servers. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>	401.474	342.142	0.000
<p>Title: Technical Support</p> <p>Description: Development of the Standardized Space Trainer (SST) to provide GPS III operator training. Development of Enterprise Mission Planning Systems. Facilities upgrades for Control Stations and associated equipment and servers. Systems Engineering (SE) including Technical Mission Analysis (TMA), Modernization SE and Technical Support, and Test and Evaluation (T&E).</p> <p>FY 2020 Plans: Continue work on the SST and development demonstration of capabilities. Complete installation and integration. Continue data collection and tuning of the monitoring stations equipment and OMSRE. Complete facility upgrades and testing to include the Master Control Station (MCS), Alternate MCS (AMCS), and remote monitor station sites.</p> <p>FY 2021 Plans:</p>	32.430	38.200	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A021 / OCX

B. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
N/A			
FY 2020 to FY 2021 Increase/Decrease Statement:			
N/A			
Accomplishments/Planned Programs Subtotals	433.904	380.342	0.000

C. Other Program Funding Summary (\$ in Millions)											
Line Item	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
• RDTE 07 PE 1203265F: <i>GPS III Space Segment</i>	139.180	42.440	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	181.620
• SPAF 01 GPSIII: <i>GPS III Space Segment</i>	69.386	31.466	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	100.852
• RDTE 05 PE 1203269F: <i>GPS III Follow-On</i>	412.202	447.875	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	860.077
• SPAF 01 GPS03C: <i>GPSIII Follow On</i>	0.000	394.625	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	394.625

Remarks

D. Acquisition Strategy

The Air Force is pursuing a "Block" approach for OCX in order to respond to warfighter capability requirements. The strategy calls for capability (e.g., better signal maintainability, Unified S-Band (USB), Search and Rescue (SAR) GPS, and near-real time Command and Control (C2)) on-ramps for the follow-on contract for GPS III Space Vehicles (SVs) (starting no earlier than SV11) which will require updates to the OCX ground segment. Enterprise studies will ensure GPS Enterprise synchronization across space and ground segments. Acquisition strategy for OCX Block 3F is currently in work. However, the program office is targeting a tailored ACAT II program with a targeted award in FY 2021.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A021 / OCX
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GPS OCX Phase B OCX Block 1 & 2 Development	C/CPAF	Raytheon : Aurora, CO	2,781.214	369.604	Dec 2018	321.639	Dec 2019	-		-		-	632.320	4,104.777	4,413.394
GPS OCX Technical Mission Analysis	MIPR	Various : Various	46.081	16.803	Dec 2018	15.124	Dec 2019	-		-		-	46.182	124.190	-
GPS OCX Enterprise SE&I	C/CPAF	TASC : El Segundo, CA	54.932	0.000	Dec 2018	5.795	Dec 2019	-		-		-	20.595	81.322	88.187
GPS OCX Modernization/ SE & Technical Support	Various	Various : Various	65.035	2.006	Dec 2018	2.650	Dec 2019	-		-		-	0.000	69.691	-
GPS OCX AMCS Facility Dev	Various	Various : Various	1.392	1.000	Mar 2019	-		-		-		-	0.000	2.392	-
GPS OCX Standard Space Trainer (SST)	C/CPAF	Sonalyt, Inc : Waterford, CT	16.500	6.000	Dec 2018	5.000	Dec 2019	-		-		-	0.000	27.500	34.000
GPS OCX Enterprise Mission Planning	C/CPIF	Booz Allen Hamilton Eng Services : El Segundo, CA	22.100	-		5.800	Jan 2020	-		-		-	0.000	27.900	33.700
GPS OCX Phase A Development	Various	Various : Various	289.000	-		-		-		-		-	0.000	289.000	289.000
Subtotal			3,276.254	395.413		356.008		-		-		-	699.097	4,726.772	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GPS OCX T&E	C/Various	Various : Various	5.872	6.621	Mar 2019	9.626	Mar 2020	-		-		-	0.000	22.119	-
Subtotal			5.872	6.621		9.626		-		-		-	0.000	22.119	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GPS OCX FFRDC	MIPR	Various : Various	143.415	4.636	Oct 2018	4.949	Oct 2019	-		-		-	21.396	174.396	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A021 / OCX

	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
OCX																												
Block 0 Interim Contractor Support																												
1.7/2.1 Integration and Test																												
GSYS Factory Qualification Test (FQT)																												
Monitor Station /Legacy Ground Antenna Installs																												
GPS System Simulator (GSYS) Accreditation																												
Iteration 1.7/2.1 FQT Test Readiness Review (TRR)																												
Block 1 FQT																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A021 / OCX

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
OCX				
Block 0 Interim Contractor Support	1	2019	4	2020
1.7/2.1 Integration and Test	2	2019	1	2020
GSYS Factory Qualification Test (FQT)	2	2019	4	2019
Monitor Station /Legacy Ground Antenna Installs	2	2019	1	2020
GPS System Simulator (GSYS) Accreditation	1	2020	1	2020
Iteration 1.7/2.1 FQT Test Readiness Review (TRR)	2	2020	2	2020
Block 1 FQT	2	2020	2	2020

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force										Date: February 2020		
Appropriation/Budget Activity 3600 / 7					R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>				Project (Number/Name) 67A025 / <i>GPS Enterprise Integrator</i>			
COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
67A025: <i>GPS Enterprise Integrator</i>	461.338	57.697	64.960	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	583.995
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

A. Mission Description and Budget Item Justification

The GPS Joint Program Office established and maintains the technical baseline and is responsible for the successful fielding of all the GPS Segments (space, control, and user). In order to successfully execute these responsibilities, GPS Enterprise Integrator (EI) creates an enterprise architecture, integrates segment products, verifies the enterprise requirements are adequately met, develops and implements various Systems Engineering documents, defines methods of verification, conducts integrated system test and test analysis, develops and manages the Enterprise technical baseline which reflect multiple stakeholder requirements; Stakeholders include the Department of Defense (DoD), foreign governments, industry, and the general public (through four public interface specifications). Furthermore, GPS EI ensures GPS capabilities meet the warfighter's, civil agencies', commercial entities', international treaties', and over four billion global GPS users' needs. Moreover, GPS EI is responsible for delivering a reliable PNT signal capability to military operators, the civil user community, and international partners. In addition, GPS EI validates the system performance in various mission threat scenarios during its development as well as provides in-depth technical expertise to enhance government control, oversight and program accountability. GPS EI is also responsible for all aspects of schedule and technical alignment across the GPS segments (space, control, and user).

More specifically, GPS EI is responsible for technical baseline management, integration, synchronizing, testing, and verifying GPS III, OCX, Military Global Positioning System User Equipment (MGUE), M-Code Early Use (MCEU) and Contingency Operations (COps). Additionally, GPS EI is responsible for creating and managing plans that provide early exercise of the products under development, compatibility analysis, and inter-segment testing. The inter-segment tests are required to prove OCX interoperability with GPS III satellites and modernized user equipment. More importantly, it ensures backwards compatibility with GPS Block II satellites and legacy user equipment. The GPS EI also manages the process through which the JROC validated requirements are matured and flowed down to the system segments, while remaining consistent with various interfaces. This enables the GPS system to meet Title 10 of the USC, Sec 2281, mandated GPS capabilities, and various other obligations to the international community that provide inter-operable PNT signals.

GPS EI also supports the Government Joint Program Office's GPS spectrum protection at international forums such as the International Telecommunications Union. Such support consists of advocating on behalf of the United States (U.S.) Government when negotiating with foreign partners. In addition, GPS EI provides technical expertise to maintain relationships with other U.S. government agencies that include the Federal Aviation Administration (FAA), National Geospatial-Intelligence Agency (NGA), National Aeronautics and Space Administration (NASA) and Departments of State (DOS), Transportation (DoT), Homeland Security (DHS), and Commerce (DOC). GPS EI Spectrum also ensures GPS priority for eight essential spectrum signals, including those required for civil air navigation and safety of life. Spectrum Protection prevents encroachment from commercial or foreign entities, which results in the preservation of warfighter's reliable signal. As a result, military operations and the integrity of the global economic infrastructure are protected.

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A025 / <i>GPS Enterprise Integrator</i>
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GPS EI also provides the GPS enterprise expertise in System Safety, Enterprise level System Security Engineering covering Acquisition Systems Program Security (i.e., personnel, industrial, operations, information, sensitive compartmented information, communication, and physical), Program Protection, Foreign Disclosure, Public Release reviews, Mission System Certification and Accreditation, and Enterprise Cybersecurity. GPS EI is accountable for the development, execution, and analysis of OCX, cybersecurity, and associated test cases necessary to deliver a secure operational system.

B. Accomplishments/Planned Programs (\$ in Millions)

	FY 2019	FY 2020	FY 2021
<p>Title: GPS Enterprise Integrator</p> <p>Description: The integration and technical baseline control of all elements of the GPS system (space/control/user) in support of both military and civil users. Test and verification of integrated system performance in preparation for operational test and evaluation.</p> <p>FY 2020 Plans: Conduct Phase 2 of Integrated System Test 2-5 that verified operability of GPS III and the COps upgrade to the control segment. Support Operational Test and Evaluation (OT&E) of GPS III and COps. Conduct integrated system test of Core M-Code capability (Integrated System Test 2-6) in preparation for OT&E and operational acceptance of MCEU. Conduct government security test of OCX Block 1. Continue test planning for Integrated System Test (IST) 3-1 (OCX Block 1 and GPS III) and IST 3-2 (OCX Block 1, satellite constellation, and MGUE). Complete IST 3-3 Phase 2 and 3 laboratory tests of MGUE receivers. Conduct IST 3-3 Phase 4 lead platform tests of MGUE. Continue to support MGUE operational test, planning, and execution. Conduct M-Code Live Sky tests in support of OCX development and MGUE field testing. Support launch and on-orbit checkout testing of SVs 03-05. Execute testing for SAASM Mission Planning System (SMPS) 5B. Support Architecture Evolution Plan (AEP) ground antennas and Commercial Off-The-Shelf (COTS) upgrades. Continue cybersecurity tests across all GPS segments (space/control/user). Continue to conduct tests and analyses to protect GPS users from interference sources that threaten performance of GPS receivers. Update GPS technical baseline, specifications, and interface documents to support fielding of OCX. Participate in international Global Navigation Satellite System (GNSS) forums to advocate for GPS regulatory and technical interests. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>	57.697	64.960	0.000
Accomplishments/Planned Programs Subtotals	57.697	64.960	0.000

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Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A025 / <i>GPS Enterprise Integrator</i>

C. Other Program Funding Summary (\$ in Millions)

Line Item	FY 2019	FY 2020	FY 2021	FY 2021	FY 2021	FY 2022	FY 2023	FY 2024	FY 2025	Cost To	
			Base	OCO	Total					Complete	Total Cost
• RDTE 04 PE 1203164F: <i>NAVSTAR Global Positioning System (User Equipment) (Space)</i>	236.786	320.598	-	-	-	-	-	-	-	0.000	557.384
• RDTE 07 PE 1203265F: <i>GPS III Space Segment</i>	139.180	42.440	-	-	-	-	-	-	-	0.000	181.620
• RDTE 05 PE 1203269F: <i>GPS III Follow-On</i>	412.202	447.875	-	-	-	-	-	-	-	0.000	860.077
• RDTE 07 PE 1203913F: <i>NUDET Detection System</i>	21.578	49.300	-	-	-	-	-	-	-	0.000	70.878
• SPAF 01 Line Item GPSIII: <i>GPS III Space Segment</i>	69.386	31.466	-	-	-	-	-	-	-	0.000	100.852
• SPAF 01 GPS IIIF <i>SPAF: GPS IIIF SPAF</i>	-	394.625	-	-	-	-	-	-	-	0.000	394.625

Remarks

D. Acquisition Strategy

In accordance with a "back to basics" acquisition approach and the exercise of strong oversight of development contractors, the Air Force is required to exercise complete ownership of the architecture, system definition, technical baseline, and integration of the GPS space, ground, and user segments. While this complex inter-segment integration is traditionally performed by a prime contractor under a systems development contract, for GPS, this approach requires the government to be the integrator. To execute this responsibility, the government leverages systems engineering and integration expertise from both Federally Funded Research and Development Center (FFRDC) contractors and a Systems Engineering & Integration (SE&I) contractor. The GPS EI function of the SE&I contractor is currently funded within this PE. The SE&I effort was originally procured in 2007 through a full and open competition, as was the new follow-on SE&I contract awarded in 2015. The SE&I follow-on strategy builds in year over year cost reductions as requirements stabilize.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A025 / <i>GPS Enterprise Integrator</i>
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GPS EI Enterprise SE&I	C/CPAF	TASC : El Segundo, CA	213.203	21.000	Oct 2018	24.248	Dec 2019	0.000		-		0.000	0.000	258.451	309.213
GPS EI Technical Mission Analysis 1	MIPR	Aerospace : El Segundo, CA	94.420	11.592	Oct 2018	11.100	Dec 2019	0.000		-		0.000	0.000	117.112	-
GPS EI Technical Mission Analysis 2	RO	MITRE : Various	91.922	12.962	Oct 2018	11.827	Nov 2019	0.000		-		0.000	0.000	116.711	-
GPS EI MRTA/MSTA	C/CPIF	Draper Labs : Cambridge, MA	10.882	3.140	Dec 2018	3.400	Dec 2019	0.000		-		0.000	0.000	17.422	25.641
GPS EI Enterprise Mission Planning	C/CPIF	Various : El Segundo, CA	1.320	-		-		-		-		-	0.000	1.320	1.320
GPS EI Cybersecurity	Various	Various : El Segundo, CA	20.903	4.582	Oct 2018	6.985	Dec 2019	0.000		-		0.000	0.000	32.470	-
GPS EI Additional Product Development	Various	Various : Various	5.318	1.459	Oct 2018	2.200	Dec 2019	0.000		-		0.000	0.000	8.977	-
Subtotal			437.968	54.735		59.760		0.000		-		0.000	0.000	552.463	N/A

Test and Evaluation (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
EI Integrated Systems Test	Various	Various : El Segundo, CA	0.294	-		-		-		-		-	0.000	0.294	-
Subtotal			0.294	-		-		-		-		-	0.000	0.294	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
GPS EI FFRDC	Various	Various : El Segundo, CA	1.583	0.165	Oct 2018	0.165	Dec 2019	0.000		-		0.000	0.000	1.913	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A025 / <i>GPS Enterprise Integrator</i>

FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
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 AFL	
GPS III SV03 Available for Launch	██████████
GPS III SV04 Available for Launch	██████████
GPS III SV05 Available for Launch	██████████
GPS III SV06 Available for Launch	██████████
IST	
IST Preparation and Support	████████████████████
IST 3-3/MGUE Verification Testing (Phase II-IV)	████████████████████
IST 2-5/GPS III and COps Verification Testing	██████████
IST 2-6/MCEU Verification Testing	██████████
Enterprise	
M-Code Early Use	████████████████████
SMPS Updates (v5B3 and v5C)	████████████████████
Preparation and Support for OCS to OCX transition	████████████████████

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206423F / <i>Global Positioning System III - Operational Control Segment</i>	Project (Number/Name) 67A025 / <i>GPS Enterprise Integrator</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
GPS III AFL				
GPS III SV03 Available for Launch	3	2019	1	2020
GPS III SV04 Available for Launch	4	2019	2	2020
GPS III SV05 Available for Launch	2	2020	4	2020
GPS III SV06 Available for Launch	3	2020	4	2020
IST				
IST Preparation and Support	1	2019	4	2020
IST 3-3/MGUE Verification Testing (Phase II-IV)	1	2019	4	2020
IST 2-5/GPS III and COps Verification Testing	4	2019	2	2020
IST 2-6/MCEU Verification Testing	3	2020	4	2020
Enterprise				
M-Code Early Use	1	2019	4	2020
SMPS Updates (v5B3 and v5C)	1	2019	4	2020
Preparation and Support for OCS to OCX transition	1	2019	4	2020

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1206770F / <i>Enterprise Ground Services</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	0.000	118.870	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
673140: <i>Enterprise Ground Services EGS</i>	-	0.000	118.870	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 FY 2021, PE 1206770F, Enterprise Ground Services efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206770SF Enterprise Ground Services from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

The Enterprise Ground Services (EGS) program will provide a robust enterprise ground architecture for Air Force space systems. The EGS capability will become the primary ground command and control (C2) suite of services for the Air Force Space Enterprise to meet evolving current and future space domain demands. EGS is based on Multi-Mission Satellite Operations Center (MMSOC) C2 capabilities developed under the Research and Development Space and Missile Operations (RDSMO) program.

The EGS C2 program will perform technology maturation, experiments, prototyping and operational mission transition for increased commonality and resiliency in space program ground systems. EGS will focus efforts on the rapid development and deployment of tactical C2 services, developing and integrating on-premises and cloud infrastructure and laboratories at multiple sites, advanced concept exploration, prototype development and demonstrations, user experience maturation, training and Concept of Operations (CONOPS) refinement, cyber operations and operational mission training support. These efforts will require support such as systems engineering, integration and test, standards and interface development, architecture development, enhanced cyber security development and implementation. Programs and projects in the space warfighting enterprise are evaluating ways to maximize innovation, resiliency, and our ability to rapidly respond to known and emerging threats. Space enterprise efforts aim to execute technology risk reduction efforts, integration of new or repurposed capabilities, enterprise decision-making tools, experimentation, and rapid prototyping and fielding via all appropriate acquisition authorities and contract mechanisms.

Over the Future Years Defense Program (FYDP) EGS will be developing and deploying C2 services and software applications that support transitioning legacy and new missions such as Missile Warning, Missile Defense, MILSATCOM, Space Situational Awareness and various classified and experimental satellites and missions to the EGS open architecture. The modifications to core software applications provided by EGS are being made in an Agile DevSecOps environment, which has been fundamentally designed into EGS since its inception.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Expanding the appropriate acquisition

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1206770F / <i>Enterprise Ground Services</i>
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authorities and contract mechanisms to deliver capability sooner, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

The program element may include necessary civilian pay expenses required to manage, execute, and deliver EGS 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 7, Operational System 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.

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	138.870	116.830	0.000	116.830
Current President's Budget	0.000	118.870	0.000	0.000	0.000
Total Adjustments	0.000	-20.000	-116.830	0.000	-116.830
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-20.000			
• 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	-116.830	0.000	-116.830

Change Summary Explanation

FY 2020: -\$20.000M; Congressional Reduction for contract delay.

FY 2021: -\$116.830M; Funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Enterprise Ground Services (EGS) Development	0.000	63.962	0.000
Description: Perform prototype mission partner demonstrations, cybersecurity and crypto development and implementation, standards and interface refining, training and CONOPs refinement, advance concept maturation, integration and test of mission unique software, and integration of common application and services. Expand development environment in order to develop software applications and services in support of onboarding additional satellite missions.			
FY 2020 Plans:			

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force		Date: February 2020		
Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>		R-1 Program Element (Number/Name) PE 1206770F / <i>Enterprise Ground Services</i>		
C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Continue maturation of EGS laboratories including providing an enduring capability to support DevSecOps at the Space Management Battle Lab at the Catalyst Campus. Continue the development and deployment of C2 services, prototype Mission Partner Demonstrations, cybersecurity and crypto development and implementation, platform development and interface refining, training and CONOPs refinement, advance concept maturation, support integration and test of mission unique software, and integration of common applications and services at the distributed System Integration Lab. Expand User Experience guidelines to include multiple services beyond TT&C, Ground Resource Manager, and Mission Management. Expand EGS core services based on mission needs. Mature EGS deployment automation and testing. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: EGS Pre-Operations (Pre-Ops) Support</p> <p>Description: Maintain EGS hardware and software baselines, update software licenses, cyber security, help desk operations, and associated training.</p> <p>FY 2020 Plans: Conduct pre-ops support activities for satellites using EGS to include maintaining EGS hardware baseline, updating software licenses, cyber security, help desk stand up operations, as well as associated training. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>		0.000	24.200	0.000
<p>Title: EGS Deployment</p> <p>Description: Rapidly deploy tactical C2 services and space domain capabilities to support customer-funded mission transition activities including future mission acquisition planning and risk reduction efforts.</p> <p>FY 2020 Plans: Continue the maturation of EGS prototype data centers, networks and links to converge capabilities across the EGS enterprise. Continue integration efforts with current and future space domain capabilities. Build on the FY 2019 deliveries by building out</p>		0.000	30.708	0.000

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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1206770F / <i>Enterprise Ground Services</i>
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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
<p>the enclave at Buckley Air Force Base to be identical to the EGS Instances at Schriever Air Force Base and Kirtland Air Force Base for resilience. Continue developing the programmatic, technical and architectural roadmap to enable the phased transition of mission partners to EGS. Support customer-funded mission on-boarding including future mission acquisition planning and risk reduction efforts. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>			
Accomplishments/Planned Programs Subtotals	0.000	118.870	0.000

D. Other Program Funding Summary (\$ in Millions)
N/A

Remarks
FY 2019 EGS funds were allocated in the RDSMO Program Element (PE) 1203173F; in FY 2020 EGS was established as PE 1206770F.

E. Acquisition Strategy
The EGS acquisition strategy focuses on rapidly delivering C2 prototypes and operational capabilities to warfighters, while leveraging industry best practices for agile development and continuous integration /delivery (CI/CD). One of the key tenets of the EGS acquisition strategy is to maintain government ownership of the technical baseline. As a result, EGS uses a combination of existing and new contracts, and agreements with industry and academia to procure prototypes, platform as a service (PaaS) capabilities, system engineering services, and pre-operations support for mission users. Leverage the two SBIR Phase 3 contracts that were awarded in late FY 2019 to scale EGS capabilities and enable more rapid and development and deployment of tactical C2 services to operational users.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206770F / Enterprise Ground Services	Project (Number/Name) 673140 / Enterprise Ground Services EGS
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Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Pre-Ops Support	Various	Various : Various	-	-		24.200	Jan 2020	0.000		-		0.000	Continuing	Continuing	-
HW, SW and Integration	Various	Various : Various	-	-		14.052	Mar 2020	0.000		-		0.000	Continuing	Continuing	-
Development	Various	Various : Various	-	-		39.784	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
Technical Mission Analysis (FFRDC Aerospace Costs)	MIPR	Aerospace : El Segundo, CA	-	-		6.457	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
Enterprise Systems Engineering and Integration (SE&I)	Various	MITRE : Bedford, MA	-	-		16.656	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	-		101.149		0.000		-		0.000	Continuing	Continuing	N/A

Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FFRDC (Aerospace)	MIPR	Aerospace : El Segundo, CA	-	-		5.255	Oct 2019	-		-		-	Continuing	Continuing	-
A&AS Support	Various	Varioius : Various	-	-		11.956	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
Other Support	Various	Various : El Segundo, CA	-	-		0.510	Dec 2019	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	-		17.721		0.000		-		0.000	Continuing	Continuing	N/A

	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-	118.870	0.000	-	0.000	Continuing	Continuing	N/A

Remarks
 FY 2018-2019 Enterprise Ground Services (EGS) funds were allocated in the RDSMO Program Element (PE) 1203173F and in FY 2020 EGS funds transferred to Program Element (PE) 1206770F, Project 673140.

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Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206770F / <i>Enterprise Ground Services</i>	Project (Number/Name) 673140 / <i>Enterprise Ground Services EGS</i>
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	FY 2019				FY 2020				FY 2021				FY 2022				FY 2023				FY 2024				FY 2025			
	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
<i>EGS Development</i>																												
System Integration Lab (SIL)																												
Space Management Battle Lab (SMBL)																												
Development to Operations (DevOps)																												
<i>EGS Deployment</i>																												
EGS Deployment																												
Buckley AFB Initial Capability																												
<i>EGS Pre-Ops Support</i>																												
EGS Pre-Ops Support																												
Mission Integration																												
-HEO Operations Migration to EGS (HOME)																												
-Mission Partner																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1206770F / <i>Enterprise Ground Services</i>	Project (Number/Name) 673140 / <i>Enterprise Ground Services EGS</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
EGS Development				
System Integration Lab (SIL)	1	2020	4	2020
Space Management Battle Lab (SMBL)	1	2020	4	2020
Development to Operations (DevOps)	1	2020	4	2020
EGS Deployment				
EGS Deployment	1	2020	4	2020
Buckley AFB Initial Capability	2	2020	2	2020
EGS Pre-Ops Support				
EGS Pre-Ops Support	1	2020	4	2020
Mission Integration	1	2020	4	2020
-HEO Operations Migration to EGS (HOME)	3	2020	3	2020
-Mission Partner	4	2020	4	2020

Note

Singular events depicted above represent milestones. All milestones include effort prior to and after the event.
 EGS Initial Enterprise Capability milestone includes initial delivery and maturation of tactical C2 enterprise services and space domain capabilities.
 EGS Deployment milestones include initial build-outs of EGS enclaves at operational sites. Continuous Integration/Continuous Deployment is on-going.
 EGS Pre-Ops support milestones include phased initial integration of mission partners and EGS. Pre-ops support is on-going.

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