Department of Defense
Fiscal Year (FY) 2024 Budget Estimates

March 2023

Air Force

Justification Book Volume 1 of 1

Research, Development, Test & Evaluation, Space Force

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Table of Volumes

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Volume 1 Table of Contents

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Fiscal Year (FY) 2024 President's Budget
RDT&E Descriptive Summaries
Budget Activities
March 2023

INTRODUCTION AND EXPLANATION OF CONTENTS

GENERAL

- This document has been prepared to provide information on the United States Space Force (USSF) Research, Development, Test and Evaluation (RDT&E) program elements and projects in the FY24 President's Budget (PB).
    - All exhibits in this document have been assembled in accordance with DoD 7000.14R, Financial Management Regulation, Volume 2B, Chapter 5.
    - Other comments on exhibit contents in this document:
        - Exhibits R-2/2a and R-3 provide narrative information for all RDT&E program elements and projects within the USSF FY 2024 RDT&E program with the exception of classified program elements. The format and contents of this document are in accordance to the guidelines and requirements of the Congressional committees in so far as possible.
        - The "Other Program Funding Summary" portion of the R-2 includes, in addition to RDT&E funds, Procurement funds and quantities, Military Construction appropriation funds on specific development programs, Operations and Maintenance appropriation funds where they are essential to the development effort described, and where appropriate, Department of Energy (DOE) costs.

CLASSIFICATION

- All exhibits contained in Volumes I, II, and III are unclassified. Classified exhibits are not included in the submission due to the level of security classification and necessity of special security clearances.

Department of the Air Force
FY 2024 President's Budget
Exhibit R-1 FY 2024 President's Budget
Total Obligational Authority
(Dollars in Thousands)

Mar 2023

Appropriation: 3620F Research, Development, Test, and Evaluation, Space Force

Line No	Program Element Number	Item	Act	Sec	FY 2022 Actuals	FY 2023 Less Supplementals Enactment	FY 2023 Supplementals Enactment*	FY 2023 Total Enactment
1	0601102SF	Defense Research Sciences	01	U		25,000		25,000
2	0601103SF	University Research Initiatives	01	U		30,000		30,000
	Basic Research					**55,000**		**55,000**
3	1202212SF	Defense Laboratories R&D Projects	02	U	10,098			
4	1206601SF	Space Technology	02	U	280,023	360,286		360,286
	Applied Research				**290,121**	**360,286**		**360,286**
5	1206310SF	Space Science and Technology Research and Development	03	U		447,472		447,472
6	1206616SF	Space Advanced Technology Development/Demo	03	U	227,481	167,423		167,423
	Advanced Technology Development				**227,481**	**614,895**		**614,895**
7	0604002SF	Space Force Weather Services Research	04	U		816		816
8	1203010SF	Space Force IT, Data Analytics, Digital Solutions	04	U				
9	1203164SF	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04	U	419,889	381,394		381,394
10	1203622SF	Space Warfighting Analysis	04	U		42,300		42,300
11	1203710SF	EO/IR Weather Systems	04	U	156,631	86,519		86,519
12	1203905SF	Space System Support	04	U	37,000			
13	1206410SF	Space Technology Development and Prototyping	04	U		1,015,822		1,015,822
14	1206422SF	Weather System Follow-on	04	U	64,759			
15	1206425SF	Space Situation Awareness Systems	04	U	101,755	221,421		221,421
16	1206427SF	Space Systems Prototype Transitions (SSPT)	04	U	101,533	166,427		166,427

Department of the Air Force
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Total Obligational Authority
(Dollars in Thousands)

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Appropriation: 3620F Research, Development, Test, and Evaluation, Space Force

17	1206438SF	Space Control Technology	04	U	34,760	50,303		50,303

*Includes enacted funding in the Ukraine Supplemental Appropriation Act, 2023 (Division B of Public Law 117-180) and Additional Ukraine Supplemental Appropriation Act, 2023 (Division M of Public Law 117-328).

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Mar 2023

Appropriation: 3620F Research, Development, Test, and Evaluation, Space Force

Line No	Program Element Number	Item	Act	Sec	FY 2024 Request
1	0601102SF	Defense Research Sciences	01	U	
2	0601103SF	University Research Initiatives	01	U	
	Basic Research				
3	1202212SF	Defense Laboratories R&D Projects	02	U	
4	1206601SF	Space Technology	02	U	206,196
	Applied Research				**206,196**
5	1206310SF	Space Science and Technology Research and Development	03	U	472,493
6	1206616SF	Space Advanced Technology Development/Demo	03	U	110,033
	Advanced Technology Development				**582,526**
7	0604002SF	Space Force Weather Services Research	04	U	849
8	1203010SF	Space Force IT, Data Analytics, Digital Solutions	04	U	61,723
9	1203164SF	NAVSTAR Global Positioning System (User Equipment) (SPACE)	04	U	353,807
10	1203622SF	Space Warfighting Analysis	04	U	95,541
11	1203710SF	EO/IR Weather Systems	04	U	95,615
12	1203905SF	Space System Support	04	U	
13	1206410SF	Space Technology Development and Prototyping	04	U	2,081,307
14	1206422SF	Weather System Follow-on	04	U	
15	1206425SF	Space Situation Awareness Systems	04	U	
16	1206427SF	Space Systems Prototype Transitions (SSPT)	04	U	145,948
17	1206438SF	Space Control Technology	04	U	58,374

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Total Obligational Authority
(Dollars in Thousands)

Mar 2023

Appropriation: 3620F Research, Development, Test, and Evaluation, Space Force

Line No	Program Element Number	Item	Act	Sec	FY 2022 Actuals	FY 2023 Less Supplementals Enactment	FY 2023 Supplementals Enactment*	FY 2023 Total Enactment
18	1206458SF	Tech Transition (Space)	04	U	50,000			
19	1206730SF	Space Security and Defense Program	04	U	53,896	69,169		69,169
20	1206760SF	Protected Tactical Enterprise Service (PTES)	04	U	96,942	110,801		110,801
21	1206761SF	Protected Tactical Service (PTS)	04	U	221,355	252,078		252,078
22	1206855SF	Evolved Strategic SATCOM (ESS)	04	U	166,231	519,047		519,047
23	1206857SF	Space Rapid Capabilities Office	04	U	63,677	54,077		54,077
24	1206862SF	Tactically Response Space	04	U				
	Advanced Component Development & Prototypes				**1,568,428**	**2,970,174**		**2,970,174**
25	1203269SF	GPS III Follow-On (GPS IIIF)	05	U	237,947	292,847		292,847
26	1203940SF	Space Situation Awareness Operations	05	U	40,731	57,478		57,478
27	1206421SF	Counterspace Systems	05	U	46,872	31,544		31,544
28	1206422SF	Weather System Follow-on	05	U	1,368	48,720		48,720
29	1206425SF	Space Situation Awareness Systems	05	U	123,074	96,940		96,940
30	1206431SF	Advanced EHF MILSATCOM (SPACE)	05	U	39,217	11,651		11,651
31	1206432SF	Polar MILSATCOM (SPACE)	05	U	79,557	67,215		67,215
32	1206433SF	Wideband Global SATCOM (SPACE)	05	U		48,288		48,288
33	1206440SF	Next-Gen OPIR -- Ground	05	U	542,477	582,529		582,529
34	1206442SF	Next Generation OPIR	05	U	125,853	226,601		226,601
35	1206443SF	Next-Gen OPIR -- GEO	05	U	1,199,193	1,694,933		1,694,933
36	1206444SF	Next-Gen OPIR -- Polar	05	U	471,398	849,196		849,196
37	1206445SF	Commercial SATCOM (COMSATCOM) Integration	05	U	22,603	23,413		23,413

*Includes enacted funding in the Ukraine Supplemental Appropriation Act, 2023 (Division B of Public Law 117-180) and Additional Ukraine Supplemental Appropriation Act, 2023 (Division M of Public Law 117-328).

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Mar 2023

Appropriation: 3620F Research, Development, Test, and Evaluation, Space Force

Line No	Program Element Number	Item	Act	Sec	FY 2024 Request
18	1206458SF	Tech Transition (Space)	04	U	164,649
19	1206730SF	Space Security and Defense Program	04	U	59,784
20	1206760SF	Protected Tactical Enterprise Service (PTES)	04	U	76,554
21	1206761SF	Protected Tactical Service (PTS)	04	U	360,126
22	1206855SF	Evolved Strategic SATCOM (ESS)	04	U	632,833
23	1206857SF	Space Rapid Capabilities Office	04	U	12,036
24	1206862SF	Tactically Response Space	04	U	30,000
	Advanced Component Development & Prototypes				**4,229,146**
25	1203269SF	GPS III Follow-On (GPS IIIF)	05	U	308,999
26	1203940SF	Space Situation Awareness Operations	05	U	
27	1206421SF	Counterspace Systems	05	U	36,537
28	1206422SF	Weather System Follow-on	05	U	79,727
29	1206425SF	Space Situation Awareness Systems	05	U	372,827
30	1206431SF	Advanced EHF MILSATCOM (SPACE)	05	U	4,068
31	1206432SF	Polar MILSATCOM (SPACE)	05	U	73,757
32	1206433SF	Wideband Global SATCOM (SPACE)	05	U	49,445
33	1206440SF	Next-Gen OPIR -- Ground	05	U	661,367
34	1206442SF	Next Generation OPIR	05	U	222,178
35	1206443SF	Next-Gen OPIR -- GEO	05	U	719,731
36	1206444SF	Next-Gen OPIR -- Polar	05	U	1,013,478
37	1206445SF	Commercial SATCOM (COMSATCOM) Integration	05	U	73,501

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Line No	Program Element Number	Item	Act	Sec	FY 2022 Actuals	FY 2023 Less Supplementals Enactment	FY 2023 Supplementals Enactment*	FY 2023 Total Enactment
38	1206446SF	Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)	05	U		786,340		786,340
39	1206447SF	Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)	05	U		408,527		408,527
40	1206448SF	Resilient Missile Warning Missile Tracking - Integrated Ground Segment	05	U				
41	1206853SF	National Security Space Launch Program (SPACE) - EMD	05	U	195,093	232,648		232,648
	System Development & Demonstration				**3,125,383**	**5,458,870**		**5,458,870**
42	0909999SF	Financing for Cancelled Account Adjustments	06	U	24			
43	1203622SF	Space Warfighting Analysis	06	U				
44	1205502SF	Small Business Innovation Research	06	U	290,490			
45	1206116SF	Space Test and Training Range Development	06	U	50,671	21,328		21,328
46	1206392SF	ACQ Workforce - Space & Missile Systems	06	U	214,050	253,716		253,716
47	1206398SF	Space & Missile Systems Center - MHA	06	U	12,119	13,962		13,962
48	1206601SF	Space Technology	06	U				
49	1206759SF	Major T&E Investment - Space	06	U	83,336	173,974		173,974
50	1206860SF	Rocket Systems Launch Program (SPACE)	06	U	17,489	34,872		34,872
51	1206862SF	Tactically Response Space	06	U	48,334	50,000		50,000
52	1206864SF	Space Test Program (STP)	06	U	20,185	25,291		25,291
	Management Support				**736,698**	**573,143**		**573,143**
54	1201017SF	Global Sensor Integrated on Network (GSIN)	07	U	4,574	5,321		5,321
55	1203001SF	Family of Advanced BLoS Terminals (FAB-T)	07	U	151,967	128,243		128,243

*Includes enacted funding in the Ukraine Supplemental Appropriation Act, 2023 (Division B of Public Law 117-180) and Additional Ukraine Supplemental Appropriation Act, 2023 (Division M of Public Law 117-328).

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Appropriation: 3620F Research, Development, Test, and Evaluation, Space Force

Line No	Program Element Number	Item	Act	Sec	FY 2024 Request
38	1206446SF	Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)	05	U	1,266,437
39	1206447SF	Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)	05	U	538,208
40	1206448SF	Resilient Missile Warning Missile Tracking - Integrated Ground Segment	05	U	505,569
41	1206853SF	National Security Space Launch Program (SPACE) - EMD	05	U	82,188
	System Development & Demonstration				**6,008,017**
42	0909999SF	Financing for Cancelled Account Adjustments	06	U	
43	1203622SF	Space Warfighting Analysis	06	U	3,568
44	1205502SF	Small Business Innovation Research	06	U	
45	1206116SF	Space Test and Training Range Development	06	U	
46	1206392SF	ACQ Workforce - Space & Missile Systems	06	U	258,969
47	1206398SF	Space & Missile Systems Center - MHA	06	U	13,694
48	1206601SF	Space Technology	06	U	91,778
49	1206759SF	Major T&E Investment - Space	06	U	146,797
50	1206860SF	Rocket Systems Launch Program (SPACE)	06	U	18,023
51	1206862SF	Tactically Response Space	06	U	
52	1206864SF	Space Test Program (STP)	06	U	30,192
	Management Support				**563,021**
54	1201017SF	Global Sensor Integrated on Network (GSIN)	07	U	
55	1203001SF	Family of Advanced BLoS Terminals (FAB-T)	07	U	91,369

Department of the Air Force
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Total Obligational Authority
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Appropriation: 3620F Research, Development, Test, and Evaluation, Space Force

Line No	Program Element Number	Item	Act	Sec	FY 2022 Actuals	FY 2023 Less Supplementals Enactment	FY 2023 Supplementals Enactment*	FY 2023 Total Enactment
56	1203040SF	DCO-Space	07	U	6,156	28,087		28,087
57	1203109SF	Narrowband Satellite Communications	07	U	110,493	110,142		110,142
58	1203110SF	Satellite Control Network (SPACE)	07	U	35,543	42,024		42,024
59	1203154SF	Long Range Kill Chains	07	U				
60	1203165SF	NAVSTAR Global Positioning System (Space and Control Segments)	07	U	1,900	1,062		1,062
61	1203173SF	Space and Missile Test and Evaluation Center	07	U	1,651	4,157		4,157
62	1203174SF	Space Innovation, Integration and Rapid Technology Development	07	U	17,432	45,203		45,203
63	1203182SF	Spacelift Range System (SPACE)	07	U	30,294	11,608		11,608
64	1203265SF	GPS III Space Segment	07	U	6,998	1,526		1,526
65	1203330SF	Space Superiority ISR	07	U	18,109	29,128		29,128
66	1203620SF	National Space Defense Center	07	U	1,280	2,659		2,659
67	1203873SF	Ballistic Missile Defense Radars	07	U	7,432	21,615		21,615
68	1203906SF	NCMC - TW/AA System	07	U	4,369	7,249		7,249
69	1203913SF	NUDET Detection System (SPACE)	07	U	45,887	60,429		60,429
70	1203940SF	Space Situation Awareness Operations	07	U	62,795	90,678		90,678
71	1206423SF	Global Positioning System III - Operational Control Segment	07	U	388,977	277,052		277,052
75	1206770SF	Enterprise Ground Services	07	U	170,083	123,251		123,251
76	1208053SF	Joint Tactical Ground System	07	U				
999	999999999	Classified Programs	07	U	4,402,678	5,438,608		5,438,608

*Includes enacted funding in the Ukraine Supplemental Appropriation Act, 2023 (Division B of Public Law 117-180) and Additional Ukraine Supplemental Appropriation Act, 2023 (Division M of Public Law 117-328).

Department of the Air Force
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Exhibit R-1 FY 2024 President's Budget
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(Dollars in Thousands)

Mar 2023

Appropriation: 3620F Research, Development, Test, and Evaluation, Space Force

Line No	Program Element Number	Item	Act	Sec	FY 2024 Request
56	1203040SF	DCO-Space	07	U	76,003
57	1203109SF	Narrowband Satellite Communications	07	U	230,785
58	1203110SF	Satellite Control Network (SPACE)	07	U	86,465
59	1203154SF	Long Range Kill Chains	07	U	243,036
60	1203165SF	NAVSTAR Global Positioning System (Space and Control Segments)	07	U	
61	1203173SF	Space and Missile Test and Evaluation Center	07	U	22,039
62	1203174SF	Space Innovation, Integration and Rapid Technology Development	07	U	41,483
63	1203182SF	Spacelift Range System (SPACE)	07	U	11,175
64	1203265SF	GPS III Space Segment	07	U	
65	1203330SF	Space Superiority ISR	07	U	28,730
66	1203620SF	National Space Defense Center	07	U	
67	1203873SF	Ballistic Missile Defense Radars	07	U	20,752
68	1203906SF	NCMC - TW/AA System	07	U	25,545
69	1203913SF	NUDET Detection System (SPACE)	07	U	93,391
70	1203940SF	Space Situation Awareness Operations	07	U	264,966
71	1206423SF	Global Positioning System III - Operational Control Segment	07	U	317,309
75	1206770SF	Enterprise Ground Services	07	U	155,825
76	1208053SF	Joint Tactical Ground System	07	U	14,568
999	999999999	Classified Programs	07	U	5,764,667

Department of the Air Force
FY 2024 President's Budget
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Total Obligational Authority
(Dollars in Thousands)

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Appropriation: 3620F Research, Development, Test, and Evaluation, Space Force

Line No	Program Element Number	Item	Act	Sec	FY 2022 Actuals	FY 2023 Less Supplementals Enactment	FY 2023 Supplementals Enactment*	FY 2023 Total Enactment
	Operational Systems Development				**5,468,618**	**6,428,042**		**6,428,042**
77	1203614SF	JSpOC Mission System	08	U	150,287			
78	1208248SF	Space Command & Control - Software Pilot Program	08	U		155,553		155,553
	Software And Digital Technology Pilot Programs				**150,287**	**155,553**		**155,553**
Total Research, Development, Test, and Evaluation, Space Force					**11,567,016**	**16,615,963**		**16,615,963**

*Includes enacted funding in the Ukraine Supplemental Appropriation Act, 2023 (Division B of Public Law 117-180) and Additional Ukraine Supplemental Appropriation Act, 2023 (Division M of Public Law 117-328).

Department of the Air Force
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(Dollars in Thousands)

Mar 2023

Appropriation: 3620F Research, Development, Test, and Evaluation, Space Force

Line No	Program Element Number	Item	Act	Sec	FY 2024 Request
	Operational Systems Development				**7,488,108**
77	1203614SF	JSpOC Mission System	08	U	
78	1208248SF	Space Command & Control - Software Pilot Program	08	U	122,326
	Software And Digital Technology Pilot Programs				**122,326**
Total Research, Development, Test, and Evaluation, Space Force					**19,199,340**

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Master Program Element Table of Contents (by Budget Activity then Line Item Number)

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Mar 2023

	FY 2022 Actuals	FY 2023 Less Supplementals Enactment	FY 2023 Supplementals Enactment*	FY 2023 Total Enactment	FY 2024 Request
Summary Recap of Budget Activities					
Basic Research		55,000		55,000	
Applied Research	290,121	360,286		360,286	206,196
Advanced Technology Development	227,481	614,895		614,895	582,526
Advanced Component Development & Prototypes	1,568,428	2,970,174		2,970,174	4,229,146
System Development & Demonstration	3,125,383	5,458,870		5,458,870	6,008,017
Management Support	736,698	573,143		573,143	563,021
Operational Systems Development	5,468,618	6,428,042		6,428,042	7,488,108
Software And Digital Technology Pilot Programs	150,287	155,553		155,553	122,326
Total Research, Development, Test, & Evaluation	**11,567,016**	**16,615,963**		**16,615,963**	**19,199,340**
Summary Recap of FYDP Programs					
Research and Development		55,816		55,816	849
Administration and Associated Activities	24				
Space	7,164,314	11,121,539		11,121,539	13,433,824
Classified Programs	4,402,678	5,438,608		5,438,608	5,764,667
Total Research, Development, Test, & Evaluation	**11,567,016**	**16,615,963**		**16,615,963**	**19,199,340**

*Includes enacted funding in the Ukraine Supplemental Appropriation Act, 2023 (Division B of Public Law 117-180) and Additional Ukraine Supplemental Appropriation Act, 2023 (Division M of Public Law 117-328).

RDTE, Space Force

Department of the Air Force
TOTAL CIVILIAN PERSONNEL COSTS
OP-8: OP-8 (PB)
FY 2024 President's Budget
(FY 2022)

	($ in Thousands)											Rates				
	a Begin Strength	b End Strength	c FTEs	d Basic Comp	e Overtime Pay	f Holiday Pay	g Other O.C.11	e + f + g h Total Variables	d + h i Comp O.C.11	j Benefits	i + j k Comp &	d/c l Basic Comp	i/c m Total Comp	k/c n Comp & Benefits	h/d o % BC Variables	j/d p % BC Benefits
Direct Funded Personnel (includes OC 13)	**1,972**	**2,158**	**2,138**	**302,962**	**0**	**0**	**0**	**0**	**302,962**	**0**	**302,962**	***$141,703***	***$141,703***	***$141,703***	***0.0%***	***0.0%***
D1. US Direct Hire (USDH)	**1,972**	**2,158**	**2,138**	**302,962**	**-**	**-**	**-**	**-**	**302,962**	**-**	**302,962**	*$141,703*	*$141,703*	*$141,703*	*0.0%*	*0.0%*
D1a. Senior Executive Schedule	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1b. General Schedule	1,972	2,158	2,138	302,962				-	302,962		302,962	*$141,703*	*$141,703*	*$141,703*	*0.0%*	*0.0%*
D1c. Special Schedule	-	-	-	-				-	-	-	-	-	-	-	-	-
D1d. Wage System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1e. Highly Qualified Experts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1f. Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D2. Direct Hire Program Foreign Nationals (DHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D3. Total Direct Hire	**1,972**	**2,158**	**2,138**	**302,962**	**-**	**-**	**-**	**-**	**302,962**	**-**	**302,962**	*$141,703*	*$141,703*	*$141,703*	*0.0%*	*0.0%*
D4. Indirect Hire Foreign Nationals (IHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal - Direct Funded (excludes OC 13)	*1,972*	*2,158*	*2,138*	*302,962*	-	-	-	-	*302,962*	-	*302,962*	*$141,703*	*$141,703*	*$141,703*	*0.0%*	*0.0%*
D5. Other Object Class 13 Benefits										**-**	**-**					
D5a. USDH - Benefits for Former Employees										-	-					
D5b. DHFN - Benefits for Former Employees										-	-					
D5c. Voluntary Separation Incentive Pay (VSIP)										-	-					
D5d. Foreign National Separation Liability										-	-					
Reimbursable Funded Personnel (includes OC 13)	**48**	**37**	**46**	**9,569**	**0**	**0**	**0**	**0**	**9,569**	**2,728**	**12,297**	***$208,022***	***$208,022***	***$267,326***	***0.0%***	***28.5%***
R1. US Direct Hire (USDH)	**48**	**37**	**46**	**9,569**	**-**	**-**	**-**	**-**	**9,569**	**2,728**	**12,297**	*$208,022*	*$208,022*	*$267,326*	*0.0%*	*28.5%*
R1a. Senior Executive Schedule	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R1b. General Schedule	48	37	46	9,569				-	9,569	2,728	12,297	*$208,022*	*$208,022*	*$267,326*	*0.0%*	*28.5%*
R1c. Special Schedule	-	-	-	-				-	-	-	-	-	-	-	-	-
R1d. Wage System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R1e. Highly Qualified Experts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R1f. Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R2. Direct Hire Program Foreign Nationals (DHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R3. Total Direct Hire	**48**	**37**	**46**	**9,569**	**-**	**-**	**-**	**-**	**9,569**	**2,728**	**12,297**	*$208,022*	*$208,022*	*$267,326*	*0.0%*	*28.5%*
R4. Indirect Hire Foreign Nationals (IHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal - Reimbursable Funded (excludes	*48*	*37*	*46*	*9,569*	-	-	-	-	*9,569*	*2,728*	*12,297*	*$208,022*	*$208,022*	*$267,326*	*0.0%*	*28.5%*
R5. Other Object Class 13 Benefits										**-**	**-**					
R5a. USDH - Benefits for Former Employees										-	-					
R5b. DHFN - Benefits for Former Employees										-	-					
R5c. Voluntary Separation Incentive Pay (VSIP)										-	-					
R5d. Foreign National Separation Liability										-	-					
Total Personnel (includes OC 13)	**2,020**	**2,195**	**2,184**	**312,531**	**0**	**0**	**0**	**0**	**312,531**	**2,728**	**315,259**	***$143,100***	***$143,100***	***$144,349***	***0.0%***	***0.9%***
T1. US Direct Hire (USDH)	**2,020**	**2,195**	**2,184**	**312,531**	**-**	**-**	**-**	**-**	**312,531**	**2,728**	**315,259**	*$143,100*	*$143,100*	*$144,349*	*0.0%*	*0.9%*
T1a. Senior Executive Schedule	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T1b. General Schedule	2,020	2,195	2,184	312,531	0	0	0	0	312,531	2,728	315,259	*$143,100*	*$143,100*	*$144,349*	*0.0%*	*0.9%*
T1c. Special Schedule	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T1d. Wage System	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T1e. Highly Qualified Experts	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T1f. Other	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T2. Direct Hire Program Foreign Nationals (DHFN)	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T3. Total Direct Hire	**2,020**	**2,195**	**2,184**	**312,531**	**-**	**-**	**-**	**-**	**312,531**	**2,728**	**315,259**	*$143,100*	*$143,100*	*$144,349*	*0.0%*	*0.9%*
T4. Indirect Hire Foreign Nationals (IHFN)	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
Subtotal - Total Funded (excludes OC 13)	*2,020*	*2,195*	*2,184*	*312,531*	-	-	-	-	*312,531*	*2,728*	*315,259*	*$143,100*	*$143,100*	*$144,349*	*0.0%*	*0.9%*
T5. Other Object Class 13 Benefits										**-**	**-**					
T5a. USDH - Benefits for Former Employees										0	0					
T5b. DHFN - Benefits for Former Employees										0	0					
T5c. Voluntary Separation Incentive Pay (VSIP)										0	0					
T5d. Foreign National Separation Liability										0	0					

RDTE, Space Force

Department of the Air Force
TOTAL CIVILIAN PERSONNEL COSTS
OP-8: OP-8 (PB)
FY 2024 President's Budget
(FY 2023)

($ in Thousands)

	a Begin Strength	b End Strength	c FTEs	d Basic Comp	e Overtime Pay	f Holiday Pay	g Other O.C.11	e + f + g h Total Variables	d + h i Comp O.C.11	j Benefits	i + j k Comp &	Rates d/c l Basic Comp	i/c m Total Comp	k/c n Comp & Benefits	h/d o % BC Variables	j/d p % BC Benefits
Direct Funded Personnel (includes OC 13)	**2,158**	**2,244**	**2,230**	**333,926**	**0**	**0**	**0**	**0**	**333,926**	**0**	**333,926**	***$149,743***	***$149,743***	***$149,743***	***0.0%***	***0.0%***
D1. US Direct Hire (USDH)	**2,158**	**2,244**	**2,230**	**333,926**	**-**	**-**	**-**	**-**	**333,926**	**-**	**333,926**	*$149,743*	*$149,743*	*$149,743*	*0.0%*	*0.0%*
D1a. Senior Executive Schedule	-	1	1	159				-	159	-	159	*$159,000*	*$159,000*	*$159,000*	*0.0%*	*0.0%*
D1b. General Schedule	2,158	2,243	2,229	333,767				-	333,767	-	333,767	*$149,738*	*$149,738*	*$149,738*	*0.0%*	*0.0%*
D1c. Special Schedule	-	-	-	-				-	-	-	-	-	-	-	-	-
D1d. Wage System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1e. Highly Qualified Experts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1f. Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D2. Direct Hire Program Foreign Nationals (DHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D3. Total Direct Hire	**2,158**	**2,244**	**2,230**	**333,926**	**-**	**-**	**-**	**-**	**333,926**	**-**	**333,926**	*$149,743*	*$149,743*	*$149,743*	*0.0%*	*0.0%*
D4. Indirect Hire Foreign Nationals (IHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal - Direct Funded (excludes OC 13)	*2,158*	*2,244*	*2,230*	*333,926*	-	-	-	-	*333,926*	-	*333,926*	*$149,743*	*$149,743*	*$149,743*	*0.0%*	*0.0%*
D5. Other Object Class 13 Benefits										**-**	**-**					
D5a. USDH - Benefits for Former Employees										-	-					
D5b. DHFN - Benefits for Former Employees										-	-					
D5c. Voluntary Separation Incentive Pay (VSIP)										-	-					
D5d. Foreign National Separation Liability										-	-					
Reimbursable Funded Personnel (includes OC 13)	**37**	**41**	**41**	**8,877**	**0**	**0**	**0**	**0**	**8,877**	**0**	**8,877**	***$216,512***	***$216,512***	***$216,512***	***0.0%***	***0.0%***
R1. US Direct Hire (USDH)	**37**	**41**	**41**	**8,877**	**-**	**-**	**-**	**-**	**8,877**	**-**	**8,877**	*$216,512*	*$216,512*	*$216,512*	*0.0%*	*0.0%*
R1a. Senior Executive Schedule	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R1b. General Schedule	37	41	41	8,877				-	8,877	-	8,877	*$216,512*	*$216,512*	*$216,512*	*0.0%*	*0.0%*
R1c. Special Schedule	-	-	-	-				-	-	-	-	-	-	-	-	-
R1d. Wage System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R1e. Highly Qualified Experts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R1f. Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R2. Direct Hire Program Foreign Nationals (DHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R3. Total Direct Hire	**37**	**41**	**41**	**8,877**	**-**	**-**	**-**	**-**	**8,877**	**-**	**8,877**	*$216,512*	*$216,512*	*$216,512*	*0.0%*	*0.0%*
R4. Indirect Hire Foreign Nationals (IHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal - Reimbursable Funded (excludes	*37*	*41*	*41*	*8,877*	-	-	-	-	*8,877*	-	*8,877*	*$216,512*	*$216,512*	*$216,512*	*0.0%*	*0.0%*
R5. Other Object Class 13 Benefits										**-**	**-**					
R5a. USDH - Benefits for Former Employees										-	-					
R5b. DHFN - Benefits for Former Employees										-	-					
R5c. Voluntary Separation Incentive Pay (VSIP)										-	-					
R5d. Foreign National Separation Liability										-	-					
Total Personnel (includes OC 13)	**2,195**	**2,285**	**2,271**	**342,803**	**0**	**0**	**0**	**0**	**342,803**	**0**	**342,803**	***$150,948***	***$150,948***	***$150,948***	***0.0%***	***0.0%***
T1. US Direct Hire (USDH)	**2,195**	**2,285**	**2,271**	**342,803**	**-**	**-**	**-**	**-**	**342,803**	**-**	**342,803**	*$150,948*	*$150,948*	*$150,948*	*0.0%*	*0.0%*
T1a. Senior Executive Schedule	0	1	1	159	0	0	0	0	159	0	159	*$159,000*	*$159,000*	*$159,000*	*0.0%*	*0.0%*
T1b. General Schedule	2,195	2,284	2,270	342,644	0	0	0	0	342,644	0	342,644	*$150,944*	*$150,944*	*$150,944*	*0.0%*	*0.0%*
T1c. Special Schedule	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T1d. Wage System	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T1e. Highly Qualified Experts	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T1f. Other	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T2. Direct Hire Program Foreign Nationals (DHFN)	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T3. Total Direct Hire	**2,195**	**2,285**	**2,271**	**342,803**	**-**	**-**	**-**	**-**	**342,803**	**-**	**342,803**	*$150,948*	*$150,948*	*$150,948*	*0.0%*	*0.0%*
T4. Indirect Hire Foreign Nationals (IHFN)	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
Subtotal - Total Funded (excludes OC 13)	*2,195*	*2,285*	*2,271*	*342,803*	-	-	-	-	*342,803*	-	*342,803*	*$150,948*	*$150,948*	*$150,948*	*0.0%*	*0.0%*
T5. Other Object Class 13 Benefits										**-**	**-**					
T5a. USDH - Benefits for Former Employees										0	0					
T5b. DHFN - Benefits for Former Employees										0	0					
T5c. Voluntary Separation Incentive Pay (VSIP)										0	0					
T5d. Foreign National Separation Liability										0	0					

RDTE, Space Force

Department of the Air Force
TOTAL CIVILIAN PERSONNEL COSTS
OP-8: OP-8 (PB)
FY 2024 President's Budget
(FY 2024)

($ in Thousands)

	a Begin Strength	b End Strength	c FTEs	d Basic Comp	e Overtime Pay	f Holiday Pay	g Other O.C.11	e + f + g h Total Variables	d + h i Comp O.C.11	j Benefits	i + j k Comp &	Rates d/c l Basic Comp	i/c m Total Comp	k/c n Comp & Benefits	h/d o % BC Variables	j/d p % BC Benefits
Direct Funded Personnel (includes OC 13)	**2,245**	**2,157**	**2,250**	**391,842**	**0**	**0**	**0**	**0**	**391,842**	**0**	**391,842**	***$174,152***	***$174,152***	***$174,152***	***0.0%***	***0.0%***
D1. US Direct Hire (USDH)	**2,245**	**2,157**	**2,250**	**391,842**	**-**	**-**	**-**	**-**	**391,842**	**-**	**391,842**	*$174,152*	*$174,152*	*$174,152*	*0.0%*	*0.0%*
D1a. Senior Executive Schedule	1	8	8	1,272	-	-	-	-	1,272	-	1,272	*$159,000*	*$159,000*	*$159,000*	*0.0%*	*0.0%*
D1b. General Schedule	2,244	2,149	2,242	390,570	-	-	-	-	390,570	-	390,570	*$174,206*	*$174,206*	*$174,206*	*0.0%*	*0.0%*
D1c. Special Schedule	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1d. Wage System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1e. Highly Qualified Experts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D1f. Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D2. Direct Hire Program Foreign Nationals (DHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
D3. Total Direct Hire	**2,245**	**2,157**	**2,250**	**391,842**	**-**	**-**	**-**	**-**	**391,842**	**-**	**391,842**	*$174,152*	*$174,152*	*$174,152*	*0.0%*	*0.0%*
D4. Indirect Hire Foreign Nationals (IHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal - Direct Funded (excludes OC 13)	*2,245*	*2,157*	*2,250*	*391,842*	-	-	-	-	*391,842*	-	*391,842*	*$174,152*	*$174,152*	*$174,152*	*0.0%*	*0.0%*
D5. Other Object Class 13 Benefits										**-**	**-**					
D5a. USDH - Benefits for Former Employees										-	-					
D5b. DHFN - Benefits for Former Employees										-	-					
D5c. Voluntary Separation Incentive Pay (VSIP)										-	-					
D5d. Foreign National Separation Liability										-	-					
Reimbursable Funded Personnel (includes OC 13)	**41**	**103**	**76**	**9,065**	**0**	**0**	**0**	**0**	**9,065**	**0**	**9,065**	***$119,276***	***$119,276***	***$119,276***	***0.0%***	***0.0%***
R1. US Direct Hire (USDH)	**41**	**103**	**76**	**9,065**	**-**	**-**	**-**	**-**	**9,065**	**-**	**9,065**	*$119,276*	*$119,276*	*$119,276*	*0.0%*	*0.0%*
R1a. Senior Executive Schedule	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R1b. General Schedule	41	103	76	9,065	-	-	-	-	9,065	-	9,065	*$119,276*	*$119,276*	*$119,276*	*0.0%*	*0.0%*
R1c. Special Schedule	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R1d. Wage System	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R1e. Highly Qualified Experts	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R1f. Other	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R2. Direct Hire Program Foreign Nationals (DHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
R3. Total Direct Hire	**41**	**103**	**76**	**9,065**	**-**	**-**	**-**	**-**	**9,065**	**-**	**9,065**	*$119,276*	*$119,276*	*$119,276*	*0.0%*	*0.0%*
R4. Indirect Hire Foreign Nationals (IHFN)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Subtotal - Reimbursable Funded (excludes	*41*	*103*	*76*	*9,065*	-	-	-	-	*9,065*	-	*9,065*	*$119,276*	*$119,276*	*$119,276*	*0.0%*	*0.0%*
R5. Other Object Class 13 Benefits										**-**	**-**					
R5a. USDH - Benefits for Former Employees										-	-					
R5b. DHFN - Benefits for Former Employees										-	-					
R5c. Voluntary Separation Incentive Pay (VSIP)										-	-					
R5d. Foreign National Separation Liability										-	-					
Total Personnel (includes OC 13)	**2,286**	**2,260**	**2,326**	**400,907**	**0**	**0**	**0**	**0**	**400,907**	**0**	**400,907**	***$172,359***	***$172,359***	***$172,359***	***0.0%***	***0.0%***
T1. US Direct Hire (USDH)	**2,286**	**2,260**	**2,326**	**400,907**	**-**	**-**	**-**	**-**	**400,907**	**-**	**400,907**	*$172,359*	*$172,359*	*$172,359*	*0.0%*	*0.0%*
T1a. Senior Executive Schedule	1	8	8	1,272	0	0	0	0	1,272	0	1,272	*$159,000*	*$159,000*	*$159,000*	*0.0%*	*0.0%*
T1b. General Schedule	2,285	2,252	2,318	399,635	0	0	0	0	399,635	0	399,635	*$172,405*	*$172,405*	*$172,405*	*0.0%*	*0.0%*
T1c. Special Schedule	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T1d. Wage System	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T1e. Highly Qualified Experts	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T1f. Other	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T2. Direct Hire Program Foreign Nationals (DHFN)	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
T3. Total Direct Hire	**2,286**	**2,260**	**2,326**	**400,907**	**-**	**-**	**-**	**-**	**400,907**	**-**	**400,907**	*$172,359*	*$172,359*	*$172,359*	*0.0%*	*0.0%*
T4. Indirect Hire Foreign Nationals (IHFN)	0	0	0	0	0	0	0	0	0	0	0	-	-	-	-	-
Subtotal - Total Funded (excludes OC 13)	*2,286*	*2,260*	*2,326*	*400,907*	-	-	-	-	*400,907*	-	*400,907*	*$172,359*	*$172,359*	*$172,359*	*0.0%*	*0.0%*
T5. Other Object Class 13 Benefits										**-**	**-**					
T5a. USDH - Benefits for Former Employees										0	0					
T5b. DHFN - Benefits for Former Employees										0	0					
T5c. Voluntary Separation Incentive Pay (VSIP)										0	0					
T5d. Foreign National Separation Liability										0	0					

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ACRONYMS

GENERAL ACRONYMS

A&AS	- Advisory & Assistance Services
ABIDES	- Automated Budget Interactive Data Environment System
ACAT	- Acquisition Category
ACTD	- Advanced Concept Technology Demonstration
AGM	- Air-to-Ground Missile
AIM	- Air Intercept Missile
AIS	- Avionics Intermediate Shop
ACMI	- Aircraft Combat Maneuvering Instrumentation
AMRAAM	- Advanced Medium-Range Air-to-Air Missile
APPN	- Appropriation
ATD	- Advanced Technology Development
BA	- Budget Activity
BES	- Budget Estimate Submission
BY	- Budget Year
C3	- Command, Control, and Communication System
CFE	- Contractor Furnished Equipment
CONOPS	- Concept of Operation
CONUS	- Continental United States
CPMS	- Comprehensive Power Management System
CPT	- Cockpit Procedures Trainer
CRA	- Continuing Resolution Authority
CTS	- Countermeasures Test Set
CY	- Current Year
ECCM	- Electronic Counter Counter-Measures
ECM	- Electronic Counter Measures
ECO	- Engineering Change Orders
EOQ	- Economic Order Quantity
ECP	- Engineering Change Proposal
EPA	- Economic Price Adjustment
EW	- Electronic Warfare
EWAISP	- Electronic Warfare Avionics Integration Support Facility
FLIR	- Forward Looking Infra Red

FOT&E	- Follow-on Test and Evaluation
FOC	- Fully Operational Capability
FLTS	- Flight Line Test Set
FPIF	- Fixed Price Incentive Firm
FPIS	- Fixed Price Incentive Fee, Successive Targets
FY	- Fiscal Year
GANS	- Global Access Navigation & Safety
GATM	- Global Air Traffic Management
GFE	- Government Furnished Equipment
GFP	- Government Furnished Property
GPS	- Global Positioning System
GSE	- Ground Support Equipment
ICS	- Interim Contractor Support
IOC	- Initial Operating Capability
IT	- Information Technology
JUON	- Joint Urgent Operational Need
MAIS	- Major Automated Information System Program
MDAP	- Major Defense Acquisition Program
METS	- Mobile Electronic Test Stations
MYP	- Multiyear Procurement
NAVWAR	- Navigation Warfare
NMC Rate	- Not Mission Capable Rate
OCO	- Overseas Contingency Operations
OOC	- Overseas Operations Costs
OT&E	- Operational Test and Evaluation
OWRM	- Other War Reserve Material
PAGEL	- Priced Aerospace Ground Equipment List
PB	- President's Budget
PBR	- Program Budget Review
PMA	- Program Management Administration
PMC	- Procurement Method Code
PNO	- Acquisition Program Number (MDAP Codes)
PR	- Purchase Request
PRCP	- Program Resource Collection Process
PTT	- Part Task Trainer
PY	- Prior Year

R&M	- Reliability and Maintainability
RAA	- Rapid Acquisition Authority
RDT&E	- Research, Development, Test and Evaluation
RWR	- Radar Warning Receiver
ROM	- Rough Order of Magnitude
SS	- Sole Source
SOF	- Special Operation Force
TAF	- Tactical Air Force
TCAS	- Traffic Collision Alert and Avoidance System
TEWS	- Tactical Electronic Warfare System
TISS	- TEWS Intermediate Support System
TOA	- Total Obligation Authority
WCF	- Working Capital Fund
WRM	- War Reserve Material
WST	- Weapon System Trainer
UAV	- Unmanned Aerial Vehicle
XML	- Extensible Markup Language

BASE / ORGANIZATIONAL ACRONYMNS

ACC	- Air Combat Command
AETC	- Air Education & Training Command
AFCAO	- Air Force Computer Acquisition Office
AFCESA	- Air Force Civil Engineering Support Agency
AFCIC	- AF Communications & Information Center
AFCSC	- Air Force Cryptologic Service Center
AFESC	- Air Force Engineering Services Center
AFGWC	- Air Force Global Weather Central
AFIT	- Air Force Institute of Technology
AFLCMC	- Air Force Life Cycle Management Center
AFMC	- Air Force Materiel Command
AFMETCAL	- Air Force Metrology and Calibration Office
AFMLO	- Air Force Medical Logistics Office
AFOSI	- Air Force Office of Special Investigation
AFOTEC	- Air Force Operational Test & Evaluation Center
AFPC	- Air Force Personnel Center

AFPSL	- AF Primary Standards Lab
AFR	- Air Force Reserve
AFSOC	- AF Special Operations Command
AFSPC	- Air Force Space Command
AIA	- Air Intelligence Agency
ALC	- Air Logistics Center
AMC	- Air Mobility Command
ANG	- Air National Guard
ASC	- Aeronautical Systems Center
AETC	- Air Education Training Command
AU	- Air University
AWS	- Air Weather Service
CIA	- Central Intelligence Agency
DGSC	- Defense General Support Center
DLA	- Defense Logistics Center
DOE	- Department of Energy
DPSC	- Defense Personnel Support Center
DSCC	- Defense Supply Center, Columbus
DTIC	- Defense Technical Information Center
ER	- Eastern Range
ESC	- Electronic Systems Center
FAA	- Federal Aviation Agency
FBI	- Federal Bureau of Investigation
GSA	- General Services Administration
JCS	- Joint Chiefs of Staff
NATO	- North Atlantic Treaty Organization
OSD	- Office of the Secretary of Defense
PACAF	- Pacific Air Forces
USAF	- United States Air Force
USAFA	- United States Air Force Academy
USAFE	- United States Air Force Europe
USCENTCOM	- United States Central Command
USEUCOM	- United States European Command
USMC	- United States Marine Corps
USSTRATCOM	- United States Strategic Command
WP AFB	- Wright-Patterson AFB, OH

CONTRACT METHOD / TYPE ACRONYMNS

C	- Competitive
BA	- Basic Agreement
BOA	- Basic Ordering Agreement
BPA	- Blanket Purchasing Agreement
CS	- Cost Sharing
IDDQ	- Indefinite Delivery, Definite Quantity
IDIQ	- Indefinite Delivery, Indefinite Quantity
IDRT	- Indefinite Delivery, Requirements
Letter	- Letter
LH	- Labor-hour
MIPR	- Military Interdepartmental Purchase Request
MIPR-C	- Military Interdepartmental Purchase Request - Competitive
MIPR-OPT	- Military Interdepartmental Purchase Request - Option
MIPR-OTH	- Military Interdepartmental Purchase Request – Other
MIPR-SS	- Military Interdepartmental Purchase Request - Sole Source
OPT	- Option
OTH	- Other
PO	- Project Order
REQN	- Requisition
SS	- Sole Source
T&M	- Time and Materials
UCA	- Undefinitized Contract Action
WP	- Work Project

CONTRACTED BY ACRONYMNS

11 WING	- 11th Support Wing, Washington, DC
ACC	- Air Combat Command, Langley AFB, VA
AEDC	- Arnold Engineering Development Center, Arnold AFB, TN
AAC	- Air Armament Center, Eglin AFB, FL
AEDC	- Arnold Engineering Development Center, Arnold AFB, TN
AETC	- Air Education and Training Command, Randolph AFB, TX
AFCIC	- Air Force Communications and Information Center, Washington, DC
AFCESA	- Air Force Civil Engineering Support Agency, Tyndall AFB, FL

AFFTC	- Air Force Flight Test Center, Edwards AFB, CA
AFLCMC	- Air Force Life Cycle Management Center, Wright-Patterson AFB, OH
AFMC	- Air Force Materiel Command, Wright-Patterson AFB, OH
AFMETCAL	- Air Force Metrology and Calibration Office, Heath, Ohio
AFMLO	- Air Force Medical Logistics Office, Ft Detrick, MD
AIA	- Air Intelligence Agency, Kelly AFB, TX
AMC	- Air Mobility Command, Scott AFB, IL
ASC	- Aeronautical Systems Center, Wright-Patterson AFB, OH & Eglin AFB, FL
AFWA	- Air Force Weather Agency, Offutt AFB, NE
DGSC	- Defense General Support Center, Richmond, VA
DPSC	- Defense Personnel Support Center, Philadelphia, PA
ER	- Eastern Range, Patrick SFB, FL
ESC	- Electronic Systems Center, Hanscom AFB, MA
HSC	- Human Services Center, Brook AFB, TX
OC-ALC	- Oklahoma City Air Logistics Center, Tinker AFB, OK
OO-ALC	- Ogden Air Logistics Center, Hill AFB, UT
SMC	- Space & Missile Systems Center, Los Angeles AFB, CA
US STRATCOM	- US Strategic Command, Offutt AFB, NE
WACC	- Washington Area Contracting Center, Washington DC
WR	- Western Range, Vandenberg SFB, CA
WR-ALC	- Warner-Robins Air Logistics Center, Robins AFB, GA
AFSPC	- Air Force Space Command, Peterson AFB, CO
HQ ANG	- Headquarters, Air National Guard, Washington, DC
USAFE	- United States Air Force Europe, Ramstein AB, GE
USAFA	- United States Air Force Academy, Colorado Springs, CO

IDENTIFICATION CODES

Code “A”	- Line items of material which have been approved for Air Force service use.
Code “B”	- Line items of material that have not been approved for Service use
OBAN	- Operating Budget Account Number, 2-digit code for unit allocated funds

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 1: *Basic Research*					R-1 Program Element (Number/Name) PE 0601102SF / *Defense Research Sciences*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	25.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
610001: *Defense Research Sciences - Space*	-	0.000	25.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

Defense Research Sciences consists of extramural research activities in academia and industry along with intramural research performed in the Department of the Air Force (DAF), including the Air Force Research Laboratory, Air Force Institute of Technology, and the United States Air Force Academy. This program supports basic broad-based scientific and engineering research in areas critical to the five core technical competencies of the United States Space Force: Space Security; Combat Power Projection; Space Mobility and Logistics; Information Mobility; and Space Domain Awareness, while simultaneously building capacity in academia and cultivating the Science, Technology, Engineering, and Mathematics (STEM) pipeline. All research areas are subject to long-range planning and technical review by both DAF and tri-Service scientific planning groups. Efforts in this program have been coordinated through the Department of Defense (DoD) Science and Technology (S&T) Executive Committee process to harmonize efforts and eliminate duplication.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver S&T capabilities. The use of program funds in this program element would be in addition to the civilian pay expenses budgeted in program elements 0602102F, 0602201F, 0602202F, 0602203F, 0602204F, 0602602F, 0602605F, 0602788F, 0602298F, and 1206601SF.

Funds in this program element may be used to investigate specified science advancements primarily targeted to challenges in the space domain and multi-domain research with space-domain application.

This program is in Budget Activity 1, Basic Research because this budget activity includes scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601102SF / *Defense Research Sciences*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	25.000	0.000	0.000	0.000
Total Adjustments	0.000	25.000	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	25.000			
• 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)	FY 2022	FY 2023
Project: 610001: *Defense Research Sciences - Space*		
Congressional Add: *Program increase: Basic Research*	0.000	25.000
Congressional Add Subtotals for Project: 610001	0.000	25.000
Congressional Add Totals for all Projects	0.000	25.000

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
Congressional Add: Program increase: Basic Research	0.000	25.000
FY 2022 Accomplishments: Not Applicable		
FY 2023 Plans: Conducted Congressionally directed effort		
Congressional Adds Subtotals	0.000	25.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Not Applicable

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 1: *Basic Research*					R-1 Program Element (Number/Name) PE 0601103SF / *University Research Initiatives*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	30.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
610002: *University Research Initiatives - Space*	-	0.000	30.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program supports defense-related basic research in a wide range of scientific and engineering disciplines relevant to maintaining U.S. military technology superiority. Research topics include, but are not limited to, revolutionary and high priority technologies critical to the five core technical competencies of the United States Space Force: Space Security; Combat Power Projection; Space Mobility and Logistics; Information Mobility; and Space Domain Awareness. The program also enhances and promotes the education of U.S. scientists and engineers in disciplines critical to maintaining, advancing, and enabling future U.S. defense technologies. This program assists universities in establishing superior instrumentation capabilities needed to improve the quality of defense-related research and education. A fundamental component of this program is the recognition that future technologies and technology exploitations require highly coordinated and concerted multi- and inter-disciplinary efforts. Efforts in this program have been coordinated through the Department of Defense Science and Technology Executive Committee process to harmonize efforts and eliminate duplication.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver science & technology capabilities. The use of program funds in this program element would be in addition to the civilian pay expenses budgeted in program elements 0602102F, 0602201F, 0602202F, 0602203F, 0602204F, 0602602F, 0602605F, 0602788F, 0602298F, and 1206601SF.

Funds in this program element may be used to investigate specified science advancements primarily targeted to challenges in the space domain and multi-domain research with space-domain application.

This program is in Budget Activity 1, Basic Research because this budget activity includes scientific study and experimentation directed toward increasing fundamental knowledge and understanding in those fields of the physical, engineering, environmental, and life sciences related to long-term national security needs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 1: *Basic Research*	**R-1 Program Element (Number/Name)** PE 0601103SF / *University Research Initiatives*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	30.000	0.000	0.000	0.000
Total Adjustments	0.000	30.000	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	30.000			
• 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)	FY 2022	FY 2023
Project: 610002: *University Research Initiatives - Space*		
Congressional Add: *Program increase: Defense University Research Instrumentation Program*	0.000	30.000
Congressional Add Subtotals for Project: 610002	0.000	30.000
Congressional Add Totals for all Projects	0.000	30.000

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
Congressional Add: Program increase: Defense University Research Instrumentation Program	0.000	30.000
FY 2022 Accomplishments: Not Applicable		
FY 2023 Plans: Conducted Congressionally directed effort		
Congressional Adds Subtotals	0.000	30.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Not Applicable

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 1202212SF *I Defense Laboratories R&D Projects*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	10.098	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.098
622030: *Defense Lab R&D Projects*	-	10.098	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	10.098

A. Mission Description and Budget Item Justification

Implementation of 10 U.S.C. Section 4123, amendment to 10 U.S.C. Section 2363, to fund: innovative basic and applied research conducted at the defense laboratory and supports military missions; development programs supporting the transition of technologies developed by the defense laboratory into operational use; workforce development activities improving the capacity of the defense laboratory to recruit and retain personnel with necessary scientific and engineering expertise that support military missions; and the repair or minor military construction of the laboratory infrastructure and equipment.

The United States Space Force (USSF) is dependent on technological advances in response to emerging threats and to maintain a competitive advantage. The USSF has a comprehensive and deliberative planning process to identify and fund research that is expected to have the greatest benefit to the USSF and the warfighter. 10 U.S.C. Section 4123 provides the Commander of the Air Force Research Laboratory (AFRL), in consultation with the Department of the Air Force Science and Technology Executive, a degree of flexibility to rapidly exploit scientific breakthroughs or respond to emerging threats, to include developing a skilled workforce and necessary infrastructure. This flexibility increases the rate of innovation and accelerates the development and fielding of needed military capabilities to address current and future problems.

In FY 2021 the USSF established Program Element (PE) 1202212SF, which internally reprograms 10 U.S.C. Section 4123 funds to this USSF program element in the year of execution after receipt of the appropriation. This allows increased transparency to Congress on 10 U.S.C. Section 4123 funding and additional execution flexibility for 10 U.S.C. Section 4123 activities to cross all technology areas. This is a parallel effort to United States Air Force (USAF) PE 0602212F, which also internally reprograms 10 U.S.C. Section 4123 funds into the USAF program element in the year of execution after receipt of the appropriation.

This program is in Budget Activity 2, Applied Research because this budget activity includes studies, investigations, and non-system specific technology efforts directed toward general military needs with a view toward developing and evaluating the feasibility and practicality of proposed solutions and determining their parameters.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 1202212SF *I Defense Laboratories R&D Projects*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	10.098	0.000	0.000	0.000	0.000
Total Adjustments	10.098	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	10.098	0.000	0.000	0.000	0.000

Change Summary Explanation

Increase in FY 2021 in Other Adjustments is due to realignment of funds to PE 1202212SF to support Research and Development Projects, 10 U.S.C. Section 4123. Increase in FY22 is a result of an established USSF budget which was used to calculate funds that will be aligned to PE 12022112SF to support Research and Development Projects, 10 U.S.C. 4123.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Defense Laboratories R&D Projects - Air Force Research Laboratory	10.098	0.000	0.000
Description: Implementation of 10 U.S.C. Section 2363, amendment to PL 110-417, 10 U.S.C. Section 2358 and 10 U.S.C. 2805(d)(1)(B), to fund: innovative basic and applied research conducted at the Air Force Research Laboratory (AFRL) and supports military missions; development programs supporting the transition of technologies developed by AFRL into operational use; workforce development activities improving the capacity of AFRL to recruit and retain personnel with necessary scientific and engineering expertise that support military missions; and the repair or minor military construction of the laboratory infrastructure and equipment. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** NA ***FY 2023 to FY 2024 Increase/Decrease Statement:*** NA			
Accomplishments/Planned Programs Subtotals	10.098	0.000	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 1202212SF *I Defense Laboratories R&D Projects*

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Not Applicable

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 2: *Applied Research*					R-1 Program Element (Number/Name) PE 1206601SF / *Space Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	280.023	360.286	206.196	0.000	206.196	157.742	159.394	160.521	164.238	Continuing	Continuing
621010: *Space Survivability & Surveillance*	-	24.869	59.612	41.591	0.000	41.591	35.263	30.771	31.843	32.962	Continuing	Continuing
624846: *Spacecraft Payload Technologies*	-	16.012	61.582	71.286	0.000	71.286	20.138	20.834	21.256	22.080	Continuing	Continuing
624847: *Rocket Propulsion Technology*	-	21.180	16.966	14.483	0.000	14.483	15.654	16.001	16.329	16.917	Continuing	Continuing
624866: *Lasers & Imaging Technology*	-	25.048	22.742	19.985	0.000	19.985	20.020	20.481	21.085	21.795	Continuing	Continuing
625018: *Spacecraft Protection Technology*	-	49.015	36.026	32.345	0.000	32.345	40.411	45.136	43.152	42.881	Continuing	Continuing
628809: *Spacecraft Vehicle Technologies*	-	143.899	163.358	26.506	0.000	26.506	26.256	26.171	26.856	27.603	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program focuses on six major areas. First, the space survivability and surveillance area develops technologies to understand space weather and the geophysics environment for mitigation and exploitation of these effects to Department of Air Force systems. Second, the spacecraft payload technologies area improves satellite payload operations by developing advanced materials/components, networking, analysis tools, and subsystem capabilities. Third, the rocket propulsion technology area develops rocket propulsion technologies for space access, space maneuver, and the sustainment of strategic systems. Fourth, the lasers & imaging technology area conducts research supporting ground-based optical space situational awareness and ground-to-space laser-enabled communication. Fifth, the spacecraft protection area develops technologies for protecting United States space assets in potential hostile settings. The last major area, spacecraft vehicles, focuses on spacecraft platform and control technologies, operator effectiveness, and their interactions. Efforts in this program have been coordinated through the Department of Defense Science and Technology Executive Committee process to harmonize efforts and eliminate duplication.

This Program Element (PE) may include necessary civilian pay expenses required to manage, execute, and deliver science & technology capabilities. The use of such program funds would be in addition to civilian pay expenses budgeted in PE 1206616SF/Space Advanced Technology Development/Demo.

This program element may include necessary expenses to support the operation and maintenance of facilities to manage, execute, and deliver science and technology capabilities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*

This program is in Budget Activity 2, Applied Research because this budget activity includes studies, investigations, and non-system specific technology efforts directed toward general military needs with a view toward developing and evaluating the feasibility and practicality of proposed solutions and determining their parameters.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	286.505	243.737	257.886	0.000	257.886
Current President's Budget	280.023	360.286	206.196	0.000	206.196
Total Adjustments	-6.482	116.549	-51.690	0.000	-51.690
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-32.706			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	140.900			
• Congressional Directed Transfers	0.000	8.355			
• Reprogrammings	4.866	0.000			
• SBIR/STTR Transfer	-4.316	0.000			
• Other Adjustments	-7.032	0.000	-51.690	0.000	-51.690

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 624847: *Rocket Propulsion Technology*		
Congressional Add: *Congressional Add: Program increase - non-toxic fuels*	2.954	-
Congressional Add: *Propulsion Technology*	-	5.000
Congressional Add: *Congressional Add: Program increase - adaptive medium-lift engine architecture*	4.924	-
Congressional Add Subtotals for Project: 624847	7.878	5.000
Project: 625018: *Spacecraft Protection Technology*		
Congressional Add: *Congressional Add: Program increase - autonomy in space*	9.849	-
Congressional Add: *Congressional Add: Program increase - ground-based interferometry*	5.909	2.000
Congressional Add: *Congressional Add: Program increase - open architecture payloads*	9.849	-
Congressional Add: *Congressional Add: Program increase - architecture for space domain awareness beyond GEO*	15.168	-
Congressional Add: *Congressional Add: Program Increase - digital engineering and modeling for space domain awareness*	-	9.500
Congressional Add: *Congressional Add: Program Increase - lunar surface space domain awareness*	-	4.000
Congressional Add: *Congressional Add: Program Increase - SOSA-based spacecraft protection technology*	-	10.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 1206601SF *I Space Technology*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Congressional Add Subtotals for Project: 625018	40.775	25.500
Project: 628809: *Spacecraft Vehicle Technologies*		
Congressional Add: *Congressional Add: Program increase - radiation hardened microprocessor*	8.766	-
Congressional Add: *Congressional Add: Program increase - lithium sulfur battery development*	3.939	-
Congressional Add: *Congressional Add: Program increase - thin-film photovoltaic energy*	2.954	3.000
Congressional Add: *Congressional Add: Program increase - multi-mission distributed antenna technology*	9.849	-
Congressional Add: *Congressional Add: Program increase - hybrid space architecture*	4.924	5.000
Congressional Add: *Congressional Add: Program increase - ultra-lightweight space solar arrays*	4.924	-
Congressional Add: *Congressional Add: Program increase - university consortia for space technology*	9.849	20.000
Congressional Add: *Congressional Add: Program increase - advanced multi-physics thermal management*	4.924	-
Congressional Add: *Congressional Add: Program increase - fundamental research*	14.774	-
Congressional Add: *Congressional Add: Program increase - space solar power inc demonstration*	2.856	-
Congressional Add: *Congressional Add: Program increase - aerospace films for increased operational range of reconnaissance*	-	6.000
Congressional Add: *Congressional Add: Program increase - 3D graphene lithium-sulfur batteries*	-	5.000
Congressional Add: *Congressional Add: Program increase - L-Band active phased array demonstration*	-	3.000
Congressional Add: *Congressional Add: Program increase - next generation multiband space array antenna*	-	10.000
Congressional Add: *Congressional Add: Program increase - advanced analog microelectronics*	-	3.000
Congressional Add: *Congressional Add: Program increase - spectrum superiority lab*	-	5.000
Congressional Add: *Congressional Add: Program increase - advanced space power systems*	-	9.400
Congressional Add: *Congressional Add: Program increase - cybersecurity for a hybrid space architecture*	-	15.000
Congressional Add: *Congressional Add: Program increase - flexible solar panels*	-	5.000
Congressional Add: *Congressional Add: Program increase - high efficiency lightweight RF amplifiers for LEO constellation*	-	5.000
Congressional Add: *Congressional Add: Program increase - moving target engagement solutions*	-	6.000
Congressional Add: *Congressional Add: Program increase - operational upper stage augmentation kit*	-	10.000
Congressional Add Subtotals for Project: 628809	67.759	110.400

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 2: *Applied Research*	**R-1 Program Element (Number/Name)** PE 1206601SF *I Space Technology*

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

	FY 2022	FY 2023
Congressional Add Totals for all Projects	116.412	140.900

Change Summary Explanation

FY24 PB to PB change of -51.690 result of:
257.886M - Baseline
+21.198M - Realignments
-72.888M - Database Error, realignment to BA06 1206601SF
206.196M - Final

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 2	R-1 Program Element (Number/Name) PE 1206601SF / *Space Technology*	Project (Number/Name) 621010 / *Space Survivability & Surveillance*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
621010: *Space Survivability & Surveillance*	-	24.869	59.612	41.591	0.000	41.591	35.263	30.771	31.843	32.962	Continuing	Continuing

Note

Decrease from FY 2023 to FY 2024 reflects realignment and consolidation of thrusts to other Budget Projects to better align with the Department of the Air Force (DAF) Operational Imperatives (OI) and the USSF Space System Command (SSC) Program Executive Office's (PEO) mission areas. Civilian Pay in this project was assigned an incorrect project code that aligned it in Budget Activity (BA) 06 (RDT&E Management Support), Project C6601Z. Funds will be transferred back to PE 1206616SF BA 02 in a follow-up technical adjustment request.

A. Mission Description and Budget Item Justification

This project develops technologies to understand and control the space environment for warfighter's future capabilities. The focus is on characterizing and forecasting the battlespace environment for more realistic space system design, modeling, and simulation, as well as the battlespace environment's effect on space systems' performance. This includes technologies to specify and forecast the space environment for planning operations, ensure uninterrupted system performance, optimize space-based surveillance operations, and provide capability to mitigate or exploit the space environment for both offensive and defensive operations.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Environment Research	7.228	17.418	15.591
Description: Develop techniques, forecasting tools, sensors, and technologies for specifying, monitoring, predicting, and controlling space environmental conditions hazardous to Department of Defense (DoD) operational space and radar systems.			
FY 2023 Plans: Continue advancement of regional space environment specification and modeling to enable tactical applications. Complete development of next generation ionospheric observing systems. Continue development of controlled-radio frequency propagation effects across relevant frequency ranges for operations. Continue improvements in efficiency of plasma generation systems to enable practical applications. Complete plasma cloud formation models and evolution for engineered solutions. Complete next generation system for specifying and predicting space environment impacts on radio frequency services at relevant frequencies. Continue developing and enhancing space environment modelling capabilities to better enable accurate specification and forecasting of the state of the space environment, and the resulting impacts to DoD and national systems. Initiate advanced research into beyond-geosynchronous space environment impacts to national systems. Continue applied research of space environment interactions and effects for space situational awareness. Initiate transition of basic research in solar and space environment physics to applied research efforts.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 621010 / *Space Survivability & Surveillance*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Increase support for North American Aerospace Defense Command (NORAD) Homeland Defense Modernization and Department of the Air Force (DAF) Arctic strategy. Develop and investigate representative and median regional space environment specifications intended for operational system simulation experiments. Extend and improve software radio techniques to monitoring and specifying space environment impacts. Utilize Artificial Intelligence (AI)/Machine Learning (ML) techniques. Improve efficiency of plasma generation systems. Support space experiments and demonstrations. Develop and enhance space environment modelling capabilities to better enable accurate specification and forecasting of the state of the space environment and the resulting impacts to Department of Defense and national systems. Extend advanced research into beyond-geosynchronous space environment impacts to national systems. Continue applied research of space environment interactions and effects for space situational awareness. Evaluate basic research in solar and space environment physics for transition to applied research efforts. Initiate exploratory work on space protection and exploitation technologies. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by 1.827M due to a database error which realigned the civilian pay in this thrust to a BA 06 project. Funds will be transferred back in a follow-up technical adjustment request.			
Title: Surveillance Technologies	5.438	10.053	0.000
Description: Develop advanced target detection techniques, spectral signature libraries, and decision aids for space-based sensors and surveillance systems. ***FY 2023 Plans:*** Continue development of novel sensing technologies, including innovative data analytics and sensor concepts, to track targets that pose new challenges for missile warning systems and an expanded range of tactical threat warning systems. Continue development of automated data analytics for data processing on-board satellites, and cloud platforms, to meet tactical mission timelines. Continue study of tactical surveillance technologies for target detection by autonomous sensing grids operating across multiple-domains to meet the information timeliness, track custody and data access requirements necessary to detect, track and target emerging hypersonic missile threats. ***FY 2024 Plans:*** In FY 2024 this thrust will be realigned to PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies, and consolidated under one thrust titled Missile Warning and Tactical Sensing to better align projects under mission areas focused on the DAF OIs and in line with the USSF SSC PEOs. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by 10.053M due to realignment to a different Project. In FY 2024 this thrust will be realigned to PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies, and consolidated under one thrust titled Missile Warning and Tactical Sensing to better align projects under mission areas focused on the DAF OIs and in			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 621010 / *Space Survivability & Surveillance*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
line with the USSF SSC PEOs. Therefore, an explanation of the change between Fiscal Years (FY) cannot be made in a relevant manner. This realignment did not result in any discontinuation of effort. FY to FY funding change explanations will be reflected in the new thrust beginning in FY 2025.			
Title: Alternative Navigation Technologies ***Description:*** Develop new technologies based on cold atom physics and photonics that provide autonomous jam-proof precision inertial navigation to augment Global Positioning System (GPS) in case of GPS-denial. Develop atomic clocks and methods to disseminate time based on new technologies to replace legacy GPS atomic clocks and networks. ***FY 2023 Plans:*** Continue testing of cold atom 3-axis accelerometers for improved Internal Navigation Systems in Global Position System-denied environments. Continue development of advanced photonic systems for high performance time transfer. Continue development of advanced components for quantum systems such as very low noise amplifiers, power efficient narrow-bandwidth lasers, and optical frequency comb technology. Continue development of quantum timing systems for advanced communication applications. Initiate preparation for second demonstration of 3-axis accelerometer outside of laboratory environment. ***FY 2024 Plans:*** In FY 2024 this thrust will be realigned to PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies and consolidated under one thrust titled Space Communication/Positioning, Navigation, & Timing (PNT) Technologies to better align projects focused on the DAF OIs and in line with the USSF SSC PEO's mission areas. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by 14.541M due to realignment to a different Project. In FY 2024 this thrust will be realigned to PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies and consolidated under one thrust titled Space Communication/Positioning, Navigation, & Timing (PNT) Technologies to better align projects focused on the DAF OIs and in line with the USSF SSC PEO's mission areas. Therefore, an explanation of the change between FYs cannot be made in a relevant manner. This realignment did not result in any discontinuation of effort. FY to FY funding change explanations will be reflected in the new thrust beginning in FY 2025.	12.203	14.541	0.000
Title: Strategic Radiation Hardened Electronics ***Description:*** Design, develop, produce and qualify strategic radiation hardened (SRH) non-volatile memory (NVM) that does not exist today and is suitable to support DoD strategic missile, missile defense, and space system needs and to address a more diverse & advanced nuclear threat. ***FY 2023 Plans:*** Initiate identification of electrical and radiation performance requirements and specification development for strategic radiation hardened non-volatile memory. Initiate design, fabrication, test and evaluation of test articles to support technical development.	0.000	17.600	26.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 621010 / *Space Survivability & Surveillance*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Initiate space qualification of the strategic radiation hardened non-volatile memory family and supporting design support kit. Initiate efforts to ensure durability of a domestic source of readout integrated circuits and focal plane array technologies. Initiate efforts to enable maturation of large format high-dynamic range focal plane arrays. ***FY 2024 Plans:*** Finalize concept design for SRH NVM to address the electrical and radiation performance requirements identified in FY 2023. Continue plan for fabrication, test and evaluation of test articles to mitigate emerging radiation effects in electronics. Initiate the technical development of the sub-scale test chip and continue efforts to develop a space qualification strategy. Continue efforts to ensure durability of a domestic source of readout integrated circuits (ROIC) and focal plane array (FPA) technologies. Continue efforts to enable maturation of large format high-dynamic range FPAs. Initiate feasibility assessment to port radiation hardened ROIC technology from current State-of-the-Art to a more advanced processing node. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 by 8.400M due to initiating efforts for the technical development of the sub-scale test chip and feasibility assessment of advanced ROIC technology.			
Accomplishments/Planned Programs Subtotals	24.869	59.612	41.591

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 2	R-1 Program Element (Number/Name) PE 1206601SF / *Space Technology*	Project (Number/Name) 624846 / *Spacecraft Payload Technologies*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
624846: *Spacecraft Payload Technologies*	-	16.012	61.582	71.286	0.000	71.286	20.138	20.834	21.256	22.080	Continuing	Continuing

Note

Increase from FY 2023 to FY 2024 reflects realignment and consolidation of thrusts from Project 621010/Space Survivability & Surveillance and Project 628809/ Spacecraft Vehicle Technologies to better align with the DAF OIs and the USSF SSC PEO's mission areas. Civilian Pay in this project was assigned an incorrect project code that aligned it in Budget Activity (BA) 06 (RDT&E Management Support), Project C6601Z. Funds will be transferred back to PE 1206616SF BA 02 in a follow-up technical adjustment request.

A. Mission Description and Budget Item Justification

This project develops advanced technologies that enhance spacecraft payload operations by improving materials/component, networking, analysis tools, and subsystem capabilities. The project focuses on development of advanced space data generation and exploitation technologies, including infrared sensors; and development of high-fidelity space simulation models that support space-based surveillance and space asset protection research and development for the warfighter.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space-Based Detector Technologies	5.006	4.032	0.000
Description: Develop advanced infrared device technologies that enable hardened space detector arrays with improved detection to perform acquisition, tracking, and discrimination of space objects and missile warning.			
FY 2023 Plans: Complete design, development, and assessment of low-cost, high-volume infrared detectors and focal plane arrays for proliferated space architecture layers. Continue development of focal plane array optical data outputs for higher speed and data throughput and continue radiation tolerance characterization of photonic devices. Continue development and refinement of alternative infrared focal plane array materials and device architectures. Continue development and assessment of event based sensing concepts and hardware and initiate partnerships with other Government agencies to explore potential transition paths. Continue development of high dynamic range, laser hardened 8192 x 8192 pixels, 10 micron pixel pitch focal plane arrays to provide resilience against emerging threats.			
FY 2024 Plans: In FY 2024 this thrust is consolidated under one thrust titled Missile Warning and Tactical Sensing to better align with the DAF OIs and the USSF SSC PEO's mission areas.			
FY 2023 to FY 2024 Increase/Decrease Statement: FY 2024 decreased compared to FY 2023 by 4.032M due to realignment and consolidation under a different Project. In FY 2024 this thrust is consolidated under one thrust titled Missile Warning and Tactical Sensing to better align with the DAF OIs and the			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 624846 / *Spacecraft Payload Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
USSF SSC PEO's mission areas. Therefore, an explanation of the change between FYs cannot be made in a relevant manner. This realignment did not result in any discontinuation of effort. FY to FY funding change explanations will be reflected in the new thrust beginning in FY 2025.			
Title: Missile Warning and Tactical Sensing	-	0.000	8.076
Description: Develop advanced infrared device technologies that enable hardened space detector arrays with improved detection to perform acquisition, tracking, and discrimination of space objects and missile warning. Develop advanced target detection techniques, spectral signature libraries, and decision aids for space-based sensors and surveillance systems. ***FY 2023 Plans:*** In FY 2024 the Surveillance Technology and Space-Based Detector Technology thrusts are consolidated under the new Missile Warning and Tactical Sensing thrust. The FY 2023 Plans for the Surveillance Technology thrust remain in PE 1206601SF/ Space Technology, Project 621010/Space Survivability & Surveillance, and the Space-Based Detector Technology thrust in PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies. ***FY 2024 Plans:*** Complete performance characterization of High Dynamic Range (HDR) resilient 10um pitch Focal Plane Array (FPA) series. Results will be rolled into full large format FPA build. Continue developing a more thorough understanding of noise sources in smaller Complementary Metal Oxide Semiconductor (CMOS) mixed signal nodes which are vital to success of HDR FPA program. Continue involvement in Event Based Sensor (EBS) development and assist in defining DoD and IC path forward. Evaluate the performance of test chips as they become available, as part of the AFRL collaboration with the Defense Advanced Research Projects Agency (DARPA). Continue the development of next generation infrared detector materials that have the potential of offering higher performance. Continue development of novel sensing concepts for space-based surveillance and detection of challenging, evolving strategic and tactical targets in contested environments. Initiate development and design of space-based sensors for resilient target custody by proliferated space architectures. Continue development of data analytics for edge processing, cloud solutions, and human-machine learning to shorten sensor-to-shooter timelines. Initiate development of trusted artificial intelligence and machine learning models for autonomous classification and moving target indication of ground vehicles, air platforms, and maritime vessels for battlefield operations. Initiate study of sensing systems optimized for space-based autonomous tasking and moving target indication from multiple target surveillance and tracking layers of a hybrid space architecture. Continue study and development of autonomous sensing strategies and technologies for multi-domain target acquisition and tracking by networked satellite constellations. ***FY 2023 to FY 2024 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 624846 / *Spacecraft Payload Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 increased compared to FY 2023 by 8.076M due to realignment and consolidation of thrusts from different Projects. In FY 2024 the Surveillance Technology and Space-Based Detector Technology thrusts are consolidated under the new Missile Warning and Tactical Sensing thrust. The FY 2023 Plans for the Surveillance Technology thrust remain in PE 1206601SF/ Space Technology, Project 621010/Space Survivability & Surveillance, and the Space-Based Detector Technology thrust in PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies. Therefore, an explanation of the change between FYs cannot be made in a relevant manner. This realignment did not result in a new start. FY to FY funding change explanations will be reflected in this new thrust beginning in FY 2025.			
Title: Space Electronics Research ***Description:*** Develop technologies for space-based payload components such as radiation-hardened electronic devices, microelectro-mechanical system devices, and advanced electronics packaging. ***FY 2023 Plans:*** Continue leadership role in Deputy Assistant Secretary of Defense Systems Engineering trusted and assured microelectronics strategy efforts to develop trusted manufacturing techniques that reduce risk to National Security Space systems. Continue adapting bench-marking capabilities on new electronics using the latest spacecraft algorithms and transitioning bench-marking capabilities and results to the acquisition community to enable data-informed payload architecture design decisions. Initiate prototype memory manufacturing, testing and design improvements. Complete research and development of ultra-low power and neuromorphic/cortical processing architectures and advanced transistor research to enable game-changing capabilities in future National Security Space systems. Continue research and development of high-performance processing for small satellites to enable revolutionary on-orbit edge processing, autonomy, data fusion, and machine learning. ***FY 2024 Plans:*** In FY 2024 this thrust is realigned to PE 1206601SF/Space Technology, Project 628809/Spacecraft Vehicle Technologies and consolidated under one thrust, titled Spacecraft Component Technologies to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by 5.683M due to realignment and consolidation to a different Project. In FY 2024 this thrust is realigned to PE 1206601SF/Space Technology, Project 628809/Spacecraft Vehicle Technologies and consolidated under one thrust, titled Spacecraft Component Technologies to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. Therefore, an explanation of the change between FYs cannot be made in a relevant manner. This realignment did not result in any discontinuation of effort. FY to FY funding change explanations will be reflected in the new thrust beginning in FY 2025.	0.000	5.683	0.000
Title: Modeling and Simulation Tools for Space Applications	1.545	3.752	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 624846 / *Spacecraft Payload Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Provide modeling, simulation, and analysis for technology evolution in space-based terrestrial surveillance systems, precision navigation and timing, space situational awareness, satellite communications, space environment monitoring, and space control payloads. ***FY 2023 Plans:*** Continue mission-level military utility analyses of technology and associated architectures and employment concepts across multi-domain mission areas. Continue refining guidelines and checkpoints for concept maturation evaluations in context of emerging space technologies. Continue to evolve processes for applying model-based systems engineering into technology decision-making and flight experiment design. ***FY 2024 Plans:*** In FY 2024 this thrust is transferred to Program Element 1206616SF/Space Advanced Technology Development/Demo, Project 633834/Integrated Space Technology Demonstrations, to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by 3.752M due to realignment to a different Program Element. In FY 2024 this thrust is transferred to Program Element 1206616SF/Space Advanced Technology Development/Demo, Project 633834/ Integrated Space Technology Demonstrations, to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. Therefore, an explanation of the change between FYs cannot be made in a relevant manner. his realignment did not result in any discontinuation of effort. FY to FY funding change explanations will be reflected in the new thrust beginning in FY 2025.			
Title: Alternative Positioning, Navigation, and Timing Technology	9.461	7.315	0.000
Description: Identify and develop technologies that enable new, or enhance existing, United States positioning, navigation, and timing satellite capabilities by increasing resiliency and availability of accuracy, and/or increasing the affordability of providing current capabilities. Develop technologies to meet identified Air Force Space Command/Space and Missile Systems Center positioning, navigation, and timing space payload technology needs. ***FY 2023 Plans:*** Initiate flight experiments to examine the interaction of signals between the space, ground, and user equipment segments in contested environments and exercise potential CONOPs. Continue development of technologies for multi-layer space-based positioning, navigation, and timing architecture in order to improve resiliency of the space architecture, affordability, and reduce burden on the user. Continue development of physics level modeling and simulations of next generation space architecture and the impact of developing technologies. Continue laboratory and field testing capabilities of new signals and architecture concepts. ***FY 2024 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 624846 / *Spacecraft Payload Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
In FY 2024 this thrust is consolidated under one thrust titled Space Communication/PNT Technologies to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by 7.315M due to consolidation to a new thrust. In FY 2024 this thrust is transferred to Program Element 1206616SF/Space Advanced Technology Development/Demo, Project 633834/Integrated Space Technology Demonstrations, to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. Therefore, an explanation of the change between FYs cannot be made in a relevant manner. his realignment did not result in any discontinuation of effort. FY to FY funding change explanations will be reflected in the new thrust beginning in FY 2025.			
Title: Space Communication/ Positioning, Navigation & Timing Technologies	-	0.000	13.210
Description: Identify and develop technologies that enable new, or enhance existing, United States communication, positioning, navigation, and timing satellite capabilities. Technology solutions should improve performance, increase robustness and/or resilience, and/or increase the affordability of providing current capabilities. Develop technologies to meet identified US Space Command/Space Systems Command communication, positioning, navigation, and timing space payload technology needs. Develop new technologies based on cold atom physics and photonics that provide autonomous jam-proof precision inertial navigation to augment Global Positioning System in case of Global Positioning System-denial. Develop atomic clocks and methods to disseminate time based on new technologies to replace legacy Global Positioning System atomic clocks and networks ***FY 2023 Plans:*** In FY 2024 the Alternative Navigation Technologies thrust, the Space Communication Technologies thrust, and the Alternative Positioning, Navigation, and Timing Technology thrust are consolidated under the new Space Communication/PNT thrust. The FY 2023 Plans for the Alternative Navigation Technologies thrust remain in PE 1206601SF/Space Technology, Project 621010/Space Survivability & Surveillance, the Space Communication Technologies thrust in PE 1206601SF/Space Technology, Project 628809/ Spacecraft Vehicle Technologies, and the Alternative Positioning, Navigation, and Timing Technology thrust in PE 1206601SF/ Space Technology, Project 624846/Spacecraft Payload Technologies. ***FY 2024 Plans:*** Continue scientific research and technology development for space communications exploring W/V-band spectrum options. Continue to support field demonstrations and on-orbit experiments to examine the interaction of communication, position, navigation and timing signals between the multi-layer, multi-function architectures in contested environments and exercise potential Concept of Operations (CONOPs). Continue development of the enabling technologies to increase Timing precision, enable transition to proliferated low earth orbit constellation, and provide increased options for the user. Continue to support Quantum Rim of the Pacific (RIMPAC) exercise and other opportunities to accelerate the fielding of Quantum-based technologies. Continue laboratory development of Quantum-based technologies and component miniaturization efforts. ***FY 2023 to FY 2024 Increase/Decrease Statement:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 624846 / *Spacecraft Payload Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 increased compared to FY 2023 by 13.210M due to realignment and consolidation of thrusts from different Projects. In FY 2024 the Alternative Navigation Technologies thrust, the Space Communication Technologies thrust, and the Alternative Positioning, Navigation, and Timing Technology thrust are consolidated under the new Space Communication/PNT thrust. The FY 2023 Plans for the Alternative Navigation Technologies thrust remain in PE 1206601SF/Space Technology, Project 621010/Space Survivability & Surveillance, the Space Communication Technologies thrust in PE 1206601SF/Space Technology, Project 628809/ Spacecraft Vehicle Technologies, and the Alternative Positioning, Navigation, and Timing Technology thrust in PE 1206601SF/ Space Technology, Project 624846/Spacecraft Payload Technologies. Therefore, an explanation of the change between FYs cannot be made in a relevant manner. This realignment did not result in a new start. FY to FY funding change explanations will be reflected in this new thrust beginning in FY 2025.			
Title: Resilient Satellite Navigation ***Description:*** *Formerly Resilient Positioning, Navigation, and Timing Solutions Advance and evaluate technologies contributing diversity to satellite positioning, navigation and timing (PNT) information delivery, creating models of performance, scalability and resiliency needed to anchor USSF's Space Warfighting Analysis Center (SWAC) Force Design analytics. Pursue signals and user equipment concepts targeting low size, weight and power (SWAP) users. Promote and characterize commercial PNT capabilities potentially suitable for DoD use. Conduct laboratory and on-orbit experimentation to capture representative integrated system performance and feed back key parameters to SWAC analyses and forward into future requirements definition. ***FY 2023 Plans:*** Initiate development of technologies for frequency and waveform agility that can use alternate signal sources for positioning, navigation, and timing solutions in jammed environments. Initiate development of technologies for path diversity and alternate signal processing with the ability to provide solutions to modifiable software defined user equipment. ***FY 2024 Plans:*** Complete development of reprogrammable user equipment silicon. Continue signals and hardware/software-in-the-loop (HIL/SIL) development toward on-orbit demonstration of reprogrammable PNT signal broadcast to low-SWAP user equipment to assess resiliency, performance and scalability. Conduct modeling and simulation of planned field experiments utilizing testbed assets to predict end-to-end PNT performance in contested electromagnetic environment. Feed initial findings back to inform SWAC Force Design model. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 by 9.200M due to increased modeling & simulation and conducting field experiments to inform SWAC Force Design.	0.000	40.800	50.000
Accomplishments/Planned Programs Subtotals	16.012	61.582	71.286

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 624846 / *Spacecraft Payload Technologies*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 2	R-1 Program Element (Number/Name) PE 1206601SF / *Space Technology*	Project (Number/Name) 624847 / *Rocket Propulsion Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
624847: *Rocket Propulsion Technology*	-	21.180	16.966	14.483	0.000	14.483	15.654	16.001	16.329	16.917	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project develops rocket propulsion technologies for space access and space maneuver. Analytical and experimental areas of emphasis are propellants, propellant management, combustion, rocket material applications, and innovative space propulsion concepts. Technologies of interest will improve reliability, performance, survivability, affordability, and environmental compatibility of these systems. Develop technologies to reduce the weight and cost of components using new materials and improved designs and manufacturing techniques. All efforts in this project contribute to the sustainment of the space and rocket propulsion industry, providing rocket propulsion technology for the entire Department of Defense (DoD). Technologies under this project enable capabilities of interest to both DoD and National Aeronautics and Space Administration (NASA). Tasks include: modeling and simulation; proof of concept tests of critical components; advanced component development; and ground-based tests. All thrusts are reviewed by a DoD level steering committee yearly for relevance to DoD missions, and the associated support costs.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Liquid Engine Combustion Technologies	6.261	5.059	6.123
Description: Develop advanced liquid engine combustion technology for improved performance, while preserving chamber lifetime and reliability needs for engine uses in heavy lift space vehicles. ***FY 2023 Plans:*** Complete installation of new test facility that will fill the current capability gap and allow for fast, low-cost testing of multi-injector designs and stability strategies at conditions relevant to the demands of both Department of Defense and industry for next-generation engines (including use of liquid oxygen and higher pressures and thrust). Continue the employment of new fuel and material operating limitations, manufacturing processes, and launch goals in cycle analysis to identify trade space for future engines. Continue to develop and evaluate advanced material solutions for high temperature components in rocket propulsion. Continue development and payoff determination of rotating detonation rocket engine technologies. ***FY 2024 Plans:*** Continue the employment of new fuel and material operating limitations, manufacturing processes, and launch goals in cycle analysis to identify trade space for future engines. Continue to develop and evaluate advanced material solutions for high temperature components in rocket propulsion. Continue development and payoff determination of rotating detonation rocket engine technologies. Initiate technologies and material studies supporting rapid launch capabilities emphasizing digital design capabilities. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2024 increased compared to FY2023 by $1.065 million. Funding increase due to initiation of the digital design capabilities work.			
Title: Advanced Liquid Engine Technologies	2.771	2.718	3.290

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 624847 / *Rocket Propulsion Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Develop advanced liquid engine technologies for improved performance, while increasing life and reliability needs for engine uses in expendable and reusable launch vehicles. ***FY 2023 Plans:*** Continue sub-scale risk mitigation and technology maturation activities to incorporate into next generation engine concepts. Continue modular component integration and interaction research activities supporting next generation engine concepts. ***FY 2024 Plans:*** Continue sub-scale risk mitigation and technology maturation activities to incorporate into next generation engine concepts. Continue modular component integration and interaction research activities supporting next generation engine concepts and operational capabilities. Initiate technologies and processes supporting modeling and analysis for rapid launch capabilities. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2024 increased compared to FY2023 by $0.572 million. Funding increase due to increased fuel supply costs for testing.			
Title: On-Orbit Propulsion Technologies ***Description:*** Develop solar electric, chemical, and advanced propulsion technologies for station-keeping, repositioning, and orbit transfer for satellites and satellite constellations. ***FY 2023 Plans:*** Continue advanced chemical propellants development focusing on flight-weight systems to assist in transition to industry partners. Continue to support the maturation of advanced diagnostics for both chemical and electric propulsion thruster plumes with potential for integrated state-of-health application. Continue to expand the validation and verification programs (both experimental and flight) to quantify accuracy of modeling and simulation tools developed to support thruster-spacecraft integration. Continue transition and support of thruster/plume modeling framework to spacecraft industry to propulsion community. Continue expanding exploration of advanced integrated electric propulsion and chemical thruster concepts and assess new spacecraft propulsion requirements. ***FY 2024 Plans:*** Continue advanced chemical propellants development focusing on flight-weight systems to assist in transition to industry partners. Continue to support the maturation of advanced diagnostics for both chemical and electric propulsion thruster plumes with potential for integrated state-of-health application. Continue to expand the validation and verification programs (both experimental and flight) to quantify accuracy of modeling and simulation tools developed to support thruster-spacecraft integration. Continue transition and support of thruster/plume modeling framework to spacecraft industry to propulsion community. Continue expanding	4.270	4.189	5.070

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 624847 / *Rocket Propulsion Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
exploration of advanced integrated electric propulsion and chemical thruster concepts and assess new spacecraft propulsion requirements. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2024 increased compared to FY2023 by $0.881 million. Funding increase due to increased cost of fuels and raw materials.			
Accomplishments/Planned Programs Subtotals	13.302	11.966	14.483

	FY 2022	FY 2023
Congressional Add: Congressional Add: Program increase - non-toxic fuels ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	2.954	-
Congressional Add: Propulsion Technology ***FY 2023 Plans:*** Conduct Congressionally directed efforts.	-	5.000
Congressional Add: Congressional Add: Program increase - adaptive medium-lift engine architecture ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	4.924	-
Congressional Adds Subtotals	7.878	5.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 2	R-1 Program Element (Number/Name) PE 1206601SF / *Space Technology*	Project (Number/Name) 624866 / *Lasers & Imaging Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
624866: *Lasers & Imaging Technology*	-	25.048	22.742	19.985	0.000	19.985	20.020	20.481	21.085	21.795	Continuing	Continuing

A. Mission Description and Budget Item Justification

This project conducts research advancing ground-based optical space domain awareness, techniques to counter laser threats to space craft, and laser applications towards ground-to-space communication.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Electro-Optic Space Domain Awareness and Satellite Security	25.048	22.742	19.985

Description: Develop advanced, long-range, electro-optical technologies that enable ground-based optical Space Domain Awareness (SDA) and quantum-based optical communications. Develop and use technologies to quantitatively assess the vulnerability of blue satellite systems and components to lasers and other directed energy sources. Operate the Starfire Optical Range (SOR) to conduct research meeting internal and customer requirements.

FY 2023 Plans:

Continue research and development of laser-enabled space domain awareness (SDA) focused on full-dark imaging using laser illumination. Continue to mature component technologies for 24/7 real-time optical and infrared imaging of near-earth and geosynchronous objects enabling characterization on tactical timelines. Continue investigation through measurement, modeling, and simulation of the susceptibility of satellite components to laser and other directed energy threats to inform practical designs for protective equipment and for employing protection methods on tactically-rapid timelines. Continue to mature daylight detection of satellites allowing custody through daytime hours when satellites cannot normally be detected by ground-based optical systems. Continue development of laser-enabled options for both ranging to and imaging of geosynchronous satellites from apertures smaller than 3 meters. Continue development of long-range secure optical network technology leveraging quantum science, especially for free space lasercomm channels during daylight. Continue project to apply machine-learning to automatically identify geosynchronous orbit objects more accurately and rapidly than current "hard-wired" algorithms. Conduct research into maintaining custody of space craft in 3-body-gravitational pseudo-orbits, such as in cis-lunar space and Earth-Sun equilibrium zones. Continue to maintain the Starfire Optical Range (SOR) facilities and experimental equipment in a mission-ready state for both R&D and for use by Space Operations Command DEL2/Det2.

FY 2024 Plans:

Demonstrate and transition to SPOC and SSC laser-enabled space domain awareness (SDA) focused on full-dark imaging using laser illumination. Continue to mature component technologies for 24/7 real-time optical and infrared imaging of near-earth and geosynchronous objects enabling characterization on tactical timelines. Continue investigation through measurement, modeling, and simulation of the susceptibility of satellite components to laser and other directed energy threats to inform practical designs for

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 624866 / *Lasers & Imaging Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
protective equipment and for employing protection methods on tactically-rapid timelines. Continue to mature daylight detection of satellites allowing custody through daytime hours when satellites cannot normally be detected by ground-based optical systems. Continue development of laser-enabled options for both ranging to and imaging of geosynchronous satellites from apertures smaller than 3 meters. Continue development of long-range secure optical network technology leveraging quantum science, especially for free space lasercomm channels during daylight. Continue projects to apply machine-learning to automatically identify non-spatially resolved space objects and their components more accurately and rapidly than current "hard-wired" algorithms. Conduct research into maintaining custody of space craft in 3-body-gravitational pseudo-orbits, such as in cis-lunar space and Earth-Sun equilibrium zones. Upgrade the Starfire Optical Range (SOR) facilities to provide infrastructure resilience to enable operations by Space Operations Command DEL2/Det2. Continue to sustain SOR experimental equipment in a mission-ready state for both R&D and for use by Space Operations Command DEL2/Det2. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY24 decreased from FY23 by $2.757M due to tech adjustment of funds from PE 060205F Project 625173 to PE 1206601SF Project 624866 in FY23.			
Accomplishments/Planned Programs Subtotals	25.048	22.742	19.985

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 2	R-1 Program Element (Number/Name) PE 1206601SF / *Space Technology*	Project (Number/Name) 625018 / *Spacecraft Protection Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
625018: *Spacecraft Protection Technology*	-	49.015	36.026	32.345	0.000	32.345	40.411	45.136	43.152	42.881	Continuing	Continuing

Note

The Major Thrust in this project was updated from Threat Warning Research to Space Control to better identify the breadth of research in this mission area. Consequently, the Mission Description was also updated.

A. Mission Description and Budget Item Justification

This project develops the technologies to perform faster, well-informed decision making for space operations, enhanced mission assurance of critical space services, and integrate space with joint operational picture for protecting United States space assets, in potentially hostile environments, to assure continued space system operation. The project provides transitionable technology and knowledge to enable speed-of-light protection, many-on-many engagement and defense, and new orbit regimes despite growing threat impunity.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Control	8.240	10.526	20.345
Description: *Formerly Threat Warning Research Provide timely, well-informed decisions enabled by space situational awareness in the cislunar environment, analytic tools powered by modern techniques and practices, trusted autonomy in both ground and on-orbit systems, and an underlying resilience to cyber and electronic warfare threats. ***FY 2023 Plans:*** Continue to develop techniques to detect, track, identify, and characterize satellites using multi-phenomenology techniques with particular focus on space situational awareness in the cislunar environment; investigate potential flight experiments that will demonstrate utility of cislunar situational awareness for deterring threats from deep space. Continue development of on-orbit threat warning sensing and assessment with emphasis on spectrum awareness and inherent, on-board satellite sensors. Continue research on cyber hardening of space assets with laboratory testbeds and solidify a pipeline for continuously transitioning cyber hardening techniques to on-orbit experiments. Continue experimentation and exercises with Department of Defense ground architectures, operations centers, and commercial and international partners, with an emphasis on employing agile space operations software development techniques. Continue engagements with commercial space data providers for testing new enabling technologies on commercial satellites. Continue to develop on-board autonomous satellite technologies and plan for next generation flight experiments. ***FY 2024 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 625018 / *Spacecraft Protection Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue to develop techniques to detect, identify, track, characterize, and catalog satellites using multi-phenomenology techniques with particular focus on space situational awareness in the cislunar environment; provide technical expertise towards flight experiments that will demonstrate utility of cislunar situational awareness for establishing and transferring custody, tracking, and deterring threats from deep space. Continue studies to inform potential upgrades to operational tools used in space situational awareness. Continue development of on-orbit threat warning sensing and assessment with emphasis on spectrum awareness and inherent, on-board satellite sensors. Continue research on cyber vulnerability and cyber hardening methods of space assets with laboratory testbeds; developing standards and techniques. Continue collaboration and demonstration of cyber hardening techniques aboard on-orbit experiments through established transitionary pipeline of flight experiments; growing pipeline for future demonstrations. Continue to develop on-board autonomous satellite technologies, emphasizing operational resilience for tactical action, awareness across operator, ground and space interfaces, enabling tactical awareness for distributed system elements, defining success criteria for many-to-many engagements; plan for next generation flight experiments. Continue experimentation and exercises with DoD ground architectures, operations centers, commercial and international partners. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 by 9.819M to realign funds to this thrust for increased emphasis in space situational awareness specifically in the cislunar environment.			
Title: University Consortium for Space Research ***Description:*** Expand the University Consortium for Space Research to address research needs unique to the USSF. Create Technology Institutes at universities focused on developing and delivering technology for critical USSF missions. Support development of the future space workforce. Build capacity for space research within higher education institutions. ***FY 2023 Plans:*** Not Applicable ***FY 2024 Plans:*** Expand the number of Technology Institutes, provide programming that builds capacity for space research in higher education including a focus on minority serving institutions. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 by 12.000M due to the expansion of the University Consortium for Space, previously initiated through Congressional Budget Adds in FY 2022 and FY 2023 in PE 1206601SF/Space Technology, Project 628809/ Spacecraft Vehicle Technologies.	-	0.000	12.000
Accomplishments/Planned Programs Subtotals	8.240	10.526	32.345

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 625018 / *Spacecraft Protection Technology*

	FY 2022	FY 2023
Congressional Add: Congressional Add: Program increase - autonomy in space ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	9.849	-
Congressional Add: Congressional Add: Program increase - ground-based interferometry ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort. ***FY 2023 Plans:*** Conduct Congressionally directed effort.	5.909	2.000
Congressional Add: Congressional Add: Program increase - open architecture payloads ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	9.849	-
Congressional Add: Congressional Add: Program increase - architecture for space domain awareness beyond GEO ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	15.168	-
Congressional Add: Congressional Add: Program Increase - digital engineering and modeling for space domain awareness ***FY 2023 Plans:*** Conduct Congressionally directed effort.	-	9.500
Congressional Add: Congressional Add: Program Increase - lunar surface space domain awareness ***FY 2023 Plans:*** Conduct Congressionally directed effort.	-	4.000
Congressional Add: Congressional Add: Program Increase - SOSA-based spacecraft protection technology ***FY 2023 Plans:*** Conduct Congressionally directed effort.	-	10.000
Congressional Adds Subtotals	40.775	25.500

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 2	R-1 Program Element (Number/Name) PE 1206601SF / *Space Technology*	Project (Number/Name) 628809 / *Spacecraft Vehicle Technologies*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
628809: *Spacecraft Vehicle Technologies*	-	143.899	163.358	26.506	0.000	26.506	26.256	26.171	26.856	27.603	Continuing	Continuing

Note

Funding and thrust changes from FY 2023 to FY 2024 reflect realignment and consolidation of thrusts in PE 1206601SF/Space Technology from Project 624846/ Spacecraft Payload Technologies. The overall decrease is due to significant Congressional Adds in FY 2023 and a database error pertaining to Civilian Pay in FY 2024. Civilian Pay was assigned an incorrect project code aligning it in Budget Activity (BA) 06 (RDT&E Management Support), Project C6601Z. Funds will be transferred back to PE 1206616SF BA 02 in a follow-up technical adjustment request.

A. Mission Description and Budget Item Justification

This project is a pervasive portfolio pursuing a broad range of emerging technologies targeted for application and insertion in the future national space architecture. The project focuses on spacecraft components including, structures, power, thermal management, electronics, and robotics/logistics modules. Leap-ahead capability is provided utilizing in-house expertise and laboratories, and by leveraging the creativity and innovation of the Nation's industry, universities, and national laboratories to conduct applied research. The project maintains core competencies in astrodynamics, controls, electronics, materials, power, structures, and thermal, and provides foundational technologies supporting all space mission areas.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Power/Thermal Research	8.118	10.376	0.000
Description: Develop technologies for advanced space platform subsystems such as compact, high efficiency solar power cells and arrays, and innovative power generation concepts.			
FY 2023 Plans: Continue development of high power arrays and storage capability for small satellites including solar array structures scalable to all missions with specific power greater than 100 watts per kilogram. Continue development of power system protection capabilities to sense and warn of directed energy threats for proliferated low Earth orbit constellations and next generation US Space Force satellite buses. Continue exploration of alternative power generation sources, such as nuclear to characterize the limitations and challenges underpinning operating space systems in non-traditional orbital regimes. Continue research to enable high-pulsed power systems including generation, storage, and heat rejection technologies for small satellites.			
FY 2024 Plans: In FY 2024 this thrust will be consolidated under one thrust titled Spacecraft Component Technologies to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas.			
FY 2023 to FY 2024 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 628809 / *Spacecraft Vehicle Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 decreased compared to FY 2023 by 10.376M due to consolidation into another Thrust. In FY 2024 this thrust will be consolidated under one thrust titled Spacecraft Component Technologies to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. Therefore, an explanation of the change between FYs cannot be made in a relevant manner. This realignment did not result in any discontinuation of effort. FY to FY funding change explanations will be reflected in the new thrust beginning in FY 2025.			
Title: Space Structures and Controls Research ***Description:*** Develop revolutionary and enabling technologies, including lighter weight, lower cost, high performance structures for space platforms; guidance, navigation, and controls hardware and software for next generation of space superiority systems. ***FY 2023 Plans:*** Continue research in autonomous spacecraft flight software including verification and validation and techniques for high-fidelity simulations. Complete transition efforts in agile manufacturing, additive manufacturing, and high-performance phased arrays and antennas. Continue research to enable space logistics concepts including autonomous rendezvous, proximity operations, and docking; refueling and module upgrade; and on-orbit assembly. Continue research to develop guidance and navigation algorithms for cislunar space including novel orbits. Continue research efforts in high-performance, resilient small satellite technologies and development efforts in deployable structures, metrology, power and thermal management for tactical intelligence, surveillance, and reconnaissance missions in contested environments. ***FY 2024 Plans:*** In FY 2024 this thrust with associated funding is consolidated under one thrust titled Spacecraft Component Technologies to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by 19.280M due to consolidation into another Thrust. In FY 2024 this thrust will be consolidated under one thrust titled Spacecraft Component Technologies to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. Therefore, an explanation of the change between FYs cannot be made in a relevant manner. This realignment did not result in any discontinuation of effort. FY to FY funding change explanations will be reflected in the new thrust beginning in FY 2025.	16.388	19.280	0.000
Title: Spacecraft Component Technologies ***Description:*** Develop technology and research initiatives executed through continuous cycles of development, maturation, and assessment of component technologies. Develop revolutionary and enabling technologies including: lighter weight, lower cost, high-performance structures and thermal systems for space platforms; compact, high-efficiency solar power cells and arrays, and innovative power-generation concepts; radiation-hardened electronic devices; microelectro-mechanical system devices; advanced	0.000	0.000	26.506

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 628809 / *Spacecraft Vehicle Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
electronics packaging; guidance, navigation, and controls hardware and software; refueling and logistics module upgrade; on-orbit assembly; and high degree of freedom robotics. ***FY 2023 Plans:*** In FY 2024 the Space Electronics Research, Space Power/Thermal Research, and Space Structures and Controls Research thrusts were consolidated under the new Spacecraft Component Technologies thrust. The FY 2023 plans for the Space Electronics thrust remain in PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies, and the Space Power/Thermal and Space Structures and Controls remain in PE 1206601SF/Space Technology, Project 628809/Spacecraft Payload Technologies. ***FY 2024 Plans:*** Continue development of high power arrays and storage capability for small satellites including solar array structures scalable to all missions with specific power greater than 100 Watts per kilogram. Transition compact telescoping array to industry and initiate new efforts pushing toward landmark 40% efficiency solar cells. Transition initial development of directed energy protection capabilities for proliferated low Earth orbit constellations and next generation US Space Force satellite buses. Complete exploration of alternative power generation sources, such as nuclear to characterize the limitations and challenges underpinning operating space systems in non-traditional orbital regimes. Initiate technology development required for alternative power generation sources and next-generation US Space Force satellite buses. Transition research to enable high-pulsed power systems including generation, storage, and heat rejection technologies for small satellites. Continue research efforts in high-performance, resilient small satellite technologies and development efforts in deployable structures, metrology, power and thermal management for tactical intelligence, surveillance, and reconnaissance missions in contested environments. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 by 25.506M due to realignment and consolidation of thrusts from different Projects. In FY 2024 the Space Electronics Research, Space Power/Thermal Research, and Space Structures and Controls Research thrusts were consolidated under the new Spacecraft Component Technologies thrust. The FY 2023 plans for the Space Electronics thrust remain in PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies, and the Space Power/Thermal and Space Structures and Controls remain in PE 1206601SF/Space Technology, Project 628809/Spacecraft Payload Technologies. Therefore, an explanation of the change between FYs cannot be made in a relevant manner. This realignment did not result in a new start. FY to FY funding change explanations will be reflected in this new thrust beginning in FY 2025.			
Title: Space Experiments	34.545	8.890	0.000
Description: Develop flight experiments to improve the capabilities of existing operational space systems and to enable new transformational space capabilities. ***FY 2023 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 628809 / *Spacecraft Vehicle Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue design and build of satellite experiments demonstrating small satellite systems/sub-systems to prove performance, military utility, and enabling capabilities in autonomy, cyber resiliency and integration of commercial and government space networks for command and control (C2) of a hybrid space architecture. ***FY 2024 Plans:*** In FY 2024 this thrust is transferred to Program Element 1206616SF/Space Advanced Technology Development/Demo, Project 633834/Integrated Space Technology Demonstrations and consolidated into the Integrated Satellite Demonstrations thrust to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by 8.890M due to realignment and consolidation to a different Project. In FY 2024 this thrust is transferred to Program Element 1206616SF/Space Advanced Technology Development/Demo, Project 633834/ Integrated Space Technology Demonstrations and consolidated into the Integrated Satellite Demonstrations thrust to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. Therefore, an explanation of the change between FY's cannot be made in a relevant manner. This realignment did not result in any discontinuation of effort. FY to FY funding change explanations will be reflected in the new thrust beginning in FY 2025.			
Title: Space Communication Technologies ***Description:*** Develop technologies for next-generation space communications terminals and equipment and methods/techniques to enable future space system operational command and control concepts. ***FY 2023 Plans:*** Continue scientific research and technology development for space communications with focus on W/V-band spectrum options, laser communications, and adaptive technologies. Complete demonstration of multi-wavelength optical router. Initiate development of reconfigurable laser communication technology. Initiate demonstration of technology for positioning, navigation, and timing over laser communication links. ***FY 2024 Plans:*** In FY 2024 this thrust is realigned to PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies, and consolidated under one thrust titled Space Communication/Positioning, Navigation, & Timing Technologies to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by 14.412M due to realignment and consolidation to a different Project. In FY 2024 this thrust is realigned to PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies, and consolidated under one thrust titled Space Communication/Positioning, Navigation, & Timing Technologies to better align efforts with the DAF OIs and the USSF SSC PEO's mission areas. Therefore, an explanation of the change between FYs cannot be made in a relevant	17.089	14.412	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 628809 / *Spacecraft Vehicle Technologies*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
manner. This realignment did not result in any discontinuation of effort. FY to FY funding change explanations will be reflected in the new thrust beginning in FY 2025.			
Accomplishments/Planned Programs Subtotals	76.140	52.958	26.506

	FY 2022	FY 2023
Congressional Add: Congressional Add: Program increase - radiation hardened microprocessor ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	8.766	-
Congressional Add: Congressional Add: Program increase - lithium sulfur battery development ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	3.939	-
Congressional Add: Congressional Add: Program increase - thin-film photovoltaic energy ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort. ***FY 2023 Plans:*** Conduct Congressionally directed effort.	2.954	3.000
Congressional Add: Congressional Add: Program increase - multi-mission distributed antenna technology ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	9.849	-
Congressional Add: Congressional Add: Program increase - hybrid space architecture ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort. ***FY 2023 Plans:*** Conduct Congressionally directed effort.	4.924	5.000
Congressional Add: Congressional Add: Program increase - ultra-lightweight space solar arrays ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	4.924	-
Congressional Add: Congressional Add: Program increase - university consortia for space technology ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort. ***FY 2023 Plans:*** Conduct Congressionally directed effort.	9.849	20.000
Congressional Add: Congressional Add: Program increase - advanced multi-physics thermal management ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	4.924	-
Congressional Add: Congressional Add: Program increase - fundamental research	14.774	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 628809 / *Spacecraft Vehicle Technologies*

	FY 2022	FY 2023
FY 2022 Accomplishments: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - space solar power inc demonstration	2.856	-
FY 2022 Accomplishments: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - aerospace films for increased operational range of reconnaissance	-	6.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - 3D graphene lithium-sulfur batteries	-	5.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - L-Band active phased array demonstration	-	3.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - next generation multiband space array antenna	-	10.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - advanced analog microelectronics	-	3.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - spectrum superiority lab	-	5.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - advanced space power systems	-	9.400
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - cybersecurity for a hybrid space architecture	-	15.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - flexible solar panels	-	5.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - high efficiency lightweight RF amplifiers for LEO constellation	-	5.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - moving target engagement solutions	-	6.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 2	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*	**Project (Number/Name)** 628809 / *Spacecraft Vehicle Technologies*

	FY 2022	FY 2023
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - operational upper stage augmentation kit	-	10.000
FY 2023 Plans: Conduct Congressionally directed effort.		
Congressional Adds Subtotals	67.759	110.400

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 1206310SF *I Space Science and Technology Research and Development*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	447.472	472.493	0.000	472.493	489.580	493.127	509.703	525.104	Continuing	Continuing
634869: *Space Science and Technology Research and Development*	-	0.000	447.472	472.493	0.000	472.493	489.580	493.127	509.703	525.104	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	12	-	12	-	-	-	-		

Note

This program element includes funds for the Tranche 1 Transport Layer program, which is a Middle Tier of Acquisition effort. The total cost of the Tranche 1 Transport Layer Middle Tier of Acquistion effort is $3,199.000 million. The Tranche 1 Transport Layer program is fully funded across the Future Years Defense Program.

FY 2024 RDT&E funding for PE 1206310SF, Program 634869 is in compliance with budgeted end items per the approved test strategy and FY 2023 Omnibus, Sec. 8059.

A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is developing and demonstrating next generation space capabilities for the joint warfighter enabled by proliferation of satellites and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department of Defense (DoD) space needs as stated in the National Defense Strategy and DoD Space Vision, including low-latency tactical communication, beyond line of sight targeting, and advanced missile tracking. Specifically, SDA will demonstrate and field persistent, resilient capabilities needed to be responsive to emerging multi-domain threats against the U.S. national interest. SDA is responsible for the overall programmatic development and execution of a Proliferated Warfighter Space Architecture (PWSA). In coordination with other DoD Space stakeholders, SDA will drive the development of space capabilities to achieve the DoD Space Vision and reduce overlap and inefficiency. SDA will expand the DoD's space warfighting capability and foster growth in the U.S. space industrial base, by developing enhanced government-commercial relationships and international collaborations with key allies and partners.

While SDA is not responsible for building and fielding all capabilities within the PWSA, the Agency is responsible for orchestrating and architecting the PWSA and ensuring capability delivery to the warfighter following a spiral development approach. SDA is building and fielding the Transport Layer, a proliferated constellation of satellites to provide low-latency, beyond line of sight (BLOS), high-volume data transport for the warfighter. This transport layer will provide the space-based connectivity backbone for Joint All-Domain Command and Control (JADC2).

The establishment of a proliferated data transport layer is essential to developing a new and responsive space architecture. SDA will integrate additional constellations with this transport layer to provide multiple warfighting capabilities, such as advanced missile warning, 24/7/365 custody of time critical targets, and alternative position, navigation and timing (PNT) capabilities in navigation warfare (NAVWAR) resilient environments.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 1206310SF *I Space Science and Technology Research and Development*

This program element funds the research and development activity to deliver capabilities to U.S. joint warfighting forces in two-year tranches, beginning in FY 2022, including performing trade studies, technical analyses, or modeling and simulation; identifying and maturing enabling technologies; defining and conducting risk reduction experiments and demonstrations, prototyping hardware or software systems; and exploring novel concepts for future warfighting capabilities.

This program is in Budget Activity 3, Advanced Technology Development because this budget activity includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	460.820	690.386	0.000	690.386
Current President's Budget	0.000	447.472	472.493	0.000	472.493
Total Adjustments	0.000	-13.348	-217.893	0.000	-217.893
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-26.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	12.652			
• 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	-217.893	0.000	-217.893

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 634869: *Space Science and Technology Research and Development*		
Congressional Add: *Defense of Low-Earth Orbit Satellites*	0.000	7.652
Congressional Add: *Defense-in-Depth for Spacecraft Cybersecurity*	0.000	5.000
Congressional Add Subtotals for Project: 634869	0.000	12.652
Congressional Add Totals for all Projects	0.000	12.652

Change Summary Explanation

In FY 2022 and prior, funds for this effort were in Appropriation 0400, RDT&E BA 03, PE 126310SDA.

FY 2023 Congressional marks resulted in a net reduction of $13.348 million. Project 634869 (Space Science and Technology Research and Development) was decreased by $26.000 million for follow-on Tranches. Project 634869 was increased by $7.652 million to support defense of low-earth orbit satellites and increased by $5.000 million to develop defense-in-depth for spacecraft cybersecurity.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 1206310SF *I Space Science and Technology Research and Development*

FY 2024 decreases due to a budget realignment to RDT&E, PE 1206410SF, for continued development of the Tranche 1 and Tranche 2 Transport Layers.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Development Agency R&E	0.000	434.820	472.493

Description: Research and development activities to support development, demonstration, and fielding of a resilient military sensing and data transport capability via a proliferated space architecture in Low Earth Orbit (LEO). The funds support the development of an increasingly broad set of technologies (including alternative navigation solutions, advanced missile tracking, multi-INT fusion algorithms, integrated battle management algorithms, and next generation tactical data links) that are critical to delivering a robust initial warfighting capability in the Proliferated Warfighter Space Architecture (PWSA).

FY 2023 Plans:

Tranche 0
- Demonstrate optical inter-satellite communication links from space-to-space, space-to-air, and space- to-ground.
- Conduct tracking on-orbit operations demonstration.
- Begin testing the developed algorithms for integrated battle management command, control, and communications (BMC3) applications on-orbit.
- Demonstrate Link-16 connectivity from space vehicle to terrestrial users.
- Complete satellites launches and conduct capstone demonstration.

Tranche 1
- Complete the design and Critical Design Reviews of the Tranche 1 (T1) Transport Layer space vehicles.
- Complete the TACSATCOM radio frequency payload design and Critical Design Reviews for the T1 Demonstration and Experimentation Systems (T1DES) space vehicles.
- Begin designing the software and hardware for the battle management command, control, and communications (BMC3) Applications Factory and Applications.
- Complete Transport segment space vehicle system design.
- Complete ground operations and network integration interoperability testing.
- Conduct early initial launch vehicle studies.
- Design the T1 network mission management systems hardware and software.
- Design the BMC3 software architecture.

Tranche 2
- Finalize Minimum Viable Capability design requirements with warfighting community.
- Initiate Tranche 2 (T2) acquisition and source selection processes leading to space vehicle vendor procurement instruments.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 1206310SF / *Space Science and Technology Research and Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- Explore alternate tactical data links, waveforms, and/or APNT signals to demonstrate in T2 Demonstration and Experimentation Systems (T2DES). NExT - Complete the interface control documents of the space vehicles for the NExT Program and design the space vehicles. - Formalize agreements with partnering organizations. ***FY 2024 Plans:*** Tranche 0 - Continue to conduct post-Capstone demonstrations and experimentations with warfighters. - Test and demonstrate more complex on-orbit data fusion algorithms with tracking algorithms for BMC3 applications on-orbit. - Continue to refine optical inter-satellite communication links from space-to-space, space-to-air, and space-to-ground. - Continue tracking on-orbit operations background data collection and target of opportunity observation. - Continue testing the developed algorithms for integrated BMC3 applications on-orbit. Tranche 1 - Support on-orbit risk reduction of T1 Transport satellites. - Complete the Critical Design Review for the BMC3 Applications Factory. - Begin implementing T1 BMC3 Applications. - Coordinate a series of launches and demonstrate space vehicle interoperability and tactical data communications. - Design a BMC3 Application Factory software and hardware design. Tranche 2 - Continue Transport space vehicle system design for Link-16 and proliferate TACSATCOM capability as demonstrated via T1DES. - Continue design and analysis effort for an additional tactical data link, waveform, and/or APNT signal planned for demonstration in T2 (i.e., T2DES) and proliferation beginning with Proliferated Warfighter Space Architecture (PWSA) Tranche 3. NExT - Complete the Critical Design Review for the Partner Payload Program space vehicles. - Begin payload to space vehicle integration in preparation for launch. - Complete NExT space vehicle system design. - Begin establishing ground network systems for operations and integration with payloads. ***FY 2023 to FY 2024 Increase/Decrease Statement:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 1206310SF *I Space Science and Technology Research and Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
The increase from the FY 2023 amount to the FY 2024 amount coincides with the increased risk reduction and technology maturation efforts that are stand-alone and happening concurrently with T1 and T2 activities. It also reflects an increase in the developmental work for the T2 effort and NExT activities.			
Accomplishments/Planned Programs Subtotals	0.000	434.820	472.493

	FY 2022	FY 2023
Congressional Add: Defense of Low-Earth Orbit Satellites ***FY 2022 Accomplishments:*** N/A ***FY 2023 Plans:*** Rapidly prototype, evaluate, and iterate on a product that provides human operators with an enhanced human-machine interface intended to bolster space system situational awareness and maintain/ restore reliance via human-space system trust calibration on critical spacecraft systems, constellations, and command and control (C2). Provide machine-speed assistance in developing tactics, techniques, and procedures (TTPs) to return the space system to a trustworthy state once a system is degraded and/or a compromise is suspected/detected.	0.000	7.652
Congressional Add: Defense-in-Depth for Spacecraft Cybersecurity ***FY 2022 Accomplishments:*** N/A ***FY 2023 Plans:*** Research, design, test, and deploy cyber defense-in-depth techniques and algorithms for proliferated LEO class space vehicles. This will lay the foundation for SDA's PWSA architecture against cyber and intrusion exploitation.	0.000	5.000
Congressional Adds Subtotals	0.000	12.652

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• RDTE 03 1206310SDA: *Space Development Agency R&E*	166.615	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

For FY 2022 and prior, this work is performed in Appropriation 0400, BA 3, PE 1206310SDA, Space Science and Technology Research and Development, Project 012, Space Development Agency R&E.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 1206310SF *I Space Science and Technology Research and Development*

E. Acquisition Strategy

Partners for these activities include DoD research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, University Affiliated Research Centers, Missile Defense Agency (MDA), Space Systems Command (SSC), and Defense Advanced Research Projects Agency (DARPA). SDA is also a potential transition partner for technology developers seeking to conduct on-orbit experimentation and prototyping.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 3: *Advanced Technology Development (ATD)*					R-1 Program Element (Number/Name) PE 1206616SF / *Space Advanced Technology Development/Demo*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	227.481	167.423	110.033	0.000	110.033	103.000	105.404	107.322	111.238	Continuing	Continuing
633834: *Integrated Space Technology Demonstrations*	-	73.001	72.256	65.731	0.000	65.731	63.700	65.205	66.485	68.881	Continuing	Continuing
634868: *Maui Space Surveillance System*	-	18.997	15.921	10.667	0.000	10.667	10.983	11.245	11.290	11.746	Continuing	Continuing
634922: *Space & Missile Rocket Propulsion*	-	58.760	59.342	22.629	0.000	22.629	23.326	23.841	24.330	25.206	Continuing	Continuing
63682J: *Spacecraft Vehicles*	-	76.723	19.904	11.006	0.000	11.006	4.991	5.113	5.217	5.405	Continuing	Continuing

A. Mission Description and Budget Item Justification

This program focuses on four major areas. First, integrated space technology demonstrations, is a series of advanced technology demonstrations designed to address mission needs by applying emerging technologies from the Air Force Research Laboratory, other United States government laboratories, and industry. Second, the program focuses on ground-based optical space situational awareness technology development and demonstration at the Maui Space Surveillance System in Hawaii, as well as the operation and upgrade of the facility. Third, the program develops and demonstrates advanced and innovative low-cost high performance satellite propulsion technologies and components. The last major area, spacecraft vehicles, focuses on developing technologies for next-generation space communications terminals and equipment. Efforts in this program have been coordinated through the Department of Defense Science and Technology Executive Committee process to harmonize efforts and eliminate duplication.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver science & technology capabilities. The use of such program funds would be in addition to civilian pay expenses budgeted in program element 1206601SF.

This program element may include necessary expenses to support the operation and maintenance of facilities to manage, execute, and deliver science and technology capabilities.

The Department of the Air Force technologies in this program are both enabling and enduring as we invest in maturing emerging technologies that address established mission gaps, and transformational technologies that address integrated enterprise capabilities intended to reshape the future force across air, space, and cyber warfighting domains. Development of transformational operational capabilities through advanced technology solutions focuses on five strategic capabilities: Global Persistent Awareness; Resilient Information Sharing; Rapid, Effective Decision-Making; Complexity, Unpredictability, and Mass; and Speed and Reach of Disruption and Lethality.

This program is in Budget Activity 3, Advanced Technology Development because this budget activity includes development of subsystems and components and efforts to integrate subsystems and components into system prototypes for field experiments and/or tests in a simulated environment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 1206616SF *I Space Advanced Technology Development/Demo*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	238.584	103.395	104.937	0.000	104.937
Current President's Budget	227.481	167.423	110.033	0.000	110.033
Total Adjustments	-11.103	64.028	5.096	0.000	5.096
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	64.028			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-3.066	0.000			
• SBIR/STTR Transfer	-8.037	0.000			
• Other Adjustments	0.000	0.000	5.096	0.000	5.096

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 633834: *Integrated Space Technology Demonstrations*		
Congressional Add: *Congressional Add: Project increase - core manipulator joint*	1.608	-
Congressional Add: *Congressional Add: Program increase - accelerate cislunar flight experiment*	35.788	20.000
Congressional Add: *Congressional Add: Program increase - space research hub*	-	4.000
Congressional Add Subtotals for Project: 633834	37.396	24.000
Project: 634868: *Maui Space Surveillance System*		
Congressional Add: *Congressional Add: Program increase - accelerate cislunar flight experiment*	8.000	-
Congressional Add Subtotals for Project: 634868	8.000	-
Project: 634922: *Space & Missile Rocket Propulsion*		
Congressional Add: *Congressional Add: Program increase - tridyne multi-mode propulsion*	6.764	3.000
Congressional Add: *Congressional Add: Program increase - accelerate cislunar flight experiment*	15.461	-
Congressional Add: *Hall multi-mode propulsion Tech*	-	3.000
Congressional Add: *Additive Mfg of solid rocket propellant*	-	3.000
Congressional Add: *Commercial Space Access Improvements*	-	5.000
Congressional Add: *Congressional Add: Program increase - upper stage engine technology*	22.225	23.400

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 3: *Advanced Technology Development (ATD)*	**R-1 Program Element (Number/Name)** PE 1206616SF *I Space Advanced Technology Development/Demo*

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Congressional Add Subtotals for Project: 634922	44.450	37.400
Project: 63682J: *Spacecraft Vehicles*		
Congressional Add: *Congressional Add: Program increase - nuclear propulsion technologies for cislunar flight*	67.642	-
Congressional Add Subtotals for Project: 63682J	67.642	-
Congressional Add Totals for all Projects	157.488	61.400

Change Summary Explanation

FY 2024: The Department of Defense increased funding by $5.000M for initiating the Orbital Prime effort.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 3	R-1 Program Element (Number/Name) PE 1206616SF / *Space Advanced Technology Development/Demo*	Project (Number/Name) 633834 / *Integrated Space Technology Demonstrations*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
633834: *Integrated Space Technology Demonstrations*	-	73.001	72.256	65.731	0.000	65.731	63.700	65.205	66.485	68.881	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Additional FY24 funds of 2.831M for the Maui Space Surveillance System Civilian pay were inadvertently put into this BPAC. Funds will be realigned upon enactment.

A. Mission Description and Budget Item Justification

This project is a series of advanced technology demonstrations designed to address mission needs by applying emerging technologies from the Air Force Research Laboratory, other United States government laboratories, and industry. These technologies are integrated into system-level demonstrations that are used to test, evaluate, and validate the technologies in a relevant environment.

This project includes the initiation and development of programs addressing Department of the Air Force (DAF) capability gaps and provides technologies for transformational future force capabilities. Transformational efforts will be identified through a competitive process and be responsive to DAF design priorities. Selected efforts will be designated as transformational, indicating enterprise-level priority.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Integrated Satellite Demonstrations	27.498	20.679	21.887
Description: Develop satellite technologies for integrated, robust, and flexible satellite demonstrations building on previous work and leveraging investments by other organizations.			
FY 2023 Plans: Continue mission-level military utility analyses of technology and associated architectures and employment concepts across multi-domain mission areas. Continue refining guidelines and checkpoints for concept maturation evaluations in context of emerging space technologies. Continue to evolve processes for applying model-based systems engineering into technology decision-making and flight experiment design. Continue design and build of satellite experiments demonstrating small satellite systems/ sub-systems to prove performance, military utility, and enabling capabilities in autonomy, cyber resiliency and integration of commercial and government space networks for command and control (C2) of a hybrid space architecture.			
FY 2024 Plans: Continue development of integrated satellite demonstrations of key space technologies across multi-domain mission areas. Continue design, build, and test of small satellite missions with a focus on capabilities in autonomy, cyber resiliency, and			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 3	**R-1 Program Element (Number/Name)** PE 1206616SF / *Space Advanced Technology Development/Demo*	**Project (Number/Name)** 633834 / *Integrated Space Technology Demonstrations*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
integration of commercial, allied, and government space networks for command and control (C2) of a hybrid space architecture. Continue evolution of the space center of excellence to accelerate transition of space capabilities to the joint warfighter. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY24 increased to support continued development, design, build, and test of small satellite missions with a focus on capabilities in autonomy, cyber resiliency, and integration of commercial, allied, and government space networks for command and control (C2) of a hybrid space architecture. Continue evolution of the space center of excellence to accelerate transition of space capabilities to the joint warfighter.			
Title: Transformational Technology Development ***Description:*** Continually funded effort. This funding allocation will initiate new and continue existing Transformational Technology Development efforts. The Transformational Technology Development program will select new projects, in alignment with mission focused areas which include, but are not limited to: Intelligent Planning and Wargaming, Battlespace Awareness, and other multi-domain operations capabilities. Investments focus on technology development efforts including, but are not limited to technologies to enhance survivability, operability and performance of personnel, sensors, and structures in a threat environment through space technology demonstrations for cislunar space situational awareness, autonomy demonstrations, and space logistics. These technologies advance autonomy in space to ensure that space services are available to the joint warfighter, countering adversary threats by getting inside adversary Observe, Orient, Decide, Act (OODA) loops, operating satellites in novel distant regimes, and performing complex robotic tasks on orbit. This investment is overseen by senior representatives from Air and Space Forces who participate in the submission, initial review, and down-selection of Transformational Technology Development proposed efforts. Final selections will be reviewed by the Air Force Deputy Assistant Secretary for Science, Technology, and Engineering before a final recommendation for Congressional approval is made. ***FY 2023 Plans:*** Continue experimentation to demonstrate logistics and situational awareness in orbits beyond Geosynchronous Earth Orbit. Initiate projects selected from the annual WARTECH process that investigate Department of the Air Force prioritized topics. Continue to perform modeling, simulation, and analyses to establish the future force effect of candidate Transformational Component investments and continue the next cycle of WARTECH process. ***FY 2024 Plans:*** Continue experiment demonstrating advanced space situational awareness and multi-agent satellite inspection with integration and test of payloads for rendezvous, proximity operations, and docking. Initiate integration of payloads for cislunar space	8.107	27.577	26.475

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 3	**R-1 Program Element (Number/Name)** PE 1206616SF / *Space Advanced Technology Development/Demo*	**Project (Number/Name)** 633834 / *Integrated Space Technology Demonstrations*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
situational awareness (beyond Geosynchronous Orbit) experiment to satellite bus. Continue experiment demonstrating space logistics with ground testing of robotic payload software and end-to-end demonstration of propulsion module swap. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased as compared to FY 2023 by 1.102M due to higher USSF priorities.			
Title: Modeling and Simulation Tools for Space Applications ***Description:*** Provide modeling, simulation, and analysis for technology evolution in space-based terrestrial surveillance systems, precision navigation and timing, space domain awareness, satellite communications, space environment monitoring, and space control payloads. ***FY 2023 Plans:*** In FY 2024 the Modeling and Simulation Tools for Space Applications thrust is transferred to Program Element (PE) 1206616SF/ Space Advanced Technology Development/Demo, Project 633834/Integrated Space Technology Demonstrations, to better align projects focused on the DAF Operational Imperative for Space Order of Battle, and in line with the USSF Space System Command's Program Executive Office's mission areas. The FY 2023 Plans for the Modeling and Simulation Tools for Space Applications thrust remain in PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies. ***FY 2024 Plans:*** Continue mission-level military utility analyses of technology and associated architectures and employment concepts across multi-domain mission areas. Continue refining guidelines and checkpoints for concept maturation evaluations in context of emerging space technologies. Continue to evolve processes for applying model-based systems engineering into technology decision-making and flight experiment design. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 by 8.852M due to realignment from a different Project. In FY 2024 the Modeling and Simulation Tools for Space Applications thrust is transferred to Program Element (PE) 1206616SF/Space Advanced Technology Development/Demo, Project 633834/Integrated Space Technology Demonstrations, to better align projects focused on the DAF Operational Imperatives, and in line with the USSF Space System Command's Program Executive Office's mission areas. The FY 2023 Plans for the Modeling and Simulation Tools for Space Applications thrust remain in PE 1206601SF/Space Technology, Project 624846/Spacecraft Payload Technologies.	-	0.000	8.852
Title: Agile Space Operations Technology ***Description:*** Develop, provide, and leverage agile software development platforms and pipelines that support pain point identification and rapid software application prototyping, operational evaluation, operator/Guardian effectiveness, and certification in support of USSF operators in collaboration with commercial partners.	-	0.000	3.517

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 3	**R-1 Program Element (Number/Name)** PE 1206616SF / *Space Advanced Technology Development/Demo*	**Project (Number/Name)** 633834 / *Integrated Space Technology Demonstrations*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: In FY 2024 the Agile Space Operations Technology effort was separated as a stand alone thrust under PE 1206616SF/Space Advanced Technology Development/Demo, Project 633834/Integrated Space Technology Demonstrations, to better align projects focused on the DAF Operational Imperative for Space Order of Battle, and in line with the USSF Space System Command's Program Executive Office's mission areas. FY 2023 Plans were included in PE 1206601SF/Space Technology, Project 625018/ Spacecraft Protection Technology as part of the Space Control thrust. ***FY 2024 Plans:*** Continue to focus on tactical level exploratory development and transition of emerging technologies, refine an environment to perform agile software development and delivery through user focused collaboration and commercial partnerships, and to work with USSF Field Commands and SAF to develop and field a variety of software applications to the USSF Space Delta Units and improve Guardian performance. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 by 3.517M due to realignment from a different Program Element. In FY 2024 the Agile Space Operations Technology effort was separated as a stand alone thrust under PE 1206616SF/Space Advanced Technology Development/Demo, Project 633834/Integrated Space Technology Demonstrations, to better align projects focused on the DAF Operational Imperatives and in line with the USSF Space System Command's Program Executive Office's mission areas. FY 2023 Plans were included in PE 1206601SF/Space Technology, Project 625018/Spacecraft Protection Technology as part of the Space Control thrust.			
Title: Orbital Prime ***Description:*** SpaceWERX Orbital Prime will transition agile, affordable, and accelerated space capabilities, reducing risk to the global commons to rapidly field In-space Servicing, Assembly, Manufacturing (ISAM) capabilities. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** Pair funding with capabilities being matured through the SpaceWERX Small Business Innovation Research/Small Business Technology Transfer (SBIR/STTR) pipeline set aside for Orbital Prime, which includes Strategic Funding Increase (STARTFI) matching consideration, and to seed a Prize Challenge such as through the private sector X-Prize program. ***FY 2023 to FY 2024 Increase/Decrease Statement:***	-	0.000	5.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 3	**R-1 Program Element (Number/Name)** PE 1206616SF / *Space Advanced Technology Development/Demo*	**Project (Number/Name)** 633834 / *Integrated Space Technology Demonstrations*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Orbital Prime efforts are a new start for FY24.			
Accomplishments/Planned Programs Subtotals	35.605	48.256	65.731

	FY 2022	FY 2023
Congressional Add: Congressional Add: Project increase - core manipulator joint ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	1.608	-
Congressional Add: Congressional Add: Program increase - accelerate cislunar flight experiment ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort. ***FY 2023 Plans:*** Conduct Congressionally directed effort.	35.788	20.000
Congressional Add: Congressional Add: Program increase - space research hub ***FY 2023 Plans:*** Conduct Congressionally directed effort.	-	4.000
Congressional Adds Subtotals	37.396	24.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 3	R-1 Program Element (Number/Name) PE 1206616SF / *Space Advanced Technology Development/Demo*	Project (Number/Name) 634868 / *Maui Space Surveillance System*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
634868: *Maui Space Surveillance System*	-	18.997	15.921	10.667	0.000	10.667	10.983	11.245	11.290	11.746	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program funds ground-based optical space situational awareness technology development and demonstration at the Maui Space Surveillance System in Hawaii, as well as the operation and upgrade of the experimental equipment and required facilities. Efforts in this program have been coordinated through the Department of Defense Science and Technology Executive Committee process to harmonize efforts and eliminate duplication.

A civilian pay adjustment should have been applied to this Project in the previous cycle to correct a Project code such that the BPAC aligns to PE 1206616SF, Project 634868 under Budget Activity 03. This fix reverses a previous error that aligned this BPAC to Budget Activity (BA) 06 (RDT&E Management Support) resulting in the unintentional creation of Project C6601Z in PE 1206616SF under BA 06.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Operate and Upgrade Maui Space Surveillance System	10.997	15.921	10.667
Description: Operate, sustain, and upgrade the Maui Space Surveillance System to support development, demonstration, and integration of ground-based optical space domain awareness technologies for use in R&D, as well as for missions conducted by the Space Operations Command DELTA 2/15 Space Surveillance Squadron (SPOC/DEL2/15SPSS). ***FY 2023 Plans:*** Continued to maintain the Maui Space Surveillance System R&D facilities and experimental equipment in a mission-ready state, including needed upgrades and modernization to keep the R&D facilities and equipment in good working order to perform efficiently and reliably. Continued to operate Maui Space Surveillance System R&D facilities for development and demonstration of ground based space domain awareness capabilities in conjunction with customer programs and to contribute to the SPOC/DEL2/15SPSS's operational Space Domain Awareness mission. Continued to collect observations of satellites as requested by mission partners. As needed, operated the prototype regional wide-area-search of the geosynchronous belt in the Pacific AOR ahead of the fielding of the joint Space Systems Command + Australian Space Surveillance Telescope facility. Continued to host missions in the Pacific AOR for DoD components and other government agencies. ***FY 2024 Plans:*** Continue to maintain the Maui Space Surveillance System R&D facilities and experimental equipment in a mission-ready state, including needed upgrades and modernization to keep the R&D facilities and equipment in good working order to perform efficiently and reliably. Continue to operate Maui Space Surveillance System R&D facilities for development and demonstration			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 3	**R-1 Program Element (Number/Name)** PE 1206616SF / *Space Advanced Technology Development/Demo*	**Project (Number/Name)** 634868 / *Maui Space Surveillance System*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
of ground-based space domain awareness capabilities in conjunction with customer programs and to contribute to the SPOC/ DEL2/15SPSS's operational Space Domain Awareness mission. Continue to collect observations of satellites as requested by mission partners. As needed, operate the prototype regional wide-area-search of the geosynchronous belt in the Pacific AOR ahead of the fielding of the joint Space Systems Command + Australian Space Surveillance Telescope facility. Begin construction of the new Air Force Maui Optical and Supercomputing (AMOS) facility funded under MILCON authority. Begin re-construction of the Small Telescope Advanced Research site. Continue to host missions in the Pacific AOR for DoD components and other government agencies. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY24 decreased from FY23 by $5.254M. Decrease was due to realignment of funds from PE 1206616SF, Project 634868 to PE 1206601SF, Project 624866. In addition, a civilian pay adjustment should have been applied to this Project in the previous cycle to correct this Project code to align PE 1206616SF, Project 634868 under Budget Activity 03. This adjustment would have reversed a previous error that aligned this BPAC to Budget Activity (BA) 06 (RDT&E Management Support) resulting in the unintentional creation of Project C6601Z in PE 1206616SF under BA 06. This correction has not been processed.			
Accomplishments/Planned Programs Subtotals	10.997	15.921	10.667

	FY 2022	FY 2023
Congressional Add: Congressional Add: Program increase - accelerate cislunar flight experiment	8.000	-
FY 2022 Accomplishments: Conduct Congressionally directed effort.		
Congressional Adds Subtotals	8.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 3	R-1 Program Element (Number/Name) PE 1206616SF / *Space Advanced Technology Development/Demo*	Project (Number/Name) 634922 / *Space & Missile Rocket Propulsion*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
634922: *Space & Missile Rocket Propulsion*	-	58.760	59.342	22.629	0.000	22.629	23.326	23.841	24.330	25.206	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops and demonstrates advanced and innovative low-cost rocket turbo-machinery and components, and low-cost space launch propulsion technologies. Characteristics such as environmental acceptability, affordability, reliability, responsiveness, reduced weight, and reduced operation and launch costs are emphasized. Increased life and performance of propulsion systems are key goals. Technology areas investigated include ground demonstrations of compact, lightweight, advanced propulsion technologies, higher efficiency energy conversion systems (derived from an improved understanding of combustion fundamentals), and high-energy propellants. Technological advances in this project could improve the performance of expendable payload capabilities by approximately twenty to fifty percent and reduce launch, operations, and support costs by approximately thirty percent. Responsiveness and operability of propulsion systems will be enhanced for reusable launch systems. The efforts in this project contribute to the sustainment of the rocket propulsion industry, providing rocket propulsion technology for the entire Department of Defense (DoD) and National Aeronautics and Space Administration (NASA). The efforts in this project are reviewed by a DoD level steering committee annually for relevance to DoD missions, and the associated support costs.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Liquid Rocket Propulsion Technologies	8.161	9.530	9.828
Description: Develop liquid rocket propulsion technology for current and future space launch vehicles. Demonstrate technologies and concepts of operation supporting rapid launch capability.			
FY 2023 Plans: Continue modular engine feasibility to address scalability, applicability, testability, and life cycle cost for National Security Space applications. Continue development of disruptive engine concepts/cycles for liquid propellant engines, engine system components, and control for space launch system. Initiate evaluation of austere location launch capability with commercial partners and demonstration opportunities. Continue coordination of technology transition opportunities for space access to manage technology insertion and evaluate capabilities for rocket engine hardware and related systems.			
FY 2024 Plans: Continue modular engine feasibility to address scalability, applicability, testability, and life cycle cost for National Security Space applications. Continue development of disruptive engine concepts/cycles for liquid propellant engines, engine system components, and control for space launch system. Continue evaluation of austere location launch capability with commercial partners and demonstration opportunities, driving towards a sustainable rapid launch capability. Continue coordination of technology transition opportunities for space access to manage technology insertion and evaluate capabilities for rocket engine			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 3	**R-1 Program Element (Number/Name)** PE 1206616SF / *Space Advanced Technology Development/Demo*	**Project (Number/Name)** 634922 / *Space & Missile Rocket Propulsion*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
hardware and related systems. Initiate a digital framework for space access planning, integration, modeling and logistical areas to facilitate rapid launch capabilities. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2024 increased compared to FY2023 by $0.298 million. Funding increase due to increase in fuel costs for testing operations.			
Title: On-Orbit Propulsion Technologies ***Description:*** Develop solar electric, electric, and monopropellant propulsion technologies for existing and future satellites, upper stages, orbit transfer vehicles, and satellite maneuvering. ***FY 2023 Plans:*** Continue to develop and transition experimental, modeling and simulation, and theoretical efforts geared towards advanced thruster development with emphasis on understanding thrust scale-up. Continue analysis and development of multi-mode propulsion opportunities to combine high efficiency and high thrust capabilities on a common propellant. Continue thrust scale-up effort for advanced non-toxic propellant for use in monopropellant thrusters and electric propulsion thruster for a multi-mode propulsion capability. Initiate flight-weight design and development of multimode propulsion flight system combining capabilities of chemical thrusters and electric propulsion thrusters and utilizing a single common propellant for greater operational potentiality. ***FY 2024 Plans:*** Continue to develop and transition experimental, modeling and simulation, and theoretical efforts geared towards advanced thruster development with emphasis on understanding thrust scale-up. Continue analysis and development of multi-mode propulsion opportunities to combine high efficiency and high thrust capabilities on a common propellant. Continue thrust scale-up effort for advanced non-toxic propellant for use in monopropellant thrusters and electric propulsion thrusters for a multi-mode propulsion capability. Continue flight-weight design and development of multimode propulsion flight system combining capabilities of chemical thrusters and electric propulsion thrusters and utilizing a single common propellant for greater operational potentiality. Initiate design and development of high power electric propulsion thrusters for enhanced maneuver capability. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2024 increased compared to FY2023 by $0.389 million. Funding increase due to hardware purchases for upcoming flight demonstration.	6.149	12.412	12.801
Accomplishments/Planned Programs Subtotals	14.310	21.942	22.629

	FY 2022	FY 2023
Congressional Add: Congressional Add: Program increase - tridyne multi-mode propulsion	6.764	3.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 3	**R-1 Program Element (Number/Name)** PE 1206616SF / *Space Advanced Technology Development/Demo*	**Project (Number/Name)** 634922 / *Space & Missile Rocket Propulsion*

	FY 2022	FY 2023
FY 2022 Accomplishments: Conduct Congressionally directed effort. ***FY 2023 Plans:*** Conduct Congressionally directed effort.		
Congressional Add: Congressional Add: Program increase - accelerate cislunar flight experiment ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort.	15.461	-
Congressional Add: Hall multi-mode propulsion Tech ***FY 2023 Plans:*** Conduct Congressionally directed effort.	-	3.000
Congressional Add: Additive Mfg of solid rocket propellant ***FY 2023 Plans:*** Conduct Congressionally directed effort.	-	3.000
Congressional Add: Commercial Space Access Improvements ***FY 2023 Plans:*** Commercial Space Access Improvements	-	5.000
Congressional Add: Congressional Add: Program increase - upper stage engine technology ***FY 2022 Accomplishments:*** Conduct Congressionally directed effort. ***FY 2023 Plans:*** Conduct Congressionally directed effort.	22.225	23.400
Congressional Adds Subtotals	44.450	37.400

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 3	R-1 Program Element (Number/Name) PE 1206616SF / *Space Advanced Technology Development/Demo*	Project (Number/Name) 63682J / *Spacecraft Vehicles*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
63682J: *Spacecraft Vehicles*	-	76.723	19.904	11.006	0.000	11.006	4.991	5.113	5.217	5.405	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project develops and demonstrates technologies critical to addressing documented military satellite communications capability gaps and top-ranked United States Space Force (USSF) and/or Space Systems Command (SSC) technology needs.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Communication Technologies	9.081	19.904	11.006
Description: Develop technologies for next-generation space communications terminals and equipment, along with methods/techniques to enable future space system operational command and control concepts. ***FY 2023 Plans:*** Continue support of W/V-band propagation flight experiment. Continue beacon ground terminal operations, maintenance, and redeployments. Continue collection and analysis of additional data to statistically characterize atmospheric propagation effects and correlate to meteorological parameters. Continue technology research and development work to address military space communications capability needs. Complete fabrication and space-qualification of V-band high power amplifiers. Complete development of W/V-band transponder flight experiment, coupled with cross-links. Initiate integration and testing of flight experiment engineering unit in preparation for launch and demonstration. Continue systems engineering and technology risk-reduction for W/V-band ground terminals. ***FY 2024 Plans:*** Initiate W/V-band transponder integration and testing activities. Prepare integrated payload for launch. Finish development of ground terminal capabilities to support transponder testing and experimentation. Continue on-orbit beacon experiment, including mission support, transmission of test signals, operation of ground receiver terminals, collection and archiving of data, monitoring of environmental conditions, and analysis of environmental impacts on W/V propagation. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 by 8.898M due to anticipated completion and delivery of W/V-band transponder unit.			
Accomplishments/Planned Programs Subtotals	9.081	19.904	11.006

	FY 2022	FY 2023
Congressional Add: Congressional Add: Program increase - nuclear propulsion technologies for cislunar flight	67.642	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 3	**R-1 Program Element (Number/Name)** PE 1206616SF / *Space Advanced Technology Development/Demo*	**Project (Number/Name)** 63682J / *Spacecraft Vehicles*

	FY 2022	FY 2023
FY 2022 Accomplishments: Conduct congressionally directed effort.		
Congressional Adds Subtotals	67.642	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604002SF *I Space Force Weather Services Research*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.816	0.849	0.000	0.849	0.865	0.886	0.904	0.936	Continuing	Continuing
645353: *SF Weather Services Research*	-	0.000	0.816	0.849	0.000	0.849	0.865	0.886	0.904	0.936	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This budget activity funds the development necessary to evaluate integrated technologies and models for future operationalization into segments of the Space Force Weather Services (SFWS) in support of the 2018 National Defense Strategy's (NDS) three lines of effort. To improve readiness for a more lethal force, SFWS provides timely, accurate, resilient and relevant environmental information, to include space and terrestrial weather, for global battlespace situational awareness for Air Force (AF), Army, Special Operations Forces (SOF), Space Force (USSF), combatant commands, the Intelligence Community (IC), and other government agencies. SFWS capabilities at home station and deployed provide critical environmental information in support of decision makers to gain the asymmetric advantage during the full spectrum of air and space combat operations. SFWS development enhances the lethality, effectiveness, and survivability of AF & SF weapon systems and precision munitions by modernizing capability and seeking the military advantage to accurately predict friendly and foe environmental impacts to optimize mission execution and planning, targeting, weaponeering, battle damage assessment, and space systems operations. To strengthen alliances and partnerships, SFWS development efforts integrate Department of Defense (DoD), government agency, commercial, and international partner environmental data with SFWS information system equipment for processing, storing, exploiting, and disseminating all-domain weather information for analysis, forecasting, mission integration, and greater interoperability. To ensure greater performance and affordability for the AF and SF, SFWS systems are being modernized through improvements to architecture and system efficiency, cybersecurity, joint all-domain command and control (JADC2) and sensing grid integration, migration to cloud computing, and expanding agile software development practices.

SFWS 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. A portion of the Weather Forecasting capability is addressed by RDT&E, BA 04, PE 0604002S, Project 645353 - Space Force Weather Services Research.

Weather Forecasting provides global and regional advanced scientific numerical weather prediction capabilities for automated, high-resolution forecast products for mission planning and execution. Space weather modeling assists in characterizing and forecasting the near-earth environment to the sun and enables space weather anomaly and space weather impact assessments. Weather Forecasting includes activities for Numerical Weather Modeling (NWM) and Space Weather Analysis and Forecast System (SWAFS). SWAFS is a software suite of 47 models and 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.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SFWS for weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604002SF / *Space Force Weather Services Research*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.816	0.845	0.000	0.845
Current President's Budget	0.000	0.816	0.849	0.000	0.849
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

Change Summary Explanation

FY 2024: +0.004M inflation increase for non-pay and non-fuel purchases.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Weather Analysis and Forecast System (SWAFS) Radio Frequency Ionospheric Scintillation Application (RISA version 2) software upgrade	0.000	0.816	0.849

Description: SWAFS RISA is an Air Force Research Laboratory (AFRL) Analysis of Alternatives (AoA) to upgrade software allowing use of model algorithms that utilize sensor packages on the Constellation Observing System to monitor Meteorology, Ionosphere, and Climate (COSMIC II) to understand space environment conditions affecting satellites and communications. Johns Hopkins University/Applied Physics Lab (JHU/APL) will perform model upgrades to Ionospheric Data Assimilation - Four Dimensional (IDA4D) to ensure compatibility with a Gov Cloud environment within the SWAFS Space Domain Awareness Environmental Toolkit - for Defense (SET4D) baseline.

FY 2023 Plans:

AFRL continues prototype development of solar forecasting tools. JHU/APL will develop IDA4D and upgrade Ovation Prime 2013 Auroral boundary models for compatibility with the SET4D cloud environment. These models deliver global ionospheric density predictions and inform pilots and radar operators of the hazards to radio communication operations when flying near the poles and it supports early warning radar operators in determining environment impacts to operate their radars during high peak aurora times. Begin development of the Radio Frequency Ionospheric Scintillation Analysis Tool (RISA v2) upgrade applications for data exploitation of advanced data Integrity tools that include: Wideband Satellite Communication Support (Mobile User Objective System (MUOS); Constellation Observing System for Meteorology, Ionosphere, and Climate (COSMIC-2) electron density Ion Velocity Meter (IVM) Algorithm; Global-scale Observations of the Limb and Disk/Ionospheric Connection Explorer (GOLD/ICON)

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 0604002SF *I Space Force Weather Services Research*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Ultraviolet Variability Data Assimilation; Global Navigation Satellite Systems (GNSS) Integration, and Rate of Total Electron Content Index (ROTI) exploitation. Additionally, numerous models such as Ovation Prime and IDA4D require re-architecture to ensure compatibility with the SET4D baseline to be operated within a Gov-Cloud environment. ***FY 2024 Plans:*** AFRL continues development of Radio frequency Ionosopheric Scintillation Application v2.0, Solar Forecasting System (SFS), and Ultra High Frequency (UHF) communication prototype AoAs. JHU/APL develops observation support from Super-Darn ground system and and Space-Based JHU/APL prototypes to begin initial evaluation of National Defense Authorization Act 2021 Arctic strategy. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to inflation.			
Accomplishments/Planned Programs Subtotals	0.000	0.816	0.849

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• RDTE 07 0305111F: *Weather Service*	3.365	-	-	-	-	-	-	-	-	0.000	3.365
• RDTE 07 1203940S: *Space Situation Awareness Operations*	-	3.144	3.913	-	3.913	3.099	3.196	3.257	3.372	Continuing	Continuing

Remarks

E. Acquisition Strategy

SWAFS will use individual Federal Acquisition Regulation (FAR) based and rapid acquisition contracting methods, as well as AFRL for development works (Technology Readiness Level (TRL) 6 and below) to develop AoA, design solutions, and prototype code.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 0604002SF / *Space Force Weather Services Research*	Project (Number/Name) 645353 / *SF Weather Services Research*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SWAFS Scintillation Nowcast Forecast Model Update AoA	PO	AFRL : Kirtland AFB, NM	-	-		0.816	Jan 2023	0.424	Jan 2024	-		0.424	0.000	1.240	-
Space Weather Model Upgrade Development	PO	JHU/APL : Laurel, MD	-	-		-		0.425	Jan 2024	-		0.425	Continuing	Continuing	-
		Subtotal	-	-		0.816		0.849		-		0.849	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.816		0.849		-		0.849	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 0604002SF / *Space Force Weather Services Research*	**Project (Number/Name)** 645353 / *SF Weather Services Research*

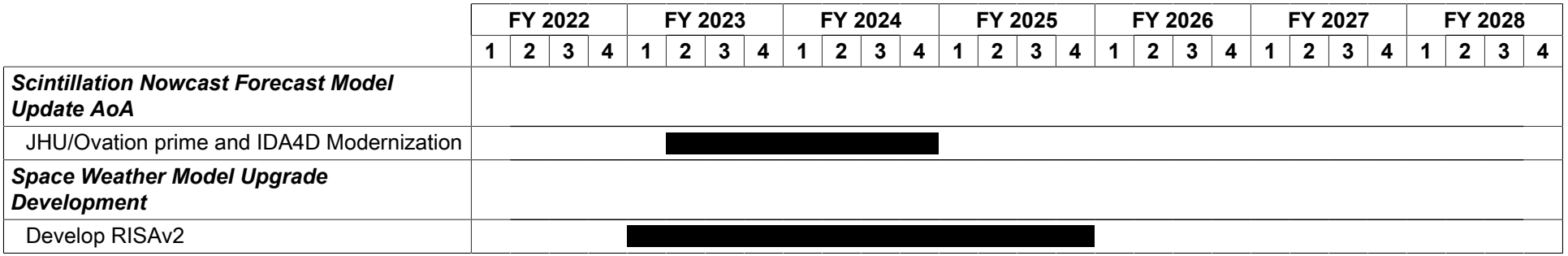

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 0604002SF / *Space Force Weather Services Research*	**Project (Number/Name)** 645353 / *SF Weather Services Research*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Scintillation Nowcast Forecast Model Update AoA				
JHU/Ovation prime and IDA4D Modernization	2	2023	4	2024
Space Weather Model Upgrade Development				
Develop RISAv2	1	2023	4	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203010SF *I Space Force IT, Data Analytics, Digital Solutions*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	61.723	0.000	61.723	62.312	57.088	57.587	58.934	Continuing	Continuing
645620: *Digital Engineering*	-	0.000	0.000	40.815	0.000	40.815	40.967	35.294	35.332	36.211	Continuing	Continuing
646017: *SSC Developmental IT Infrastructure*	-	0.000	0.000	20.908	0.000	20.908	21.345	21.794	22.255	22.723	Continuing	Continuing

Note

In FY 2024, PE 1206427S, Space Systems Prototype Transitions (SSPT), Project 645601, Digital Engineering Interconnected, Cloud-based Ecosystem (DEICE) Tech Stack, was transferred to PE 1203010SF, Space Force IT, Data Analysis, Digital Solutions, Project 645620, Digital Engineering, to consolidate Space Force digital engineering efforts. It is not a New Start.

In FY 2024, 20.814M was transferred from all Space Systems Command (SSC) program elements to PE 1203010SF, Space Force IT, Data Analysis, Digital Solutions, Project 646017, SSC Developmental IT Infrastructure, for SSC Chief Information Office Headquarters functions and integrated cybersecurity. It is not a New Start.

A. Mission Description and Budget Item Justification

This program investigates, develops, and analyzes space related capabilities to digitize the Space Domain Awareness and Protect and Defend portfolios to promote further efficiency and speed. It will conduct a wide array of activities to model, integrate, and test existing and future capabilities through a Multi-Level Security (MLS) Architecture. It will provide a pathway for data integration with various Authoritative Sources of Truth (ASOT) and Single Sources of Truth (SSOT). The supported activities include: system engineering, data engineering, data science, prototype mock up, demonstrations and testing, as well as modeling simulations and analysis related to Space Domain Awareness and Protect Defend capabilities through highly complex Space Command and Control (C2) systems traceable to a Digital Engineering Interconnected, Cloud-based Ecosystem (DEICE) Tech Stack. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capabilities sooner, Space Systems Command (SSC) will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities. This includes the development and prototyping of critical technology within the Department of Defense (DoD) across other government agencies, academic institutions, and industry partners that are identified providing foundational systems engineering to enable critical infrastructure. Digital Engineering (DE) helps create models to represent all aspects of the system and to support all the activities for the design, development, manufacture, and operation of the system throughout its lifecycle; therefore reducing overall sustainment that would have been endured. This project directly supports Space Domain Awareness (SDA) and Protect and Defend models expected to be utilized in organizations such as the National Space Test and Training Center (NSTTC) and USSF Test and Evaluation (TE). The data transport layer and cross domain layers will further be expanded and greater capability for synchronous Command and Control (C2).

DEICE Tech Stack prototypes and develops the Space Force Digital Engineering Ecosystem (DEE) as a cloud-based, remotely accessible, multilevel security, interconnected infrastructure, providing the technical methodology used to store, access, analyze, and visualize evolving systems' data and models throughout systems' acquisition lifecycles.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203010SF *I Space Force IT, Data Analytics, Digital Solutions*

Funding will investigate, develop, and analyze USSF-unique research via studies/grants/partnerships to promote further efficiency and speed using industry, academia, international and other government agencies. This funding is required to serve Chief of Space Operations priority efforts to innovate and experiment to build and agile force that better ensures our long-term competitive advantage in space. These efforts promote competition between various research organizations (e.g. laboratories, FFRDCs, etc) to advance critical research for contested space operations.

SSC Developmental IT Infrastructure supports information technology (IT), cybersecurity, software, data and network modernization. Information Technology provides customers proper tools needed to accomplish their mission. These tools enhance customer collaboration, end-user experience, exploration and integration amongst our mission partners and industry. SSC Developmental IT Infrastructure cybersecurity helps assess technical risks associated with use, by understanding the System and Enterprise-level risks posed by threats based on deployment and gathered intelligence. The software sector aims to bring Software Agile best practices as mainstream into acquisition; it also enables Platform and Infrastructure at scale based on mission thread needs. The SSC Developmental IT infrastructure provides deliberate data exposure and "normalizes" the data to make it meaningful and useful for any business or mission use case that desires to exploit it. The network modernization improves and optimizes administrative/mission networks and end-user experiences across several enclaves. The SSC Developmental IT Infrastructure also furnishes internal management of requirements, funding, contract actions, and PM support/training relating to the SSC Chief Information Office.

Space acquisition must respond with speed and agility to emerging adversary threats. SSC has transformed the organization and implementation of space acquisition to an enterprise approach, to increase innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Cross mission integration is essential to ensure existing and future systems are capable of digital processing and technologies.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver DE system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program element may include necessary support required to ensure a cyber-secure and resilient IT infrastructure.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203010SF *I Space Force IT, Data Analytics, Digital Solutions*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	61.723	0.000	61.723
Total Adjustments	0.000	0.000	61.723	0.000	61.723
• 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	61.723	0.000	61.723

Change Summary Explanation

FY 2024: +35.832M for consolidation and increase of Digital Engineering efforts into a standalone BPAC

FY 2024: +4.800M to realign Science, Technology, and Research (STR) directorate activities funding from APPN 3410, PE 1209398SF (SAG 42A), to the Service-wide IT, Data Analytics, and Digital Solutions PE

FY 2024: +20.814 transferred to consolidate funding for SSC Chief Information Office Headquarters functions and integrated cybersecurity

FY 2024: +1.216M inflation increase for non-pay and non-fuel purchases.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	Project (Number/Name) 645620 / *Digital Engineering*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
645620: *Digital Engineering*	-	0.000	0.000	40.815	0.000	40.815	40.967	35.294	35.332	36.211	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2024, PE 1206427S, Space Systems Prototype Transitions (SSPT), Project 645601, Digital Engineering Interconnected, Cloud-based Ecosystem (DEICE) Tech Stack, was transferred to PE 1203010SF, Space Force IT, Data Analysis, Digital Solutions, Project 645620, Digital Engineering, to consolidate Space Force digital engineering efforts. It is not a New Start.

A. Mission Description and Budget Item Justification

This program investigates, develops, and analyzes space related capabilities to digitize the Space Domain Awareness and Protect and Defend portfolios to promote further efficiency and speed. It will conduct a wide array of activities to model, integrate, and test existing and future capabilities through a MLS Architecture. It will provide a pathway for data integration with various ASOT and SSOT. The supported activities include: system engineering, data engineering, data science, prototype mock up, demonstrations and testing, as well as modeling simulations and analysis related to Space Domain Awareness and Protect Defend capabilities through highly complex Space C2 systems traceable to a DEICE Tech Stack. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities. This includes the development and prototyping of critical technology within the DoD across other government agencies, academic institutions, and industry partners that are identified providing foundational systems engineering to enable critical infrastructure. DE helps create models to represent all aspects of the system and to support all the activities for the design, development, manufacture, and operation of the system throughout its lifecycle; therefore reducing overall sustainment that would have been endured. This project directly supports SDA and Protect and Defend models expected to be utilized in organizations such as the NSTTC and USSF TE. The data transport layer and cross domain layers will further be expanded and greater capability for synchronous C2.

DEICE Teck Stack Prototypes and develops the Space Force DEE as a cloud-based, remotely accessible, multilevel security, interconnected infrastructure, providing the technical methodology used to store, access, analyze, and visualize evolving systems' data and models throughout systems' acquisition lifecycles.

Funding will investigate, develop, and analyze USSF-unique research via studies/grants/partnerships to promote further efficiency and speed using industry, academia, international and other government agencies. This funding is required to serve Chief of Space Operations priority efforts to innovate and experiment to build and agile force that better ensures our long-term competitive advantage in space. These efforts promote competition between various research organizations (e.g. laboratories, FFRDCs, etc) to advance critical research for contested space operations.

Space acquisition must respond with speed and agility to emerging adversary threats. SSC has transformed the organization and implementation of space acquisition to an enterprise approach, to increase innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Cross mission integration is essential to ensure existing and future systems are capable of digital processing and technologies.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	**Project (Number/Name)** 645620 / *Digital Engineering*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver DE system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Digital Engineering Integration	-	0.000	35.993

Description: DE MLS integration is the aggregation of multiple ASOT, SSOT driving toward improvements MLS layers throughout the Space Domain Awareness and Protect and Defend portfolios. This integration efforts enable space data transport layers and will support creation of computer readable models to represent all aspects of the system and to support all the activities for the design, development, manufacture, and operation of the system throughout its lifecycle. DE will lead to greater efficiency and improved quality of all the acquisition activities.

FY 2023 Plans:
N/A

FY 2024 Plans:
Leverage existing contract vehicles for awarding Other Transaction Authority (OTA) and select Small Business Innovation Research (SBIR) Phase III contracts enabling Digital Engineering and Integration Test infrastructure that allow for DEE assessments. Prototype, develop, test and establish the Space Force Digital Engineering as a Service (DEaaS) Environments hosted on Hybrid cloud platform for cloud-computing and database storage (compute & store) via SpaceDEN.

Develop and test the minimum viable product (MVP) for DEaaS by providing prototypes/demos using digital engineering tools and collaboration work spaces for the architects and systems engineers of the initial programs enabling Space System Integration activities and synergies with existing and evolving space force programs.

Continue development, integration and testing of DEaaS with Integration Execution activities and MLS tests. These tests will update the Government Reference Architecture (GRA) for SpaceDEN Environments with acquisition and operational databases, and add additional programs into the DEaaS Environment from across SSC.

Implement Integration and Operational practices for system monitoring and security procedures. Ensure Security accreditation for MLS infrastructure.

Additionally, FY 2024 funding will allow the program to continue implementing DE resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	**Project (Number/Name)** 645620 / *Digital Engineering*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
experiments and prototyping, integration and test of C2, resiliency measures and mission partner interfaces, space test/combat range events, and office support etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to transfer of PE 1206427S, SSPT, Project 645601, DEICE Tech Stack into this program.			
Title: Science, Technology, and Research Studies ***Description:*** Funds research and studies on critical technology and international efforts to prevent strategic surprise while addressing Space Force current and emerging challenges in the space domain. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** Partner with Massachusetts Institute of Technology (MIT) Artificial Intelligence (AI) Accelerator to fund six graduate scholars and one support contractor at MIT to advance artificial intelligence integration into Space Domain Awareness. Further, additional technical studies and research investigations will be accomplished based on findings from Space Futures workshops, Center for Naval Analysis reports, and other sources which drive competition between government and FFRDC organizations to provide additional insights into resilient and assured space capabilities. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to capturing proper appropriations for Science, Technology and Research (STR) directorate activities from HQ USSF Program Element to this program element and BPAC.	-	0.000	4.822
Accomplishments/Planned Programs Subtotals	-	0.000	40.815

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible. There will be numerous projects in which the program office will leverage rapid prototyping authorities to the maximum degree possible. The acquisition strategy is in coordination to leverage mission partners' platforms which are expected to be competitively awarded. Contract award is expected in FY 2024. For the DEICE Tech Stack effort, Space Force plans to employ agile software development practices and techniques, such as flexible requirements, frequent user interaction, and rapid delivery. The program will acquire tools and capabilities through an agile-based Rapid Delivery Framework that: develops, integrates, and delivers new features and capabilities through 180-day

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	**Project (Number/Name)** 645620 / *Digital Engineering*

program increments. Each DEE Prototype Demo further improves the MLS infrastructure and furthers SDA, CP, and C2 capabilities, as well as mature emerging technologies. To deliver the cloud-based environment, an existing contract with Cloud One providers will be utilized to provide: the software licenses, computer hosting, and cybersecurity. In addition, Federally Funded Research and Development Centers (FFRDCs) will provide expertise to develop required DE capabilities as well as optimizing the software configurations to support needed features. Finally, a current SBIR Phase 3 contract will be used to implement new DE capabilities based on industry best practices including: the management of the Product Backlog, assisting with on-boarding new programs, building training for new users, providing system administrative support, and creating scripts and features allowing DE activities to be automated.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	**Project (Number/Name)** 645620 / *Digital Engineering*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Digital Engineering MLS Prototyping	TBD	TBD : TBD	-	-		-		13.929	Apr 2024	-		13.929	Continuing	Continuing	-
Digital Engineering Integration and Test	TBD	TBD : TBD	-	-		-		10.000	Jan 2024	-		10.000	Continuing	Continuing	-
Science, Technology, and Research Studies	TBD	TBD : TBD	-	-		-		4.800	Oct 2024	-		4.800	Continuing	Continuing	-
Security Accreditation	TBD	TBD : TBD	-	-		-		1.000	Jan 2024	-		1.000	Continuing	Continuing	-
SE&I	TBD	TBD : TBD	-	-		-		5.000	Oct 2023	-		5.000	Continuing	Continuing	-
SBIR/STTR	TBD	TBD : TBD	-	-		-		1.254	May 2024	-		1.254	Continuing	Continuing	-
		Subtotal	-	-		-		35.983		-		35.983	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
IT Support	TBD	TBD : TBD	-	-		-		0.332	Oct 2024	-		0.332	Continuing	Continuing	-
		Subtotal	-	-		-		0.332		-		0.332	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	TBD	TBD : TBD	-	-		-		3.000	Oct 2023	-		3.000	Continuing	Continuing	-
FFRDC	RO	Various : Various	-	-		-		1.000	Oct 2023	-		1.000	Continuing	Continuing	-
Other Support	TBD	TBD : TBD	-	-		-		0.500	Oct 2023	-		0.500	Continuing	Continuing	-
		Subtotal	-	-		-		4.500		-		4.500	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	**Project (Number/Name)** 645620 / *Digital Engineering*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		40.815		-		40.815	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	**Project (Number/Name)** 645620 / *Digital Engineering*

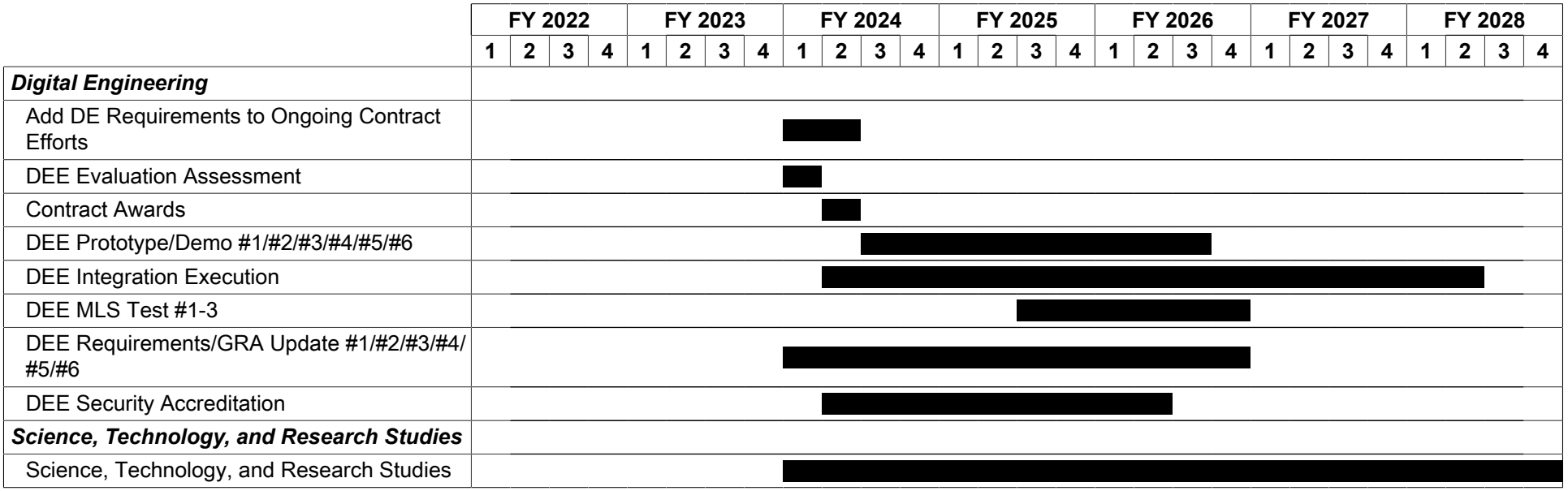

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	**Project (Number/Name)** 645620 / *Digital Engineering*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Digital Engineering				
Add DE Requirements to Ongoing Contract Efforts	1	2024	2	2024
DEE Evaluation Assessment	1	2024	1	2024
Contract Awards	2	2024	2	2024
DEE Prototype/Demo #1/#2/#3/#4/#5/#6	3	2024	3	2026
DEE Integration Execution	2	2024	2	2028
DEE MLS Test #1-3	3	2025	4	2026
DEE Requirements/GRA Update #1/#2/#3/#4/#5/#6	1	2024	4	2026
DEE Security Accreditation	2	2024	2	2026
Science, Technology, and Research Studies				
Science, Technology, and Research Studies	1	2024	4	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	Project (Number/Name) 646017 / *SSC Developmental IT Infrastructure*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
646017: *SSC Developmental IT Infrastructure*	-	0.000	0.000	20.908	0.000	20.908	21.345	21.794	22.255	22.723	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2024, 20.814M was transferred from all Space Systems Command (SSC) program elements to PE 1203010SF, Space Force IT, Data Analysis, Digital Solutions, Project 646017, SSC Developmental IT Infrastructure, for SSC Chief Information Office Headquarters functions and integrated cybersecurity. It is not a New Start.

A. Mission Description and Budget Item Justification

SSC Developmental IT Infrastructure supports information technology (IT), cybersecurity, software, data and network modernization. Information Technology provides customers proper tools needed to accomplish their mission. These tools enhance customer collaboration, end-user experience, exploration and integration amongst our mission partners and industry. SSC Developmental IT Infrastructure cybersecurity helps assess technical risks associated with use, by understanding the System and Enterprise-level risks posed by threats based on deployment and gathered intelligence. The software sector aims to bring Software Agile best practices as mainstream into acquisition; it also enables Platform and Infrastructure at scale based on mission thread needs. The SSC Developmental IT infrastructure provides deliberate data exposure and "normalizes" the data to make it meaningful and useful for any business or mission use case that desires to exploit it. The network modernization improves and optimizes administrative/mission networks and end-user experiences across several enclaves. The SSC Developmental IT Infrastructure also furnishes internal management of requirements, funding, contract actions, and PM support/training relating to the SSC Chief Information Office.

Space acquisition must respond with speed and agility to emerging adversary threats. SSC has transformed the organization and implementation of space acquisition to an enterprise approach, to increase innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program/project priorities according to an integrated unclassified/classified enterprise space architecture. Cross mission integration is essential to ensure existing and future systems are capable of digital processing and technologies.

This program element may include necessary support required to ensure a cyber-secure and resilient IT infrastructure.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: SSC Developmental IT Infrastructure	-	0.000	20.908
Description: SSC Developmental IT Infrastructure, is a USSF initiative that aims to drive effective, resilient, innovative, and cyber-secure solutions and IT across Space Systems Command, to meet warfighter and business needs.			
FY 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	**Project (Number/Name)** 646017 / *SSC Developmental IT Infrastructure*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
N/A ***FY 2024 Plans:*** SSC Developmental IT Infrastructure plans to provide customers proper tools needed to accomplish their mission; these tools bring parity between personal and work-IT experiences to increase efficiency, efficacy, and workforce morale. The network infrastructure sector plans to implement Enterprise IT as a Service (EITaaS), zero-trust integration, and the Digital Engineering Environment (DEE) framework. SSC Developmental IT Infrastructure cybersecurity will execute various efforts to help assess technical risks associated with threats based on deployment and gathered intelligence. Those efforts include, but are not limited to, implementing: a Strategic Cybersecurity Program (CSP), a Cybersecurity Operations Center, a cyber assessment program, and vulnerability management program. The software sector aims to bring Software Agile and DevSecOps best practices as mainstream into acquisition; it plans to enable Platform and Infrastructure at scale based on mission thread needs. The SSC Developmental IT infrastructure plans to provide data exposure and "normalize" the data by aligning data strategies, scaling to include various entities, and deliver Dashboards for administration and mission support. The SSC Developmental IT Infrastructure will continue to support internal management of requirements, funding, contract actions, and PM support/training relating to the SSC Chief Information Office. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to transfer to consolidate funding for SSC Chief Information Office Headquarters functions and integrated cybersecurity			
Accomplishments/Planned Programs Subtotals	-	0.000	20.908

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

SSC/CIO will utilize the most practical vehicle(s) and methods available within Federal Acquisition Regulation (FAR) and non-FAR contracts, agreements and solicitation methods. All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible. Contract and/or agreement award is expected in FY2024.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	Project (Number/Name) 646017 / *SSC Developmental IT Infrastructure*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SSC Developmental IT Infrastructure	TBD	Various : TBD	-	-		-		4.708	Jan 2024	-		4.708	Continuing	Continuing	-
		Subtotal	-	-		-		4.708		-		4.708	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Not specified. : TBD	-	-		-		7.667	Jan 2024	-		7.667	Continuing	Continuing	-
FFRDC	Various	Not specified. : TBD	-	-		-		8.533	Jan 2024	-		8.533	Continuing	Continuing	-
		Subtotal	-	-		-		16.200		-		16.200	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		20.908		-		20.908	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	**Project (Number/Name)** 646017 / *SSC Developmental IT Infrastructure*

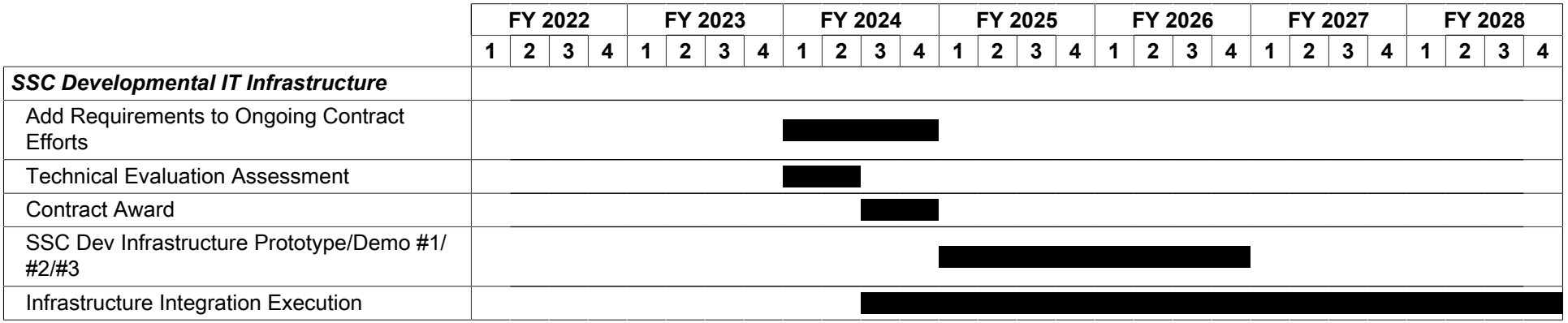

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203010SF / *Space Force IT, Data Analytics, Digital Solutions*	**Project (Number/Name)** 646017 / *SSC Developmental IT Infrastructure*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SSC Developmental IT Infrastructure				
Add Requirements to Ongoing Contract Efforts	1	2024	4	2024
Technical Evaluation Assessment	1	2024	2	2024
Contract Award	3	2024	4	2024
SSC Dev Infrastructure Prototype/Demo #1/#2/#3	1	2025	4	2026
Infrastructure Integration Execution	3	2024	4	2028

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164SF *I NAVSTAR Global Positioning System (User Equipment) (SPACE)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	367.652	419.889	381.394	353.807	0.000	353.807	299.499	133.838	0.000	0.000	Continuing	Continuing
643833: *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*	367.652	419.889	381.394	353.807	0.000	353.807	299.499	133.838	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 447

A. Mission Description and Budget Item Justification

The Global Positioning System (GPS) is a space-based radio Positioning, Navigation, and Timing (PNT) distribution system. GPS User Equipment (UE) consists of standardized receivers, antennas, antenna electronics, and other related equipment, grouped together in sets to derive navigation and time information transmitted from GPS satellites. These receiver sets are used by the Department of Defense (DoD). Research, Development, Test and Evaluation (RDT&E) funds UE development, integration, test, and analysis for new PNT receiver capabilities in Navigation Warfare (NAVWAR) across all military platforms using GPS services.

The Military Global Positioning System User Equipment (MGUE) Increment (Inc) 1 program is responsible for the development of standard modernized receiver form factors for the Service-nominated lead platforms. The MGUE Inc 1 Capability Development Document (CDD) was approved by the Joint Requirements Oversight Council (JROC) on 24 July 2014. MGUE Inc 1 is initiating a new family of modernized GPS receivers that will deliver significantly improved capability to counter current and emerging PNT threats and enable military operations in a NAVWAR environment where current legacy receiver performance would be compromised. MGUE Inc 1 received a Milestone A decision in April 2012. The program received direction in February 2014, from the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)) to execute a new acquisition strategy, accelerating the program to provide test units faster to facilitate military end users. The MGUE program received a Milestone B decision in January 2017.

The MGUE Inc 2 effort will continue to expand Military-Code (M-Code) receiver technology into additional applications (space receivers and precision guided munitions), and develop a modernized Handheld (HH) device to meet Service requirements. This effort leverages the MGUE Inc 1 technology to the maximum extent while addressing the production of M-Code integrated circuits far into the future. The MGUE Inc 2 program is being executed in three parts: 1) Risk Reduction Activities, 2) Miniature Serial Interface (MSI) Receiver Card Middle Tier Acquisition (MTA) rapid prototyping, and 3) Joint Modernized GPS Handheld Receiver Middle Tier Acquisition rapid prototyping effort. The JROC approved the MGUE Inc 2 CDD on 6 April 2018. The Air Force Service Acquisition Executive approved the MGUE Inc 2 Acquisition Strategy to include designation of two Middle Tier Acquisition Rapid Prototype efforts: 1) MSI Receiver Cards to include Next-Generation (Next Gen) Application Specific Integrated Circuit (ASIC) and 2) Joint, Modernized Handheld Receiver.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

The total cost of the MGUE Inc 2 MSI Middle Tier of Acquisition effort is $1,566.89 million. MGUE Inc 2 MSI is not fully funded across the Future Years Defense Program. The Department of the Air Force is assessing all options to address the funding shortfalls for MTA programs including additional funding in a future budget request, performance trades based on technical maturity, or transition to alternative pathways.

This Program Element (PE) may include necessary civilian pay expenses required to manage, execute, and deliver MGUE weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in PEs 1206392SF and 1206398SF.

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

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	434.194	382.594	301.005	0.000	301.005
Current President's Budget	419.889	381.394	353.807	0.000	353.807
Total Adjustments	-14.305	-1.200	52.802	0.000	52.802
• Congressional General Reductions	0.000	-1.200			
• 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	-14.305	0.000			
• Other Adjustments	0.000	0.000	52.802	0.000	52.802

Change Summary Explanation

FY 2024: +$53.200M Fund MGUE Inc 2 to Single Best Estimate
FY 2024: -$1.982M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.
FY 2024: +$1.584M Inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Military Global Positioning System (GPS) User Equipment (MGUE) Increment (Inc) 1 Product Development	75.289	66.000	24.581

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164SF *I NAVSTAR Global Positioning System (User Equipment) (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: The MGUE Inc 1 program develops standard modernized receiver form factors for the Service-nominated lead platforms in accordance with the MGUE Inc 1 Capability Development Document (CDD). ***FY 2023 Plans:*** Complete the following receiver modernization Activities: Verification Testing, Qualification Testing, Technical Requirements Verification, and Manufacturing Readiness Assessment (MRA) for the remaining MGUE card. Conduct GPS Enterprise Engineering updates to Ground Based - GPS Receiver Application Module (GRAM) - Modernized - Module (GB-GRAM-M) and GPS Receiver Application Module - Standard Electronic Module (GRAM-S/M). Conduct deficiency resolution for test problems resulting from lead platform testing. Continue preparation for Program Executive Officer (PEO) Certification of Readiness for B-2 and Arleigh Burke Destroyer (DDG) Platform Operational Test & Evaluation (OT&E). Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2024 Plans:*** Complete GPS Enterprise Engineering updates to GPS Receiver Application Module - Standard Electronic Module (GRAM-S/M). Conduct deficiency resolution for test problems resulting from lead platform testing. Complete PEO Certification of Readiness for B-2 and DDG Platform OT&E. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding decreased reflects the completion of the majority of the Raytheon Firm Fixed Price contract performance based payments, and completion of the BAE development contract. Raytheon Formal Qualification test and technical requirements verification completes on GRAM-S/M.			
Title: Advanced Technology	12.760	16.367	7.816
Description: Advanced Technology/Pre-Tech includes efforts to mature technology for future GPS receivers identified in the MGUE CDDs. These efforts aim to find innovative solutions to increase resiliency in GPS performance and improve on size, weight, power, and cost (SWAP/C) of military receivers. ***FY 2023 Plans:*** Continue developing technologies and prototypes to increase the robustness and resilience of Modernized GPS receivers and PNT system solutions. Complete the development and security certifiability testing of Modernized Protection Device (MoPD). Continue integration into a multi-Global Navigation Satellite System (GNSS) software defined radio platform and begin to demonstrate functional performance, programmability, and flexibility. Mature the Military Underwater Navigation System/M-Code (MUNS-M) software and displays based on feedback from a US Special Forces test activity. Complete fabrication of Integrated M-Code/Antenna System prototype (IMAS) and conduct design validation testing to evaluate Technical Requirement Document			

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
(TRD) compliance and access effort for production representative units. Continue Multi-GNSS prototyping including M-code and "covered signals" to increase the resilience and capability of military PNT to meet applicable National Defense Authorization Act objectives. ***FY 2024 Plans:*** Mature and test technologies and prototype demonstration systems that increase the robustness and resilience of Modernized GPS receivers and PNT system solutions. Implement required Request for Change modifications, including Regional Military Protection (RMP) and from a engineering perspective, extended Pseudorandom Noise (PRN) codes into the MoPD. Support the integration and security certification activities associated with implementing MoPD into a multi-GNSS software defined radio platform and continue to demonstrate the functional performance and flexibility of this security architecture. Continue multi-GNSS prototyping exploring the trustworthiness of "covered signals" to increase the resilience and capability of military PNT equipment and to meet applicable National Defense Authorization Act objectives. Continue working with US Special Forces and Foreign Military System (FMS) customers on supporting test, evaluation, and transition opportunities for the MUNS-M. Complete the qualification testing and prototype fabrication of the IMAS. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding decrease due to maturation of technologies and prototype demonstration leading to completion of testing and prototype fabrication of IMAS.			
Title: MGUE Inc 1 System/Platform Integration and Performance Certification ***Description:*** Integration of MGUE Inc 1 receiver form factors into the Service-nominated lead platforms in support of developmental and operational (or field) test events. Conduct technical and operational modernization impact analysis for MGUE Service lead platform integration. ***FY 2023 Plans:*** Continue platform-level verification testing of the GRAM-S/M. Continue platform-level requirements verification and reliability test activities as required to include approved engineering changes. Complete lead platform development efforts to integrate GRAM-S/M capabilities, and begin final B-2 and DDG integration and qualification efforts in support of developmental and operational or field test events. Conduct DDG independent verification and validation testing (IV&V), field testing in a threat environment and system level integration testing. Conduct B-2 combined developmental/operational test. Assist DoD integration of M-Code GPS receivers for joint Service non-lead platforms. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2024 Plans:*** Continue platform-level verification testing of the GRAM-S/M. Continue platform-level requirements verification and reliability test activities as required to include approved engineering changes. Complete B-2 and DDG integration and qualification efforts in	33.571	53.255	49.934

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164SF *I NAVSTAR Global Positioning System (User Equipment) (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
support of developmental and operational or field test events. Complete B-2 combined developmental and operational test. Assist DoD integration of M-Code GPS receivers for joint Service non-lead platforms. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding decreased due to completion of lead platform GRAM-S/M card level development efforts phasing into Production Representative Unit level integration and testing efforts.			
Title: Information Assurance, Security/Compatibility Certification, and Test/Evaluation ***Description:*** Develop, implement, and maintain GPS security certification programs. Develop policy, strategy and resource requirements for MGUE security certification and compatibility certification. Security certification, compatibility certification, and security approval ensures future military GPS receivers protect critical program information and continue working in all environments and concepts of operations called for by U.S. Strategic Command. ***FY 2023 Plans:*** Continue to conduct initial and delta security certification activities for all M-Code receivers, as required. Continue modernized security evaluations/tests for Selective Availability Anti-Spoofing Module (SAASM) and other legacy GPS receiver equipment. Review, approve, and track SAASM, M-Code receivers, and legacy receiver certified platforms and integrated applications for all of DoD. Continue technical support to develop, validate and process engineering changes. Continue SAASM and modernize Key Loading Installation Facility (KLIF) effort. Conduct GPS Enterprise Integrated System Test (IST) activities for MGUE Lead Platforms. ***FY 2024 Plans:*** Continue to conduct initial and delta security certification activities for all M-Code receivers, as required. Continue modernized security evaluations/tests for SAASM and other legacy GPS receiver equipment. Review, approve, and track SAASM, M-Code receivers, and certified legacy receiver certified platforms and integrated applications for all of DoD. Continue technical support to develop, validate and process engineering changes. Continue SAASM and modernize KLIF effort. The KLIF facilitates the programming of black key (cryptographic) algorithms into the SAASM to provide accurate positioning solutions for GPS users using secure equipment. Conduct GPS Enterprise IST activities for MGUE Lead Platforms. ***FY 2023 to FY 2024 Increase/Decrease Statement:***	18.421	9.966	10.059

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164SF *I NAVSTAR Global Positioning System (User Equipment) (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 increased due to increased DoD demand for M-Code capable GPS User equipment requiring security certification. Widespread availability of military GPS equipment is expected to ramp up in FY 2023, when the final MGUE Inc 1 card has completed successful technical requirements verification.			
Title: MGUE Inc 2 Risk Reduction ***Description:*** The MGUE Inc 2 program will develop M-Code receiver technology to meet Service requirements. MGUE Inc 2 Risk Reduction activities include, but are not limited to, acquisition strategy development, early design efforts through Preliminary Design Review (PDR) for the next generation Application Specific Integrated Circuit (ASIC) using 14nm (nanometer) ASIC technology node, handheld design activities and early user demonstrations, advanced concept studies, receiver component prototyping to include MGUE Inc 2 requirements. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A	7.736	0.000	0.000
Title: MGUE Inc 2 Miniature Serial Interface (MSI) Receiver Card Rapid Prototyping ***Description:*** The MGUE Inc 2 program will develop M-Code receiver technology for additional applications (space receivers, precision guided munitions, and handheld receivers) to meet Service requirements. MGUE Inc 2 MSI Receiver Card Rapid prototyping builds on the ASIC post-PDR progress and will develop, integrate, produce, and test M-Code capable, low size and power GPS MSI form factor to include a Next Gen ASIC. The MSI receiver card is to meet the needs of low size, weight and power (SWaP) ground-embedded users. However, The Next Gen ASIC must meet the needs of the MSI form factor and be backwards compatible with Inc 1 performance requirements as a potential functional replacement due to Inc 1 ASIC obsolescence. MGUE Inc 2 MSI Receiver Card Rapid Prototyping has been broken out into a separate effort for additional visibility. ***FY 2023 Plans:*** Continue three development contracts for new low size/power MSI receiver card to include Next Gen ASIC, hardware, and software. Continue efforts related to the prototypes including, but not limited to: ordering of components for early integrated testing, long-lead parts planning and purchase, procurement of test equipment and articles, manufacturing prototypes, and manpower. Complete Release to Manufacture (RTM) of the Next Gen ASIC and facilities planning. Complete CDR for all three vendors. Contractors will continue to verify performance requirements are met through demonstrations and testing. Continue	272.112	221.885	245.634

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164SF *I NAVSTAR Global Positioning System (User Equipment) (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
security certification and design activities. Continue investments in core ASIC technology, early ASIC fabrication, manufacturing and Intellectual Property procurement. 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. ***FY 2024 Plans:*** Continue three development contracts for new low size/power MSI receiver card to include Next Gen ASIC, hardware, and software. Continue efforts related to the prototypes including, but not limited to, ordering of components for early integrated testing, long-lead parts planning and purchase, procurement of test equipment and articles, manufacturing prototypes, and manpower. Complete First Test Article (FTA) and Proof of Design (POD) for all three vendors. Contractors will continue to verify performance requirements are met through demonstrations and testing. Continue security certification and design validation activities. Continue investments in core ASIC technology, early ASIC fabrication, manufacturing and Intellectual Property procurement. Continue MSI rapid prototyping through intellectual property maturation. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding increased to support Critical Design Review closeout activities, and FTA and POD deliveries for all three vendors.			
Title: MGUE Inc 2 Handheld	0.000	13.921	15.783
Description: The MGUE Inc 2 Handheld (HH) effort will develop a joint common modernized HH receiver that will provide M-code, anti-spoof, and anti-jam capabilities, with significant improvements in size, weight, and power. The goal of the MGUE Inc 2 HH risk reduction activities is to reduce development risk for the MGUE Inc 2 HH receiver through feedback from the rapid prototyping process and multiple joint service demonstration events. Transition HH risk reduction activities to a MTA Rapid Prototyping effort in line with the Service Acquisition Executive (SAE)-approved MGUE Inc 2 Acquisition Strategy. ***FY 2023 Plans:*** Ground Application Technical Requirements Document compliant prototype that is M-Code capable and ready for security approval. Joint service demonstration events will continue to inform HH development, burning down user acceptance risk. Integrate the MSI into HH advanced prototype and perform limited operational testing, security testing and power model analysis. Multiple competitive contracts will be awarded in FY 2023 for the MTA Rapid Prototyping effort. The MTA start is late FY 2023 after contract award when funds first obligate. Rapidly respond to implement system resiliency and situational awareness			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164SF *I NAVSTAR Global Positioning System (User Equipment) (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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. ***FY 2024 Plans:*** Continue the HH MTA Rapid Prototyping effort in line with the 2018 SAE-approved MGUE Inc 2 Acquisition Strategy. Continue to develop the Ground Application TRD-compliant prototype that will be M-Code capable and ready for security approval. Continue to conduct Joint service demonstration events to inform HH development, burning down user acceptance risk. Continue to integrate MSI technology into the HH advanced prototype; continue to perform limited operational testing, security testing and power model analysis. Analyze prototype manufacturing, hardware, software, and critical component completeness in support of the initial product baseline. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding increase due to MTA start in late FY 2023, MSI FTA integration, and testing.			
Accomplishments/Planned Programs Subtotals	419.889	381.394	353.807

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPAF 01 0305164F: *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	2.274	0.950	0.893	-	0.893	0.833	0.881	0.833	0.851	0.000	7.515

Remarks

Procurement, Space Force (PSF) funding in this PE supports legacy SAASM efforts. Similar work for the MGUE is in the planning phase.

E. Acquisition Strategy

The MGUE program has developed a comprehensive acquisition strategy to provide modernized GPS capabilities to U.S. and Allied Forces by developing a competitive market driven approach. This strategy establishes the signal compatibility and security criteria along with a process for evaluating components to enable rapid movement from development to fielding. The pillars of this effort are: (a) establishing time certain and low risk development; (b) bounding requirements to leverage mature technology to the maximum extent possible; (c) focusing on the development of form factors based on well-defined standards to support lead platform integration; and (d) implementing a proactive, collaborative MGUE platform integration activity to mitigate risk and reduce cost for DoD force structure modernization.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203164SF *I NAVSTAR Global Positioning System (User Equipment) (SPACE)*

The MGUE program awarded three sole source contracts for the Inc 1 Technology Development Phase effort in September 2012, as follow-on efforts to the competitively awarded Modernized User Equipment (MUE) contracts awarded in June 2006. The effort spans the Technology Maturation and Risk Reduction Phase through design and includes integration and test of M-Code receivers into Service-nominated lead platforms. In 1QFY2021, the program office converted the remaining Raytheon GRAM-S/M development effort to a Firm Fixed Price contract type at the direction of the Air Force Service Acquisition Executive. The contracts of the other two vendors remain primarily a Cost Plus Incentive Fee type contract. This effort also includes the security and compatibility certification of GPS receiver cards as a part of the integration effort. The Service lead platforms will select from the available vendors to integrate and perform operational testing with funding from the MGUE program. This supports compliance with PL 111-383, section 913.

The MGUE Inc 2 program developed an Acquisition Strategy to continue MGUE development by: addressing long term producibility of MGUE ASICs, identifying a U.S. owned trusted foundry for ASIC development, delivering GPS receiver cards to meet stringent Inc 2 requirements, and developing a modernized GPS handheld receiver to meet the needs of the Services. The MGUE Inc 2 program is being executed in three parts: 1) Risk Reduction Activities, 2) MSI MTA rapid prototyping, and 3) Joint Modernized GPS Handheld Receiver MTA rapid prototyping effort. The Air Force Service Acquisition Executive approved the MGUE Inc 2 Acquisition Strategy to include designation of two MTA Rapid Prototype efforts: 1) Miniature Serial Interface Receiver Card (includes Next-Gen ASIC) and 2) Joint, Modernized Handheld Receiver. MGUE Inc 2 awarded three full and open competitive contracts in Nov 2020 for MSI. The program office plans to award full and open competitive Handheld contracts beginning in FY 2023.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203164SF / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	**Project (Number/Name)** 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MGUE Inc 1 Technology Development (1)	C/CPIF	Collins Aerospace : Cedar Rapids, IA	0.012	12.210	Nov 2021	6.000	Nov 2022	-		-		-	0.000	18.222	-
MGUE Inc 1 Technology Development (2)	C/CPIF	Raytheon : El Segundo, CA	41.136	46.329	Nov 2021	45.787	Nov 2022	10.788	Nov 2023	-		10.788	2.752	146.792	-
MGUE Inc 1 Technology Development (3)	C/CPIF	L3 Harris : Anaheim, CA	1.000	0.637	Nov 2021	-		-		-		-	0.000	1.637	-
MGUE Inc 1 Platform Integration	Various	Various : Various	26.550	33.571	Nov 2021	53.255	Nov 2022	49.960	Nov 2023	-		49.960	15.510	178.846	-
MGUE Inc 1 Information Assurance	Various	Various : Various	2.710	-		-		-		-		-	0.000	2.710	-
MGUE Inc 1 Technical Mission Analysis	Various	Aerospace/MITRE : Various	7.384	1.908	Nov 2021	1.210	Nov 2022	0.861	Nov 2023	-		0.861	0.739	12.102	-
MGUE Inc 1 Enterprise SE&I	C/CPAF	SAIC : El Segundo, CA	1.596	1.597	Dec 2021	3.971	Dec 2022	3.180	Dec 2023	-		3.180	2.273	12.617	-
MGUE Advanced Technology/Pre-Tech	Various	Various : Various	5.000	12.760	Jan 2022	16.367	Jan 2023	7.816	Jan 2024	-		7.816	Continuing	Continuing	-
MGUE Inc 2 MSI Receiver Card Rapid Prototyping	Various	Various : Various	69.783	50.013	Dec 2021	17.300	Dec 2022	17.698	Dec 2023	-		17.698	Continuing	Continuing	-
MGUE Security Certification	Various	Various : Various	5.307	5.299	Nov 2021	5.460	Nov 2022	5.622	Nov 2023	-		5.622	Continuing	Continuing	-
MGUE Inc 2 Technology Development (1)	C/CPIF	BAE Systems : Cedar Rapids, IA	37.309	68.933	Nov 2021	69.474	Nov 2022	84.456	Nov 2023	-		84.456	Continuing	Continuing	-
MGUE Inc 2 Technology Development (2)	C/CPIF	L3 Harris : Anaheim, CA	28.850	44.707	Nov 2021	39.158	Nov 2022	39.100	Nov 2023	-		39.100	Continuing	Continuing	-
MGUE Inc 2 Technology Development (3)	C/CPIF	Raytheon : El Segundo, CA	35.185	63.673	Nov 2021	48.024	Nov 2022	51.090	Nov 2023	-		51.090	Continuing	Continuing	-
MGUE Inc 2 Risk Reduction	Various	Various : Various	71.173	7.737	Nov 2021	-		-		-		-	0.000	78.910	-
MGUE Inc 2 Information Assurance	Various	Various : Various	0.000	3.870	Nov 2021	3.960	Nov 2022	4.060	Nov 2023	-		4.060	Continuing	Continuing	-
MGUE Inc 2 Handheld	Various	Various : Various	0.000	-		13.921	Nov 2022	15.783	Nov 2023	-		15.783	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203164SF / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	**Project (Number/Name)** 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MGUE Inc 2 Technical Mission Analysis	Various	Aerospace/MITRE : El Segundo, CA	6.820	12.379	Nov 2021	11.309	Nov 2022	11.143	Nov 2023	-		11.143	Continuing	Continuing	-
MGUE Inc 2 Enterprise SE&I	C/CPAF	SAIC : El Segundo, CA	5.069	2.340	Jan 2022	5.753	Jan 2023	5.337	Jan 2024	-		5.337	Continuing	Continuing	-
MGUE Inc 1 and Inc 2 SBIR/STTR	Allot	TBD : Washington, DC	0.000	-		-		12.328		-		12.328	Continuing	Continuing	-
		Subtotal	344.884	367.963		340.949		319.222		-		319.222	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MGUE Inc 1 Test and Evaluation	Various	Various : Various	0.944	2.593	Jan 2022	-		0.356	Jan 2024	-		0.356	0.000	3.893	-
MGUE Inc 2 Test and Evaluation	Various	Various : Various	2.459	6.290	Jan 2022	0.548	Jan 2023	0.377	Jan 2024	-		0.377	Continuing	Continuing	-
		Subtotal	3.403	8.883		0.548		0.733		-		0.733	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MGUE Inc 1 FFRDC	RO	Aerospace/MITRE : El Segundo, CA	7.876	3.249	Dec 2021	2.059	Dec 2022	1.593	Dec 2023	-		1.593	1.367	16.144	-
MGUE Inc 2 FFRDC	RO	Aerospace/MITRE : El Segundo, CA	4.882	7.745	Dec 2021	8.449	Dec 2022	7.813	Dec 2023	-		7.813	Continuing	Continuing	-
MGUE Inc 1 A&AS	Various	Various : Various	0.831	6.466	Dec 2021	6.673	Dec 2022	4.896	Dec 2023	-		4.896	3.434	22.300	-
MGUE Inc 2 A&AS	Various	Various : Various	5.598	25.007	Dec 2021	22.192	Dec 2022	19.019	Dec 2023	-		19.019	Continuing	Continuing	-
MGUE Inc 1 and Inc 2 Other Support	Various	Various : El Segundo, CA	0.178	0.576	Oct 2021	0.524	Oct 2022	0.531	Oct 2023	-		0.531	0.150	1.959	-
		Subtotal	19.365	43.043		39.897		33.852		-		33.852	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1203164SF / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	Project (Number/Name) 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	367.652	419.889		381.394		353.807		-		353.807	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203164SF / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	**Project (Number/Name)** 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203164SF / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	**Project (Number/Name)** 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*

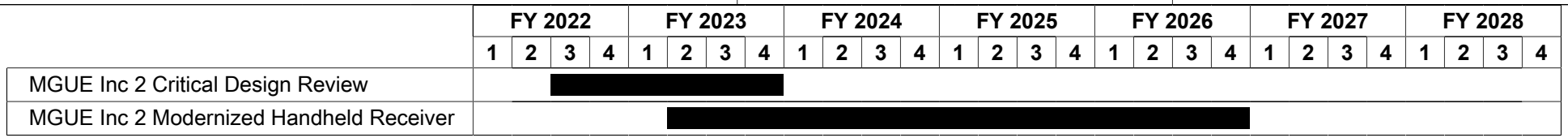

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203164SF / *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	**Project (Number/Name)** 643833 / *MILITARY GLOBAL POSITIONING SYSTEM USER EQUIP*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MGUE Increment 1				
MGUE Inc 1 M-Code & Legacy Receiver Security Certification	1	2022	3	2022
MGUE Inc 1 Developmental & Modernization	1	2022	3	2023
MGUE Inc 1 Development Test	1	2022	4	2023
MGUE Inc 1 Card level PEO Certification	1	2022	2	2024
MGUE Inc 1 Lead Platform Integration and Test	1	2022	2	2025
Advanced Technology/Pre-Tech				
ADV/Pre-Tech MoPD Security Certification Testing, Implement RFCs, and Integration into M-GNSS SDR Platforms	4	2022	3	2025
ADV/Pre-Tech IMAS TRD System fabrication and conduct design validation testing	2	2023	2	2025
ADV/Pre-Tech MUNS-M software and displays maturation	2	2023	3	2025
ADV/Pre-Tech IMAS Transition opportunities / Evaluation	4	2023	2	2026
ADV/Pre-Tech IMAS Platform Transition / Evaluation	3	2024	1	2027
MGUE Increment 2				
MGUE Inc 2 Risk Reduction Transfer to Handheld Activities	1	2022	4	2023
MGUE Inc 2 MSI Receiver Card w/Next Gen ASIC Rapid Prototyping	1	2022	1	2026
MGUE Inc 2 M-Code & Legacy Receiver Security Certification	1	2022	4	2026
MGUE Inc 2 Critical Design Review	3	2022	4	2023
MGUE Inc 2 Modernized Handheld Receiver	2	2023	4	2026

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1203622SF *I Space Warfighting Analysis*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	42.300	95.541	0.000	95.541	116.317	114.323	118.167	122.282	Continuing	Continuing
646021: *Space Warfighting Analysis Center (SWAC)*	-	0.000	42.300	95.541	0.000	95.541	116.317	114.323	118.167	122.282	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Space Warfighting Analysis Center's (SWAC) total FY 2023 operating costs were $56M. This includes $11.2M of United States Space Force (USSF) O&M funding that is part of a transfer of USSF and Space Operations Command (SpOC) functions/missions under SWAC. Beginning in FY 2024, funding for SWAC's legacy and new force design efforts are fully programmed within SWAC's RDT&E baseline.

A. Mission Description and Budget Item Justification

This request funds increased scope towards capability area analyses and integration, modeling, wargaming, and experimentation to create operational concepts and force design guidance for existing and emerging USSF missions. Capability Area design analyses identify the integrated suite of operational capabilities that fulfills USSF imperatives to preserve the United States' freedom of action in space; enables Joint Force lethality and effectiveness; and provides the Service options for developing capabilities operating in, from, and to space. These analyses efforts team with relevant stakeholders across the National Security Space enterprise from an independent perspective and will provide analytic insight to the Service to inform and/or validate solutions to operational needs and provide a basis for future capability development programs. USSF force design analyses are organized into three focus areas: Multi-Domain Sensing, Spectrum Warfare, and Force Design Integration which are aligned to USSF priorities, and follow a disciplined approach to discover, analyze, and validate concepts and the associated family of systems required to satisfy current/future mission needs while including comprehensive threat analysis. The resulting force design products will help define and inform future USSF mission requirements, capabilities/architectures, priorities and funding needs, and interface standards.

This program element may include necessary emergent/unanticipated civilian pay expenses required to manage and execute the force design mission assigned to the SWAC and/or deliver products for evolving weapon system capabilities.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203622SF *I Space Warfighting Analysis*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	44.791	76.217	0.000	76.217
Current President's Budget	0.000	42.300	95.541	0.000	95.541
Total Adjustments	0.000	-2.491	19.324	0.000	19.324
• 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	-2.491	19.324	0.000	19.324

Change Summary Explanation

FY 2023: -$2.491; reduction for FFRDC.

FY 2024: +$15.823M; realignment to APPN 3620 from APPN 3410 to align USSF and SpOC force design funding under SWAC's RDT&E baseline.

FY 2024: -$0.933M; reduction for higher USSF priorities.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Warfighting Analysis Center (SWAC)	0.000	42.300	95.541

Description: Space Warfighting Analysis Center is the foundational element to develop and provide authoritative Force Design recommendations for the United States Space Force (USSF).

FY 2023 Plans:

The Multi-Domain Sensing focus area continued to define options to incorporate multiple phenomenology sensing to address warfighters' needs to maintain custody of moving targets on the ground, at sea, and in the air; reduce data latencies; close kill chains; and better integrate spaced-based sensors with weapon systems. Missile Warning/Missile Tracking analysis evaluated options to further integrate tasking, ground processing, and fire control across the Missile Defense mission area to improve capability and resiliency. In the Spectrum Warfare focus area, the Navigational Warfare force design evaluated the diversity of position and timing needs, and evaluated how orbital diversity, integration of opportunistic sources, and advanced waveforms can meet the needs of DoD and civil users. The Restricted and Internet of Things (RIOT) Analysis of Alternatives focused on how to service the Department of Defense unique communication needs that cannot be serviced by commercial services and continue analysis of the SDT Force Design to identify the space-space transportation paths. The Force Design Integration focus area

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203622SF *I Space Warfighting Analysis*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
will continue annual wargaming assessments and outbriefs of Force Design activities to the joint and international communities. International coordination increased at the end of FY22 and is expected to become more robust. ***FY 2024 Plans:*** Expand research studies, system design analysis, and wargaming integration prototyping demonstrations across a variety of domains and mission areas to inform USSF force designs. The Multi-Domain Sensing focus area will continue to develop Capability Area Designs for Multi-Mission Orchestration from space to support various mission areas, to include Missile Warning, Missile Tracking, Missile Defense, Environmental Monitoring, Moving Target Indications, Target Identification and Characterization, closing kill chains, and other emerging applications, with a focus on reducing latencies, data fusion and ground integration. The Spectrum Warfare focus area will continue developing the topologies, Government Reference Architectures, and Capability Area designs for Internet of Things (IoT), Space to Space, Command and Control (C2), and cyber force designs. Spectrum Warfare will also work on a Government Reference Architecture for Position, Navigation, and Timing (PNT) as well as initiate work on logistics, classified communications, and analysis for a communications transition plan. Activities will discover, analyze, and validate technologies, systems, and architectures for the highest priority mission areas, and may expand or contract as dictated by resourcing and priorities. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** The increased funding continues to expand ground and latency assessments, support the alignment of optical standards, stand up Space-Based Environmental Monitoring force design analysis, and evaluate paths forward for DoD unique IoT devices. The funds will also enable expansion and maturing of digital engineering and validation activities by enhancing a networked data simulation capability which can evaluate combinations of government and commercial constellations through Wargaming, software-in-the-loop, and hardware-in-the-loop evaluation. The continued work on C2, cyber, PNT, logistics, and communications from the Spectrum Warfare focus area will help bring together the full strategic picture to ensure communication between senior leaders and their forces in order to protect and defend the nation's interests. These efforts are crucial to allow a better understanding of the communication deltas that need to be resolved to support the Joint fight.			
Accomplishments/Planned Programs Subtotals	0.000	42.300	95.541

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

E. Acquisition Strategy

SWAC collaborates with stakeholders and mission partners to access appropriate and existing contract vehicles to focus resources on USSF mission priorities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1203622SF / *Space Warfighting Analysis*	Project (Number/Name) 646021 / *Space Warfighting Analysis Center (SWAC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Warfighting Analysis Center (SWAC)	Various	Various - TBD : TBD : TBD	-	-		42.300	Dec 2023	95.541	Dec 2024	-		95.541	Continuing	Continuing	-
		Subtotal	-	-		42.300		95.541		-		95.541	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		42.300		95.541		-		95.541	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203622SF / *Space Warfighting Analysis*	**Project (Number/Name)** 646021 / *Space Warfighting Analysis Center (SWAC)*

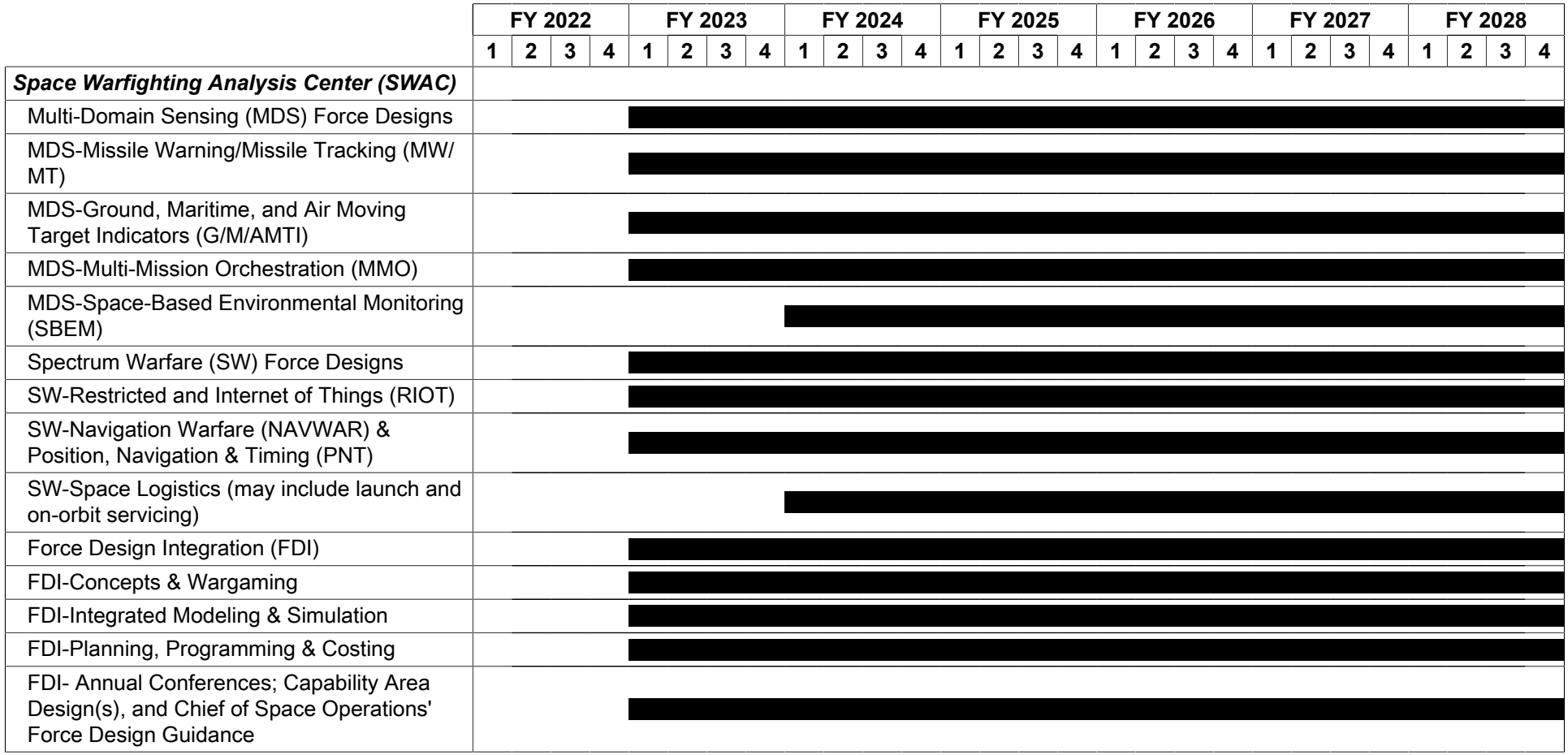

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203622SF / *Space Warfighting Analysis*	**Project (Number/Name)** 646021 / *Space Warfighting Analysis Center (SWAC)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Warfighting Analysis Center (SWAC)				
Multi-Domain Sensing (MDS) Force Designs	1	2023	4	2028
MDS-Missile Warning/Missile Tracking (MW/MT)	1	2023	4	2028
MDS-Ground, Maritime, and Air Moving Target Indicators (G/M/AMTI)	1	2023	4	2028
MDS-Multi-Mission Orchestration (MMO)	1	2023	4	2028
MDS-Space-Based Environmental Monitoring (SBEM)	1	2024	4	2028
Spectrum Warfare (SW) Force Designs	1	2023	4	2028
SW-Restricted and Internet of Things (RIOT)	1	2023	4	2028
SW-Navigation Warfare (NAVWAR) & Position, Navigation & Timing (PNT)	1	2023	4	2028
SW-Space Logistics (may include launch and on-orbit servicing)	1	2024	4	2028
Force Design Integration (FDI)	1	2023	4	2028
FDI-Concepts & Wargaming	1	2023	4	2028
FDI-Integrated Modeling & Simulation	1	2023	4	2028
FDI-Planning, Programming & Costing	1	2023	4	2028
FDI- Annual Conferences; Capability Area Design(s), and Chief of Space Operations' Force Design Guidance	1	2023	4	2028

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1203710SF / *EO/IR Weather Systems*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	156.631	86.519	95.615	0.000	95.615	78.458	80.184	81.822	84.780	0.000	664.009
643730: *EO/IR Weather System Dev*	-	156.631	86.519	95.615	0.000	95.615	78.458	80.184	81.822	84.780	0.000	664.009
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In compliance with the 2015, 2016, 2017, and 2020 National Defense Authorization Act (NDAA) and Joint Requirements Oversight Council (JROC) Memo's 092-14, 062-17, and 031-22, EWS will provide global Low-Earth Orbit (LEO) coverage to meet Space-Based Environmental Monitoring (SBEM) Electro-Optical/Infrared (EO/IR) Gaps 1) Cloud Characterization (CC) and 2) Theatre Weather Imagery (TWI). This capability will operationally replace the obsolete and aging Defense Meteorological Satellite Program (DMSP) projected end-of-life June 2026, and the EWS-Geostationary (EWS-G) projected end-of-life Sept 2030. Without the CC and TWI data, production of global predictive weather data will be severely impacted, affecting daily air operations and intelligence gathering for strategic mission planning. Moreover, INDOPACOM, CENTCOM, and AFRICOM will be unable to forecast and monitor adverse weather conditions over eastern Africa and the Indian Ocean. Lastly, the US will not meet the DoD responsibility of maintaining the SBEM civil/international partnership for the Family of Systems architecture.

Based on SBEM Capability Assessment and Strategy Review (CASR) in April 2019, the current EWS acquisition strategy focuses on a distributed LEO architecture, for scalability and increased operational resilience. The Space Force will pursue prototyping of latest industry capabilities for simplified sensor designs, while meeting CC and TWI requirements and data latencies in a distributed architecture.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver EWS for weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203710SF / *EO/IR Weather Systems*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	162.274	96.519	95.817	0.000	95.817
Current President's Budget	156.631	86.519	95.615	0.000	95.615
Total Adjustments	-5.643	-10.000	-0.202	0.000	-0.202
• 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	-5.643	0.000			
• Other Adjustments	0.000	0.000	-0.202	0.000	-0.202

Change Summary Explanation

FY 2022: -5.643M for SBIR reduction

FY 2023: -10.000M for Congressional Directed Reductions

FY 2024: -0.630M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Electro-Optical/Infrared Weather System (EWS)	156.631	86.519	95.615	0.000	95.615
Description: EWS will focus on an overlapping three-phased approach intended to mature multi-spectral imaging capabilities to collect and disseminate terrestrial atmospheric phenomena to support Department of Defense (DoD) operations. Primary effort will focus on competitive prototyping of the latest industry sensor and bus designs, development, integration, test, launch and successful on-orbit demonstrations. This effort will also assess current industrial capability to deliver CC and TWI data in a viable commercial service business, hosted on a proliferated LEO mesh network. Program will minimize technology maturity risks by evaluating multiple, competitive EO/IR sensors, satellite vehicle prototypes and commercial services in order to inform a decision on a cost-effective system or service to replace the DMSP constellation in a timely manner. Per the approved EWS Acquisition Strategy, the Program Office will continue to competitively prototype sensor and bus designs for a proliferated-LEO architecture while leveraging the existing SBEM Family of Systems (Phase II), and on-ramp to an operational system (Phase III) based on the success of Phase II in time to operationally replace DMSP					

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203710SF *I EO/IR Weather Systems*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
and EWS-G at their end of life. Leveraging the success of these efforts, the Program Office intends to field an affordable and highly capable operational replacement system in Phase III. ***FY 2023 Plans:*** For Phase II Modernized Pathfinder efforts: For Orion Space Solutions Technology Demonstration, complete associated space vehicle and launch vehicle integration. Conduct root-cause analysis for orbital insertion issue with initial demonstration launch. Re-plan, contract, build, integrate, and test additional technology demonstration. For Increment 0 Operational Demonstrations, continue General Atomics Operational Demonstration #1 build, Integration & Test (I&T) activities. Develop and coordinate mission unique requirements with SSC launch enterprise to maintain planned launch schedule by end of FY 2025. These efforts will inform a second operational demonstration #2 starting in FY 2024. 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 2024 Base Plans:*** For Phase II Modernized Pathfinder efforts: For the additional Orion Space Solutions Technology Demonstration, complete associated space vehicle and launch vehicle integration, on-orbit calibration and check-out, and technology demonstration. Assess prototype microbolometer performances in Early Morning Orbit and feed results to Phase III operational system acquisition strategy. For Increment 0 Operational Demonstrations: continue Operational Demonstration #1 build, Integration & Test (I&T) activities in preparation for an FY 2025 launch. Begin pre-acquisition activities and execute contract award of Operational Demonstration #2. Prepare for Acquisition Strategy decision in FY 2025 to support Phase III Operational Replacement definition. 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 2024 OCO Plans:***					

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203710SF *I EO/IR Weather Systems*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased slightly due to ramping down of Phase II on-orbit technology demonstration of Orion Space Solution Technology Demonstration while ramping up to build, integrate and prepare Phase II Operational Demonstration #1 initial operational demonstration for launch.					
Accomplishments/Planned Programs Subtotals	156.631	86.519	95.615	0.000	95.615

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

In accordance with the approved SBEM Acquisition Strategy (Sep 2020), the Space Force will continue to address Joint SBEM gaps with a combination of DoD materiel and non-materiel solutions, partnerships, and commercial, civil, and allied data. EWS will continue to use Section 815, Other Transaction Authority (OTA), to competitively pursue a scalable, proliferated-LEO architecture based on technological advancements in smaller sensor design and leveraging commercial-based capabilities. The Phase II modernized pathfinder efforts will include OTA contracts for technology risk reduction and operational demonstration efforts. The purpose of Phase II is to explore various technology projects and partnerships to determine the most technically acceptable, resilient, and affordable option to support Phase III. Informed by Phase II, the Phase III operational system replacement acquisition strategy will be decided in early FY 2025 and will consider modern architectures such as proliferated-LEO, hosted-payload, or other commercial capabilities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1203710SF / *EO/IR Weather Systems*	Project (Number/Name) 643730 / *EO/IR Weather System Dev*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Phase II Demo 1	C/Various	Various : Various	-	144.957	Dec 2021	71.409	Dec 2022	50.891	Dec 2023	-		50.891	Continuing	Continuing	-
Phase II Demo 2	C/Various	TBD : TBD	-	0.171	Dec 2022	-		29.106	Jul 2024	-		29.106	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA	-	1.347	Nov 2022	2.326	Jan 2023	2.178	Jan 2024	-		2.178	Continuing	Continuing	-
Enterprise Systems Engineering & Integration	C/CPIF	Engility Corp : Andover, WA	-	2.145	Nov 2022	2.527	Jan 2023	2.625	Jan 2024	-		2.625	Continuing	Continuing	-
SBIR/STTR	C/Various	TBD : TBD	-	-		2.924	Mar 2024	3.347	Mar 2024	-		3.347	Continuing	Continuing	-
		Subtotal	-	148.620		79.186		88.147		-		88.147	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp : El Segundo, CA	-	2.020	Jan 2022	3.489	Jan 2023	3.267	Jan 2024	-		3.267	Continuing	Continuing	-
A&AS	Various	Various : Various	-	5.911	Jan 2022	3.757	Jan 2023	4.111	Jan 2024	-		4.111	Continuing	Continuing	-
Other Support	Various	Various : Various	-	0.080	Oct 2021	0.087	Oct 2022	0.090	Oct 2023	-		0.090	Continuing	Continuing	-
		Subtotal	-	8.011		7.333		7.468		-		7.468	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	156.631		86.519		95.615		-		95.615	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203710SF / *EO/IR Weather Systems*	**Project (Number/Name)** 643730 / *EO/IR Weather System Dev*

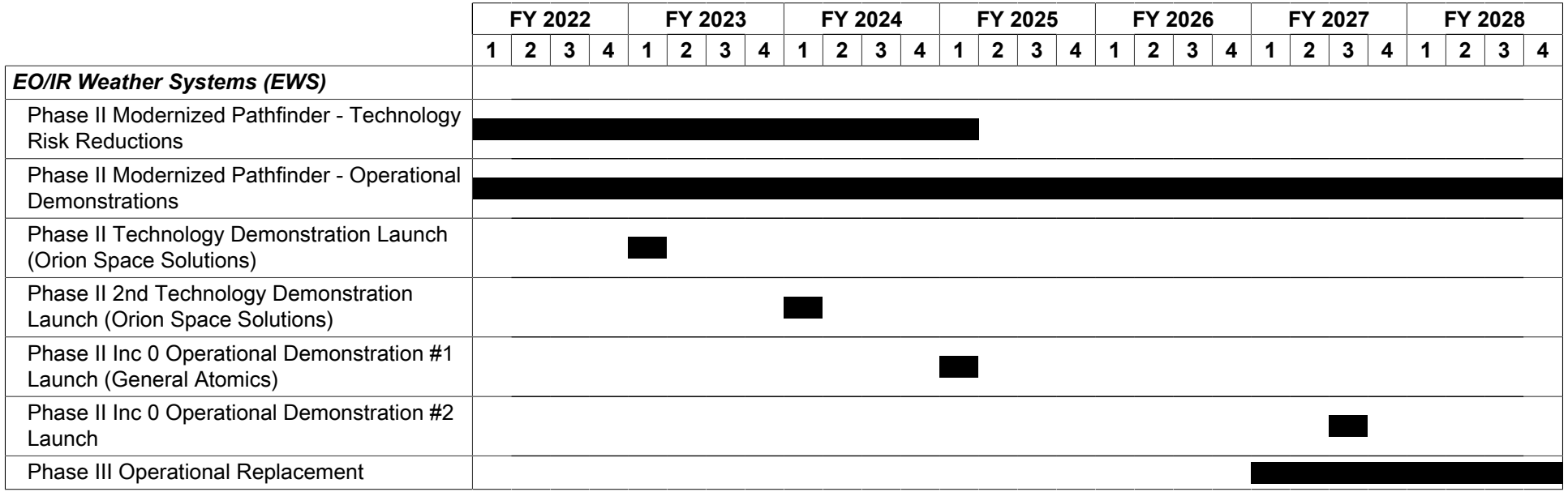

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203710SF / *EO/IR Weather Systems*	**Project (Number/Name)** 643730 / *EO/IR Weather System Dev*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
EO/IR Weather Systems (EWS)				
Phase II Modernized Pathfinder - Technology Risk Reductions	1	2022	1	2025
Phase II Modernized Pathfinder - Operational Demonstrations	1	2022	4	2028
Phase II Technology Demonstration Launch (Orion Space Solutions)	1	2023	1	2023
Phase II 2nd Technology Demonstration Launch (Orion Space Solutions)	1	2024	1	2024
Phase II Inc 0 Operational Demonstration #1 Launch (General Atomics)	1	2025	1	2025
Phase II Inc 0 Operational Demonstration #2 Launch	3	2027	3	2027
Phase III Operational Replacement	1	2027	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1203905SF / *Space System Support*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	37.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	37.000
646021: *Space Warfighting Analysis Center (SWAC)*	-	37.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	37.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2023, this program, BA 4 PE 1203905SF, Space System Support, Project 646021 Space Warfighting Analysis Center efforts were transferred to PE 1203622SF, Space Warfighting Analysis Center.

A. Mission Description and Budget Item Justification

The United States Space Force (USSF) initiated and activated the Space Warfighting Analysis Center (SWAC) in mid-FY 2021, and programmed FY 2022 funding to enable the organization to begin conducting its specialized mission. In the absence of a newly-created, SWAC-specific Program Element (PE) at the time of the budget request (FY 2022 President's Budget), the SWAC conducted FY 2022 efforts from Program Element 1203905SF (Space System Support) in the 3620 Research, Development, Test, and Evaluation (RDT&E) appropriation. In FY 2023, SWAC will begin using the newly established PE 1203622SF for all activities, thus, no further funding in FY 2023 will be directed to PE 1203905SF.

It is important to note that PE 1206730SF, Space Security Defense Program (SSDP) mission is distinctly different and intentionally separate from the USSF's SWAC; SSDP focuses its reach across the National Security Space spectrum and Space Control mission area while the SWAC's mission is aligned with Service authorities and focuses on USSF-specific priorities.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203905SF / *Space System Support*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	37.000	0.000	0.000	0.000	0.000
Current President's Budget	37.000	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

Change Summary Explanation

In FY 2022, PE 1203905SF, Space System Support, Project 646021 was used for Space Warfighting Analysis Center (SWAC) activities. SWAC activities continued efforts in FY 2023 from PE 1203622SF, Space Warfighting Analysis Center, 3620 Research, Development, Test, & Evaluation appropriation.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Warfighting Analysis Center (SWAC)	37.000	0.000	-
Description: Space Warfighting Analysis Center (SWAC) will be resourced to inform operational concepts and Force Design guidance for United States Space Force (USSF) missions by conducting analysis, modeling, wargaming, and experimentation for Research, Development, Testing, and Evaluation (RDT&E) purposes. ***FY 2023 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** NA			
Accomplishments/Planned Programs Subtotals	37.000	0.000	-

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1203905SF / *Space System Support*

E. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1203905SF / *Space System Support*	Project (Number/Name) 646021 / *Space Warfighting Analysis Center (SWAC)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Warfighting Analysis Center	Various	Various - TBD : TBD	-	37.000	Dec 2021	-		-		-		-	0.000	37.000	-
		Subtotal	-	37.000		-		-		-		-	0.000	37.000	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	37.000		-		-		-		-	0.000	37.000	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203905SF / *Space System Support*	**Project (Number/Name)** 646021 / *Space Warfighting Analysis Center (SWAC)*

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4
Space Warfighting Analysis Center (SWAC)																												
Multi-Domain Awareness (MDA) Force Design			[redacted]																									
MDA Missile Warning/Missile Tracking (MW.MT)			[redacted]																									
MDA-Tactical Intelligence, Surveillance, and Reconnaissance (T-ISR)			[redacted]																									
Spectrum Warfare (SW) Force Designs			[redacted]																									
SW-Space Data Transport (SDT)			[redacted]																									
SW-Navigation Warfare (NAVWAR) &Position, Navigation & Timing (PNT)			[redacted]																									
Force Design Integration (FDI)			[redacted]																									
FDI-Planning, Programming & Costing (P2C)			[redacted]																									
FDI- Annual Conferences; Capability Area Design(s), and Chief of Space Operations' Force Design Guidance			[redacted]																									

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1203905SF / *Space System Support*	**Project (Number/Name)** 646021 / *Space Warfighting Analysis Center (SWAC)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Warfighting Analysis Center (SWAC)				
Multi-Domain Awareness (MDA) Force Design	3	2022	4	2022
MDA Missile Warning/Missile Tracking (MW.MT)	3	2022	4	2022
MDA-Tactical Intelligence, Surveillance, and Reconnaissance (T-ISR)	3	2022	4	2022
Spectrum Warfare (SW) Force Designs	3	2022	4	2022
SW-Space Data Transport (SDT)	3	2022	4	2022
SW-Navigation Warfare (NAVWAR) &Position, Navigation & Timing (PNT)	3	2022	4	2022
Force Design Integration (FDI)	3	2022	4	2022
FDI-Planning, Programming & Costing (P2C)	3	2022	4	2022
FDI- Annual Conferences; Capability Area Design(s), and Chief of Space Operations' Force Design Guidance	3	2022	4	2022

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206410SF / *Space Technology Development and Prototyping*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	1,015.822	2,081.307	0.000	2,081.307	1,626.682	1,736.618	1,925.304	1,894.456	Continuing	Continuing
643729: *Integration and Battle Management*	-	0.000	89.072	126.661	0.000	126.661	153.462	44.169	37.259	38.600	Continuing	Continuing
643731: *Transport*	-	0.000	845.442	1,847.944	0.000	1,847.944	1,436.717	1,692.449	1,888.045	1,855.856	Continuing	Continuing
643732: *Sensing*	-	0.000	81.308	106.702	0.000	106.702	36.503	0.000	0.000	0.000	Continuing	Continuing

Note

This program element includes funds for the Tranche 1 Transport Layer program, which is a Middle Tier of Acquisition effort. The total cost of the Tranche 1 Transport Layer Middle Tier of Acquisition effort is $3,199.0 million. The Tranche 1 Transport Layer program is fully funded across the Future Years Defense Program.

A. Mission Description and Budget Item Justification

SDA is responsible for developing and demonstrating the next generation proliferated warfighter space architecture to enable U.S. military operations to be responsive to emerging multi-domain threats against our national security. To achieve that goal, SDA will help inform the Department of Defense (DoD)'s decision to develop and implement a proliferated architecture enabled by lower-cost, mass-produced space vehicles and routine space access; and shift the DoD to a development organization focused on experimentation, prototyping, and accelerated fielding. SDA will manage, direct, and execute the development of the space capabilities for the joint warfighter in accordance with DoD's Space Vision and field space capabilities at speed and scale, with the following goals:

- Bold breakthroughs designed to out-pace our competitors,
- Mission-focused technology maturation and systems engineering,
- Value-based lean engineering, manufacturing, and support,
- Warfighter-centric capability development enabling joint all-domain operations,
- Industrial base expansion; streamlined development and acquisition processes, and
- Increased acquisition cooperation across the space enterprise.

SDA will rapidly deploy critical elements of next-generation space capabilities, initially focusing on these essential capabilities:

- Indications, warnings, targeting, and tracking for defense against advanced missile threats,
- Alternate position, navigation, and timing (PNT) for a navigation warfare (NAVWAR) resilient environment,
- Responsive, resilient, common ground-based space support infrastructure (e.g., optical and RF ground stations and commercially-oriented satellite operations centers),
- Cross-domain, networked, node-independent battle management command, control, and communications (BMC3), and
- Highly-scaled, low-latency, persistent, resilient proliferated Low Earth Orbit (LEO) space data transport.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206410SF *I Space Technology Development and Prototyping*

The establishment of a proliferated data transport layer in LEO is essential to developing a new, responsive space architecture, and will be SDA's primary initial focus within the Proliferated Warfighter Space Architecture (PWSA). SDA will develop an initial set of sub-constellations in conjunction with this Transport Layer to provide additional capabilities, such as advanced missile warning and tactical satellite communications.

This program element funds efforts to develop and demonstrate a prototype proliferated Low Earth Orbit (pLEO) communications and data transport layer and its sub-constellations in support of the DoD Space Vision.

This program element may include necessary civilian pay expenses and contractor support required to facilitate delivery of the Transport capability.

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

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	986.822	1,680.407	0.000	1,680.407
Current President's Budget	0.000	1,015.822	2,081.307	0.000	2,081.307
Total Adjustments	0.000	29.000	400.900	0.000	400.900
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	29.000			
• 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	400.900	0.000	400.900

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 643731: *Transport*		
Congressional Add: *Laser Communication Downlink Systems*	0.000	25.000
Congressional Add: *Space Architecture Experimental Testbed*	0.000	4.000
Congressional Add Subtotals for Project: 643731	0.000	29.000
Congressional Add Totals for all Projects	0.000	29.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206410SF *I Space Technology Development and Prototyping*

Change Summary Explanation

The worked performed in this program element is a continuation of efforts that in FY 2022 are funded in Appropriation 0400, RDT&E, Defense-Wide, BA 4, PE 1206410SDA.

FY 2023 Congressional marks resulted in a net gain of $29.0M. Project 643731 (Transport) was increased by $4.0M to support the space architecture experimental testbed and increased by $25.0M to support laser communication downlink systems demonstrating space-to-air and space-to-ground data transport capabilities. FY 2023 Congressional marks also included $22.5M for Tranche 1 Space Resiliency Payloads, but the funds were realigned to RDT&E, BA 5, PE 1206446SF.

FY 2024 increases for Tranche 1 and Tranche 2 advanced component development and prototyping, and includes a budget realignment from RDT&E, PE 1206310SF, to support those activities.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206410SF / *Space Technology Development and Prototyping*	Project (Number/Name) 643729 / *Integration and Battle Management*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
643729: *Integration and Battle Management*	-	0.000	89.072	126.661	0.000	126.661	153.462	44.169	37.259	38.600	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

SDA is developing and demonstrating next generation space capabilities for the joint warfighter enabled by proliferation of satellites in Low Earth Orbit (LEO) and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department of Defense (DoD) space needs as stated in the National Defense Strategy and DoD Space Vision, including space-based battle management and a ground support infrastructure. SDA will orchestrate the rapid development and fielding of the Proliferated Warfighter Space Architecture (PWSA), a resilient military sensing and data transport capability via a proliferated space architecture in LEO. This program element funds the development and demonstration of space technologies to deliver space-based command and control, tasking, mission processing and dissemination capabilities, as well as an integrated, resilient network of ground support capabilities, to U.S. joint warfighting forces in bi-annual tranches, beginning in FY 2022.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Integration and Battle Management	0.000	89.072	126.661
Description: Deliver capabilities to U.S. joint warfighting forces in two-year enhanced capability tranches, beginning in FY 2022. Products include but are not limited to performing trade studies, technical analyses, or modeling and simulation; identifying and maturing enabling technologies; defining and conducting ground-based and on-orbit risk reduction demonstrations, prototyping hardware or software systems; and exploring novel concepts for future warfighting capabilities augmented by a resilient proliferated Low Earth Orbit (pLEO) satellite architecture.			
FY 2023 Plans: Tranche 0: - Complete launch vehicle integration and services. - Complete design, integration, and installation of ground operations center. - Conduct on-orbit command and control operations from ground operations center. - Begin conducting Capstone demonstrations. Tranche 1 - Complete the Critical Design Review (CDR) for the development of the Network Operations Centers. - Begin formulating requirements for Operations, Maintenance, and Sustainment of the Network Operations Centers.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643729 / *Integration and Battle Management*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- Establish analytical baseline for systems, mission and value engineering analyses. - Begin development of battle management command, control, and communications (BMC3) Layer Application Factory software to enable common data processing and fusion across all Transport Layer satellites. Tranche 2 - Conduct early risk reduction studies designed to explore opportunities for ground capability expansion, the design and construct of a Government Owned, Contractor Operated (GOCO) Test and Checkout Center (TCC) for future tranche integration, and alternate acquisition models based on emerging ground requirements. - Identify extensions and/or additional capabilities required in SDA Network Operations Centers for ground command and control of Tranche 2 assets.			
FY 2024 Plans: Tranche 0 - Continue on-orbit command and control operations from ground operations center. - Continue to coordinate post-Capstone demonstrations and experimentation with warfighters and partner organizations. - Demonstrate on-orbit data fusion to inform command and control operations. Tranche 1 - Define CONOPS and complete validation and verification for Tranche 1 for Ground based mission segment and define the GOCO architecture. - Finalize Network Operations Center modifications at Redstone Arsenal and Grand Forks for Tranche 1 satellite operations. - Develop Ground Segment Ground Entry Strategy, Operations Center Vision, and Basing Actions and prepare for readiness tests. - Leverage Tranche 0 radio frequency (RF) antenna options and identify potential to increase antenna capability. - Fund mission unique hardware and integration of the Tranche 1 space vehicles on the National Security Space Launch (NSSL) Launch vehicles. - Coordinate software-in-the-loop (SIL) and hardware-in-the-loop (HIL) activities to ensure compatibility and interoperability of Factory with Operations and Integration (O&I). - Continue development of the O&I Operations, Maintenance, and Sustainment ground operations center. - Continue development of the Application Factory that will serve as the foundation of the BMC3 Layer. - Complete the CDR of the BMC3 Layer Application Factory software that enables common data processing and fusion across all Transport Layer satellites. - Establish design standards to ensure forward compatibility and begin designing Applications for the BMC3 Layer Application Factory to processing data on-board the space vehicle. - Begin designing additional BMC3 Layer Applications for supporting additional services and users.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643729 / *Integration and Battle Management*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Tranche 2 - Initiate Tranche 2 acquisition and source selection processes leading to ground integrator procurement instruments. - Award contract for the Tranche 2 ground integrator. - Begin formulating ground operations integration requirements for follow-on Tranches. - Continue development of the TCC as a standalone Space Networking Center with terrestrial connectivity, Ground Entry Points (GEP), and all other necessary infrastructure to support the full range of Tranche 2 system operations. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** The increase between the FY 2023 amount and the FY 2024 amount supports an increase in Tranche 1 Operations and Integration activities in preparation for the Tranche 1 Launches, as well as Tranche 2 and BMC3 activities.			
Accomplishments/Planned Programs Subtotals	0.000	89.072	126.661

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• RDTE 04 1206410SDA: *Space Technology Development and Prototyping/Project 003 Integration and Battle Management*	130.719	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

The worked performed in this PE continues efforts that were previously funded in RDT&E BA 4, PE 1206410SDA, in FY 2022.

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space Systems Command (SSC), Space Rapid Capabilities Office (SpRCO), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, non-traditional aerospace and defense contractors, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206410SF / *Space Technology Development and Prototyping*	Project (Number/Name) 643729 / *Integration and Battle Management*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tranche 0	C/FFP	Various : Various	-	0.000		3.700	Mar 2023	0.000		0.000		0.000	Continuing	Continuing	-
Tranche 1 Integration and Ground Activities	Various	Various : Various	-	0.000		76.109	Feb 2023	116.605	Nov 2023	0.000		116.605	Continuing	Continuing	-
Tranche 2 Integration and Ground Activities	Various	TBD : TBD	-	0.000		9.263	Jun 2023	10.056	Mar 2024	0.000		10.056	Continuing	Continuing	-
		Subtotal	-	0.000		89.072		126.661		0.000		126.661	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		89.072		126.661		0.000		126.661	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643729 / *Integration and Battle Management*

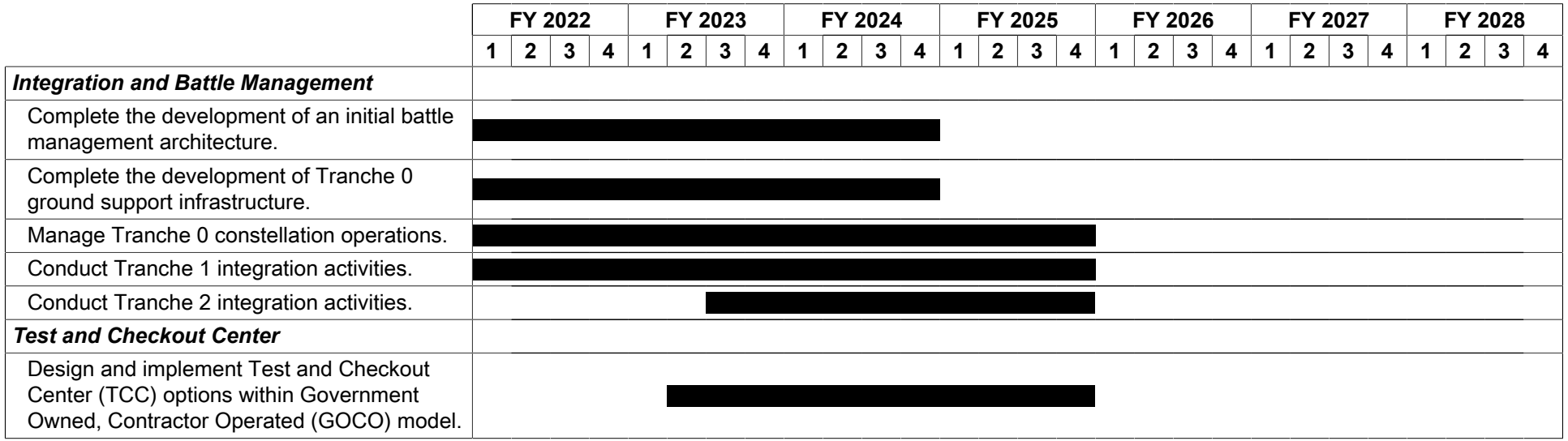

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643729 / *Integration and Battle Management*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Integration and Battle Management				
Complete the development of an initial battle management architecture.	1	2022	4	2024
Complete the development of Tranche 0 ground support infrastructure.	1	2022	4	2024
Manage Tranche 0 constellation operations.	1	2022	4	2025
Conduct Tranche 1 integration activities.	1	2022	4	2025
Conduct Tranche 2 integration activities.	3	2023	4	2025
Test and Checkout Center				
Design and implement Test and Checkout Center (TCC) options within Government Owned, Contractor Operated (GOCO) model.	2	2023	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206410SF / *Space Technology Development and Prototyping*	Project (Number/Name) 643731 / *Transport*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
643731: *Transport*	-	0.000	845.442	1,847.944	0.000	1,847.944	1,436.717	1,692.449	1,888.045	1,855.856	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	21	-	21	105	-	-	-		

Note

FY 2024 RDT&E funding for PE 1206410SF, Program 643731 is in compliance with budgeted end items per the approved test strategy and FY 2023 Omnibus, Sec. 8059.

A. Mission Description and Budget Item Justification

SDA is developing and demonstrating next generation space capabilities for the joint warfighter enabled by proliferation of satellites in Low Earth Orbit (LEO) and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department of Defense (DoD) space needs as stated in the National Defense Strategy and DoD Space Vision, including low-latency tactical communication enabling beyond line of sight targeting and advanced missile tracking. SDA is orchestrating the rapid development and fielding of the Proliferated Warfighter Space Architecture (PWSA), a resilient military sensing and data transport capability via a proliferated space architecture in LEO. This program element funds the development and demonstration of space technologies to deliver low-latency data transport and alternate position, navigation, and timing capabilities to U.S. joint warfighting forces in bi-annual tranches, beginning in FY 2022.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Transport	0.000	796.242	1,809.964

Description: Rapidly develop, deploy and demonstrate prototypes that enable a resilient and unified military data transport layer, sensor capabilities, and alternate position, navigation, and timing (APNT) capabilities enabled by a proliferated Low Earth Orbit (pLEO) architecture. This effort will define, demonstrate, and deliver the architectures and standards necessary to rapidly prototype and field new satellite capabilities in LEO.

FY 2023 Plans:

Tranche 0:
- Complete launch of Transport and Tracking satellites.
- Complete on-orbit flight operations and verify satellite-to-satellite and satellite-to-ground communications on Tranche 0 satellites.
- Conduct Tranche 0 Capstone operational demonstration.
- Leverage Tranche 0 satellites as a testbed for investigating additional capabilities after Capstone demonstration.
- Integrate additional interoperable massless payload capabilities within Tranche 0 satellites.

Tranche 1:
- Finalize design through Critical Design Review (CDR) for the Transport Layer Tranche 1 space vehicles.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643731 / *Transport*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- Investigate interoperable payloads for optical inter-satellite links for communications, radio-frequency (RF) communications, and Link-16 tactical data link operations. - Begin space vehicle assembly, integration, and test (AI&T). - Continue ground systems site development, integration, and installation in advance of operations and integration efforts at Tranche 1 Network Operations Centers under development at Grand Forks AFB, ND and Redstone Arsenal, AL. - Complete design through CDR for the Operations and Integration Layer Tranche 1 ground operations centers. - Continue hardware development and risk reduction for battle management command, control, and communications (BMC3) modules for Transport Layer satellites. Tranche 2: - Leverage lessons learned and accomplishments from Tranches 0 and 1 to inform space vehicle, ground, and interoperability design requirements for Tranche 2 and start development of the next set of capabilities. - Determine minimum viable capability for Tranche 2 Transport, tactical satellite communications and future tactical data link constellation components. - Receive concurrence from the warfighting community on performance requirements for Tranche 2. - Initiate Tranche 2 acquisition and source selection processes leading to space vehicle vendor procurement instruments. - Award initial Tranche 2 space vehicle contracts. ***FY 2024 Plans:*** Tranche 0 - Continue to leverage Tranche 0 satellites as a testbed for investigating additional capabilities after Capstone demonstrations. - Integrate additional interoperable massless payload capabilities within Tranche 0 satellites. Tranche 1 - Finish AI&T of Transport space vehicles in preparation for Transport space vehicle launches. - Determine readiness of hardware and software procedures to support the start of testing. - Determine readiness to ship flight hardware, software, and support equipment to launch site and launch site readiness to receive. - Evaluate the space flight worthiness of the space vehicle and launch vehicle flight hardware prior to integration, encapsulation, and upper stage mate. - Determine readiness for launch. - Ensure readiness to conduct launch and early orbit phase operations, transition to nominal operations, and provide continuing space vehicle and enterprise management and sustainment. - Begin launching the T1 Transport Layer space vehicles.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643731 / *Transport*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- Continue hardware development and risk reduction for BMC3 modules for Transport Layer satellites. Tranche 2 - Continue designing the Tranche 2 Transport Layer space vehicles based on requirements and lesson learned from Tranche 0 and 1 space vehicles, ground system, and interoperability requirements. - Award Tranche 2 space vehicle contracts. - Continue establishing constellation design requirements for incorporating additional tactical data links into the Transport Layer, likely via the incorporation of Transport Layer vehicles hosting alternate data links. - Complete Preliminary Design Review (PDR) and order long-lead items. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** The increase between the FY 2023 amount and the FY 2024 amount reflects the concurrent execution of Tranche 0 to include capstone demonstrations, the significant increase in Tranche 1 activities to support launches, and Tranche 2 activities.			
Title: Classified Program ***Description:*** Due to the classified nature of this project, specific details are available at a higher classification level. ***FY 2023 Plans:*** Due to the classified nature of this project, specific details are available at a higher classification level. ***FY 2024 Plans:*** Due to the classified nature of this project, specific details are available at a higher classification level. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Due to the classified nature of this project, specific details are available at a higher classification level.	0.000	20.200	37.980
Accomplishments/Planned Programs Subtotals	0.000	816.442	1,847.944

	FY 2022	FY 2023
Congressional Add: Laser Communication Downlink Systems	0.000	25.000
FY 2022 Accomplishments: N/A		
FY 2023 Plans: Develop ground, maritime and air optical communications terminals, leveraging the technical and manufacturing maturity of the current optical communications vendor market to quickly provide this capability at a lower cost and with a shorter deployment timeline. Demonstration spacecraft will be updated		

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643731 / *Transport*

	FY 2022	FY 2023
to downlink to mobile (ground, sea, and airborne) receivers that are ruggedized, and with the size, weight and power usable for mobile forces and in compliance with standards set forth by SDA.		
Congressional Add: Space Architecture Experimental Testbed ***FY 2022 Accomplishments:*** N/A ***FY 2023 Plans:*** Establish a Test & Checkout Center (TCC) as a standalone Space Networking Center with terrestrial connectivity, Ground Entry Points (GEP), and all other necessary infrastructure to support the full range of T2 system operations. The TCC would be used for Space Vehicle initialization, functional checkout, orbit raising and phasing, interoperability validation, and all other on-orbit system readiness preparations, allowing for a deliberate and orderly crossover to the SDA Space Networking Centers at Grand Forks Air Force Base, ND and Redstone Arsenal, AL.	0.000	4.000
Congressional Adds Subtotals	0.000	29.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• RDTE 04 1206410SDA: *Space Technology Development and Prototyping/ Project 001 Transport*	270.602	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

The worked performed in this PE continues efforts that were previously funded in RDT&E BA 4, PE 1206410SDA, in FY 2022.

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space Systems Command (SSC), Space Rapid Capabilities Office (SpRCO), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, non-traditional aerospace and defense contractors, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206410SF / *Space Technology Development and Prototyping*	Project (Number/Name) 643731 / *Transport*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Transport Tranche 0	Various	Various : Various	-	0.000		2.676	Mar 2023	7.700	Mar 2024	0.000		7.700	0.000	10.376	-
Transport Tranche 1	Various	Various : Various	-	0.000		595.515	Oct 2022	1,031.460	Nov 2023	0.000		1,031.460	0.000	1,626.975	-
Transport Tranche 2	Various	TBD : TBD	-	0.000		198.051	Sep 2023	770.804	Nov 2023	0.000		770.804	0.000	968.855	-
Laser Communication Downlink System	Various	TBD : TBD	-	0.000		25.000	Mar 2023	0.000		0.000		0.000	0.000	25.000	-
Classified Project	Various	Various : TBD	-	0.000		20.200	Mar 2023	37.980	Nov 2023	0.000		37.980	0.000	58.180	-
Space Architecture Experimental Testbed	TBD	Not specified. : TBD	-	-		4.000	Jun 2023	-		-		-	0.000	4.000	-
		Subtotal	-	0.000		845.442		1,847.944		0.000		1,847.944	0.000	2,693.386	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		845.442		1,847.944		0.000		1,847.944	0.000	2,693.386	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643731 / *Transport*

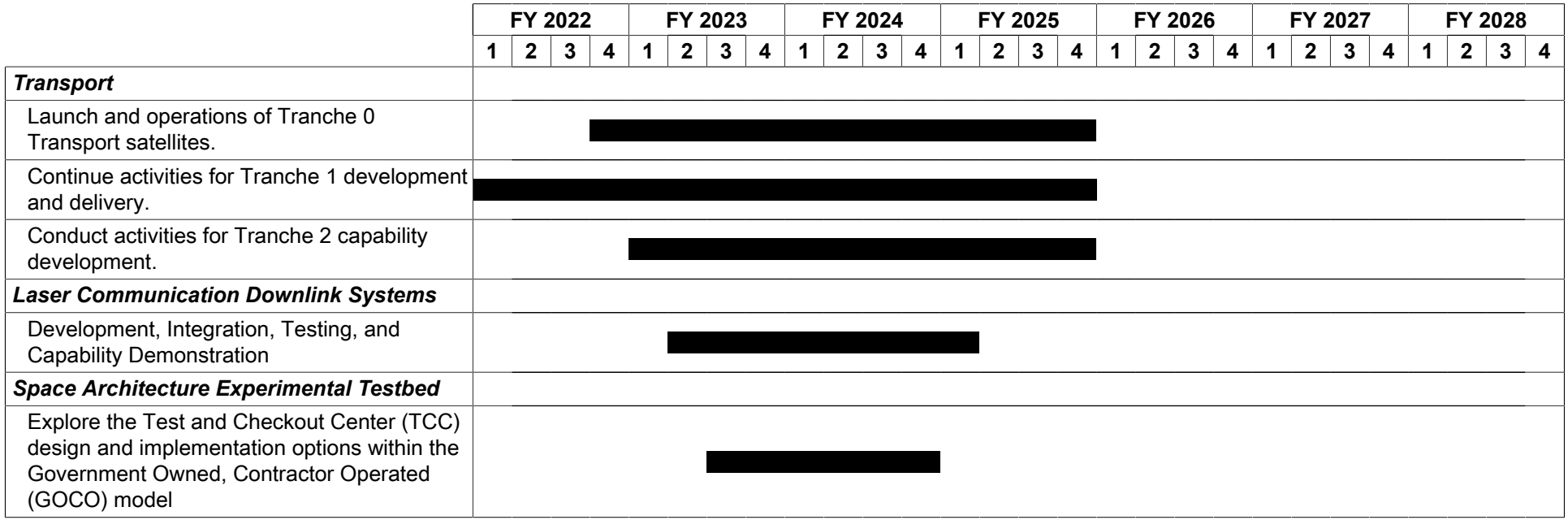

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643731 / *Transport*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Transport				
Launch and operations of Tranche 0 Transport satellites.	4	2022	4	2025
Continue activities for Tranche 1 development and delivery.	1	2022	4	2025
Conduct activities for Tranche 2 capability development.	1	2023	4	2025
Laser Communication Downlink Systems				
Development, Integration, Testing, and Capability Demonstration	2	2023	1	2025
Space Architecture Experimental Testbed				
Explore the Test and Checkout Center (TCC) design and implementation options within the Government Owned, Contractor Operated (GOCO) model	3	2023	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206410SF / *Space Technology Development and Prototyping*	Project (Number/Name) 643732 / *Sensing*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
643732: *Sensing*	-	0.000	81.308	106.702	0.000	106.702	36.503	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Funds for the Tranche 1 Tracking Layer continue in RDT&E, Space Force, PE 1206446SF.

A. Mission Description and Budget Item Justification

SDA is developing and demonstrating next generation space capabilities for the joint warfighter enabled by proliferation of satellites in Low Earth Orbit (LEO) and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department of Defense (DoD) space needs as stated in the National Defense Strategy and DoD Space Vision, including advanced missile tracking and global surveillance enabling beyond-line-of-sight targeting. SDA will orchestrate the rapid development and fielding of the Proliferated Warfighter Space Architecture (PWSA), a resilient military sensing and data transport capability via a proliferated space architecture in LEO. This program element funds the development and demonstration of space technologies to deliver advanced missile tracking, global surveillance and surface moving target custody, and enhanced space domain awareness and deterrence capabilities to U.S. joint warfighting forces in bi-annual tranches, beginning in FY 2022.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Sensing	0.000	23.456	4.002
Description: Develop and demonstrate payload prototypes compatible with a proliferated Low Earth Orbit (pLEO) architecture. This effort will focus on developing and demonstrating sensors for beyond-line-of-sight targeting, space-to-space data links, space-to-tactical data links, and advanced missile warning capabilities to enable enhanced space domain awareness. On-orbit demonstrations will be tied to existing mission-specific ground infrastructure, when it exists. Ground infrastructure will be linked or developed to support payload integration and data processing.			
FY 2023 Plans: Tranche 0: - Conduct launch of Tranche 0 Tracking satellites. - Leverage operating Tranche 0 satellites to investigate potential developmental capabilities. - Characterize high-resolution background clutter in wide range of spectral bands. - Collect data to inform medium field of view (MFOV) and wide field of view (WFOV) trades. - Demonstrate WFOV performance and cost that enables proliferation. - Conduct Tranche 0 capstone operational demonstration to validate key PWSA mission capabilities including two-dimensional (2D) tracks generated on-board, passed to Ground and to Tranche 0 space vehicles for three-dimensional (3D) fusion, and 3D tracks disseminated to user interface.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643732 / *Sensing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Tranche 1: - Integrate commercial and mission partners' satellite constellations and/or data into the PWSA to enable mission partner data to move directly into the hands of the warfighter via PWSA-enabled tactical data links. This investment creates synergy between mission partners' (commercial and government) investments in Intelligence, Surveillance, and Reconnaissance (ISR) satellite constellations, and the PWSA Transport Layer. ***FY 2024 Plans:*** Tranche 0: - Continue to leverage operating Tranche 0 satellites to investigate potential developmental capabilities. - Continue to characterize high-resolution background clutter in wide range of spectral bands. - Continue to collect data to inform medium field of view (MFOV) and wide field of view (WFOV) trades. - Continue to demonstrate WFOV performance and cost that enables proliferation. Tranche 1: - Continue to integrate commercial and mission partners' satellite constellations into the PWSA. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** The decrease between the FY 2023 and the FY 2024 amount reflects the shift from Tranche 0 to Tranche 1 activities. Funds for the Tranche 1 Tracking Layer continue in RDT&E, Space Force, PEs 1206446SF and 1206448SF.			
Title: Sabre ***Description:*** Sabre is a joint partnership executed/managed by Space Development Agency (SDA) and supported by the Office of the Secretary of Defense (OSD) Test Resource Management Center (TRMC) and United States Army Futures Command. This project will provide a three-space vehicle demonstration for space-based monitoring of telemetry data transmitted by vehicles under test (VUTs, missiles or interceptors) during flight testing. The Sabre Telemetry Relay payload module onboard the SDA NExT Low Earth Orbit (LEO) satellites will receive telemetry from VUTs during flight and relay it to range controllers on the ground. Optical inter-satellite links facilitate timely relay. Sabre will demonstrate the ability to augment or replace DoD's decades-long approach of staging ships and airplanes along ground tracks of VUTs for the purpose of telemetry collection, tracking, and flight safety. In addition to reducing infrastructure cost, Sabre will also greatly enhance range test flexibility and improve test execution operational Security. The Sabre Telemetry Relay flight demonstration will leverage previously funded OSD TRMC and U.S. Army investments for payload design. This project will also consider other missions of opportunity to enhance Joint Warfighter capabilities in LEO.	0.000	21.252	64.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643732 / *Sensing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: - Conduct mission analysis and integration. - Initiate procurement of payloads. - Engineer the mission ground segment. - Develop payload software. - Architect flight demonstrations. - Define space to ground interfaces. ***FY 2024 Plans:*** - Deliver and integrate Sabre payloads with NExT SVs. - Complete environmental testing. - Complete system Space to Ground Verification Test. - Complete system Network Verification Test. - Complete system Encryption Verification Test. - Complete Ground Readiness Review. - Conduct flight readiness review. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** The increase between the FY 2023 and the FY 2024 amount reflects payload development complexities with antennas to support TRMC's performance requirements as well as continuing efforts to prepare spacecraft for launch and test.			
Title: Classified Program ***Description:*** Due to the classified nature of this project, specific details are available at a higher classification level. ***FY 2023 Plans:*** Due to the classified nature of this project, specific details are available at a higher classification level. ***FY 2024 Plans:*** Due to the classified nature of this project, specific details are available at a higher classification level. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Due to the classified nature of this project, specific details are available at a higher classification level.	0.000	36.600	38.700
Accomplishments/Planned Programs Subtotals	0.000	81.308	106.702

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643732 / *Sensing*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• RDTE 04 1206410SDA: *Space Technology Development and Prototyping / Project 002 Sensing*	758.906	-	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

D. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space Systems Command (SSC), Space Rapid Capabilities Office (SpRCO), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, non-traditional aerospace and defense contractors, Federally Funded Research and Development Centers, and University Affiliated Research Centers.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643732 / *Sensing*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tracking Tranche 0	C/FFP	Various : Various	-	0.000		1.626	Apr 2023	0.213	Nov 2023	0.000		0.213	Continuing	Continuing	-
Transport Sensing Activities	Various	Various : Various	-	0.000		21.830	Apr 2023	3.789	Mar 2024	0.000		3.789	Continuing	Continuing	-
Sabre	C/TBD	TBD : TBD	-	0.000		21.252	Jan 2023	64.000	Nov 2023	0.000		64.000	Continuing	Continuing	-
Classified Program	C/TBD	Various : TBD	-	0.000		36.600	Jan 2023	38.700	Nov 2023	0.000		38.700	Continuing	Continuing	-
		Subtotal	-	0.000		81.308		106.702		0.000		106.702	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		81.308		106.702		0.000		106.702	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643732 / *Sensing*

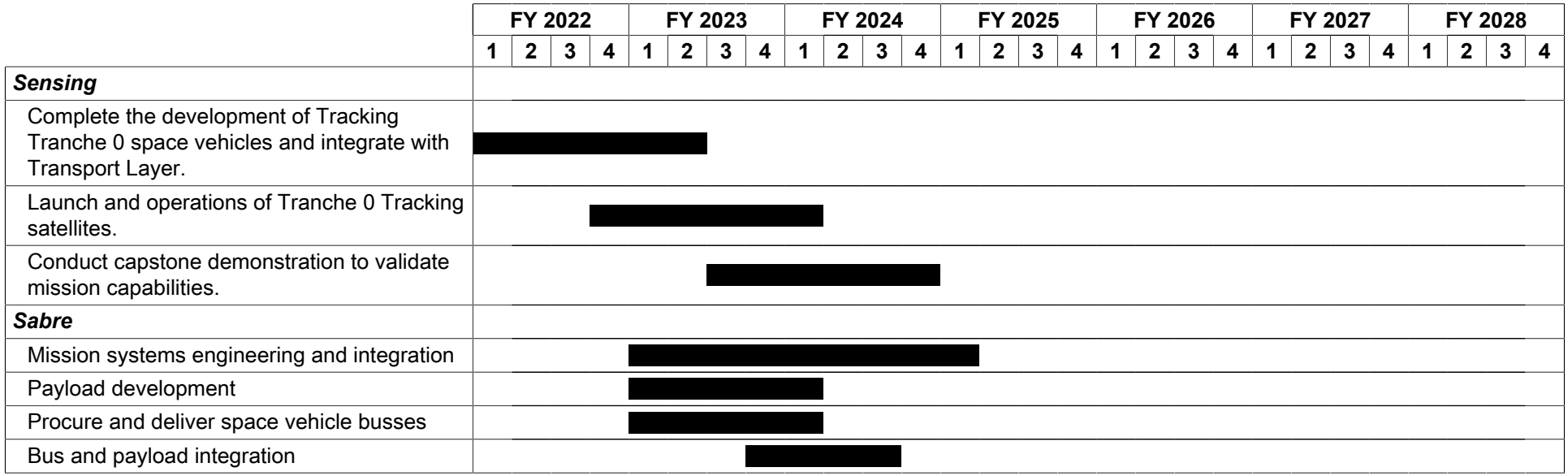

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206410SF / *Space Technology Development and Prototyping*	**Project (Number/Name)** 643732 / *Sensing*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Sensing				
Complete the development of Tracking Tranche 0 space vehicles and integrate with Transport Layer.	1	2022	2	2023
Launch and operations of Tranche 0 Tracking satellites.	4	2022	1	2024
Conduct capstone demonstration to validate mission capabilities.	3	2023	4	2024
Sabre				
Mission systems engineering and integration	1	2023	1	2025
Payload development	1	2023	1	2024
Procure and deliver space vehicle busses	1	2023	1	2024
Bus and payload integration	4	2023	3	2024

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206422SF / *Weather System Follow-on*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	64.759	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	64.759
644289: *Weather Satellite Follow-On*	0.000	64.759	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	64.759

A. Mission Description and Budget Item Justification

In FY 2023, PE 1206422SF, Weather System Follow-On, Project 644289, Weather Satellite Follow-On, R-1 Line #8 efforts were transferred to PE 1206422SF, Weather System Follow-On, Project 65A039, Weather System Follow-on - Microwave (WSF-M), R-1 Line #20 to reflect the successful completion of Milestone B on 15 May 2020. Residual budget in FY 2024 - 2025 funds has transferred from BA 4 to BA 5 in this budget cycle.

Weather System Follow-on (WSF) is a Low-Earth Orbit (LEO) microwave imaging system developed and delivered by the United States Space Force's Space Systems Command (SSC). WSF is the next generation of space-based passive microwave sensing technology. It will provide U.S. and Allied warfighters with essential weather data, including the measurement of ocean surface wind speed and direction, ice thickness, snow depth, soil moisture, and local spacecraft energetic charged particle environment. The ocean surface wind speed measurement enables tropical cyclone intensity determination by the Joint Typhoon Warning Center. The data gathered by WSF will be provided to meteorologists in support of the generation of a wide variety of weather products necessary to conduct mission planning and operations globally.

WSF is an Acquisition Category IB program comprised of two Space Vehicles (SV) and their associated command, control, and data dissemination network. Global environmental monitoring data is gathered, stored, and down-linked through the Satellite Control Network (SCN) and disseminated to Air Force and Navy weather centers. Additionally, data is broadcast real time by the satellite for utilization by heritage Direct Readout Terminals that use the data for local weather forecasting.

WSF is a Major Defense Acquisition Program (MDAP) with the Space Force as the lead component. Founded on the Space-Based Environmental Monitoring (SBEM) Analysis of Alternatives (AoA) results, the WSF will be to enable:

1) Timely weather collection over broad oceans in support of maneuvering forces;
2) Space weather capabilities to characterize operational orbits, space situational awareness, and the ionosphere.

Secondary investments may be supported to address weather gaps identified in the SBEM AoA and validated by the JROC.

Compact Ocean Wind Vector Radiometer (COWVR) is an on-orbit demonstration project of the new COWVR technology to deliver Weather Gap #3, Ocean Surface Vector Winds (OSVW) and Gap #8, Tropical Cyclone Intensity (TCI).

Energetic Charged Particles (ECP) supports the SBEM Weather Gap #11, Low Earth Orbit Energetic Charged Particle Characterization. To support this requirement, the ECP sensor will be integrated on the WSF-M satellites.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206422SF *I Weather System Follow-on*

Space acquisition must respond with speed and agility to emerging adversary threats. SSC has transformed 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, SSC 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 WSF weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	53.421	0.000	10.562	0.000	10.562
Current President's Budget	64.759	0.000	0.000	0.000	0.000
Total Adjustments	11.338	0.000	-10.562	0.000	-10.562
• 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	-1.662	0.000			
• Other Adjustments	13.000	0.000	-10.562	0.000	-10.562

Change Summary Explanation

FY 2022: -1.662M SBIRL/STTR, +13.000M ATR

FY 2024: -10.562M; residual budget transferred from PE 1206422SF, Weather System Follow-On, BA 04, to PE 1206422SF, Weather System Follow-On, BA 05 since program has completed Milestone B.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206422SF / *Weather System Follow-on*	Project (Number/Name) 644289 / *Weather Satellite Follow-On*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
644289: *Weather Satellite Follow-On*	0.000	64.759	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	64.759
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2023, PE 1206422SF, Weather System Follow-On, Project 644289, Weather Satellite Follow-On, R-1 Line #8 efforts were transferred to PE 1206422SF, Weather System Follow-On, Project 65A039, Weather System Follow-on - Microwave (WSF-M), R-1 Line #20 to reflect the successful completion of Milestone B on 15 May 2020. Residual budget in FY 2024 - 2025 funds has transferred from BA 4 to BA 5 in this budget cycle.

Weather System Follow-on (WSF) is a Low-Earth Orbit (LEO) microwave imaging system developed and delivered by the United States Space Force's Space Systems Command (SSC). WSF is the next generation of space-based passive microwave sensing technology. It will provide U.S. and Allied warfighters with essential weather data, including the measurement of ocean surface wind speed and direction, ice thickness, snow depth, soil moisture, and local spacecraft energetic charged particle environment. The ocean surface wind speed measurement enables tropical cyclone intensity determination by the Joint Typhoon Warning Center. The data gathered by WSF will be provided to meteorologists in support of the generation of a wide variety of weather products necessary to conduct mission planning and operations globally.

WSF is an Acquisition Category IB program comprised of two Space Vehicles (SV) and their associated command, control, and data dissemination network. Global environmental monitoring data is gathered, stored, and down-linked through the Satellite Control Network (SCN) and disseminated to Air Force and Navy weather centers. Additionally, data is broadcast real time by the satellite for utilization by heritage Direct Readout Terminals that use the data for local weather forecasting.

WSF is a Major Defense Acquisition Program (MDAP) with the Space Force as the lead component. Founded on the Space-Based Environmental Monitoring (SBEM) Analysis of Alternatives (AoA) results, the WSF will be to enable:

1) Timely weather collection over broad oceans in support of maneuvering forces;
2) Space weather capabilities to characterize operational orbits, space situational awareness, and the ionosphere.

Secondary investments may be supported to address weather gaps identified in the SBEM AoA and validated by the JROC.

Compact Ocean Wind Vector Radiometer (COWVR) is an on-orbit demonstration project of the new COWVR technology to deliver Weather Gap #3, Ocean Surface Vector Winds (OSVW) and Gap #8, Tropical Cyclone Intensity (TCI).

Energetic Charged Particles (ECP) supports the SBEM Weather Gap #11, Low Earth Orbit Energetic Charged Particle Characterization. To support this requirement, the ECP sensor will be integrated on the WSF-M satellites.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 644289 / *Weather Satellite Follow-On*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver WSF weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: WSF Microwave Satellite (SV1-2) ***Description:*** Develop, build, integrate, and test the WSF Microwave (WSF-M) satellites, including bus, payloads, and ground upgrades to satisfy JROC-directed SBEM Capability gaps. ***FY 2023 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** NA	64.108	0.000	-
Title: COWVR Tech Demo ***Description:*** The Compact Ocean Surface Wind Vector Radiometer (COWVR) launch objective supports Category A Weather Requirements, as codified in JROC Memo 092-014, providing on-orbit technology demonstration of the new COWVR technology to deliver Weather Gap #3, Ocean Surface Vector Winds (OSVW) and Gap #8, Tropical Cyclone Intensity (TCI). This will be a cooperative mission with NASA for integrating the sensor onto the International Space Station (ISS) as a weather technology demonstration project. The new mission designation for the COWVR launch will be Space Test Program Houston Mission #8 (STP-H8). Demonstrating COWVR technology in the space environment remains an important milestone for the microwave data weather mission in lieu of the ORS-6 cancellation. Unlike ORS-6, COVWR will fly on the ISS and the residual operational capability is not guaranteed as a result. ***FY 2023 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** NA	0.241	0.000	-
Title: ECP ***Description:*** Energetic Charged Particles (ECP) will support the SBEM Weather Gap 11 and address the Secretary of the Air Force (SECAF) policy which directs each Space Force Satellite Office to plan for and integrate ECP sensors on all pre-Milestone B new satellite acquisitions. To support this requirement, the ECP sensor will be integrated on the WSF-M satellite. ***FY 2023 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:***	0.410	0.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 644289 / *Weather Satellite Follow-On*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
NA			
Accomplishments/Planned Programs Subtotals	64.759	0.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The acquisition strategy for WSF is based on validated SBEM AoA results from FY 2014 and subsequent acquisition strategy development activities that were conducted in FY 2015. The WSF acquisition strategy focuses on streamlined acquisition processes for providing materiel solutions to OSVW, TCI & LEO ECP, as validated by the JROC; deliver microwave sensing solution to address DoD needs for OSVW and TCI capabilities and deliver space environment sensing solution to address LEO ECP capabilities for on-orbit attributions and support of anomaly resolutions.

The Space Force is conducting a technology demonstration of the Compact Ocean Wind Vector Radiometer (COWVR) sensor on the International Space Station (ISS), utilizing its unique technology demonstration capabilities for on-orbit demonstration of COWVR technology. The Space Systems Command (SSC) Space Test Program Office is the lead Space Force organization spearheading the NASA partnership, with the SSC Space Sensing (SN) Directorate responsible for the COWVR sensor and providing programmatic support to enable COWVR sensor to ISS integration/technology demonstration.

The program awarded a contract for WSF-M with up to two satellites through a full and open competition. The WSF-M first satellite (SV-1) Initial Launch Capability is 1st quarter FY 2024. The pre-priced WSF-M SV-2 option was exercised in Nov 2022. WSF-M SV-2 ILC is 4th quarter FY 2027. The WSF SV-2 will be functionally equivalent to SV-1. The Naval Research Lab Blossom Point Tracking Facility (BPTF) will be the Satellite Operations Center (SOC) for WSF-M.

The WSF ECP sensor is developed by AFRL and will be integrated onto the WSF-M satellites.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206422SF / *Weather System Follow-on*	Project (Number/Name) 644289 / *Weather Satellite Follow-On*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
COWVR Technology Demonstration	Various	Various : Various	0.000	0.241	Apr 2022	-		-		-		-	0.000	0.241	-
WSF Microwave System (SV1-2)	C/FFP	Ball Aerospace : Boulder, CO	0.000	48.717	Nov 2021	-		-		-		-	0.000	48.717	-
ECP	Various	Various : Various	0.000	0.410	Jan 2022	-		-		-		-	0.000	0.410	-
Enterprise Systems Engineering & Integration	C/CPAF	Engility Corp : Andover, MA	0.000	2.589	Dec 2021	-		-		-		-	0.000	2.589	-
Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA	0.000	5.506	Oct 2021	-		-		-		-	0.000	5.506	-
Naval Research Laboratory Blossom Point	MIPR	NRL : Welcome, MD	0.000	3.193	Dec 2021	-		-		-		-	0.000	3.193	-
		Subtotal	0.000	60.656		-		-		-		-	0.000	60.656	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp : El Segundo, CA	0.000	2.491	Oct 2021	-		-		-		-	0.000	2.491	-
A&AS	Various	Various : El Segundo, CA	0.000	1.527	Feb 2022	-		-		-		-	0.000	1.527	-
Other Support	Various	Various : El Segundo, CA	0.000	0.085	Nov 2021	-		-		-		-	0.000	0.085	-
		Subtotal	0.000	4.103		-		-		-		-	0.000	4.103	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	64.759		-		-		-		-	0.000	64.759	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 644289 / *Weather Satellite Follow-On*

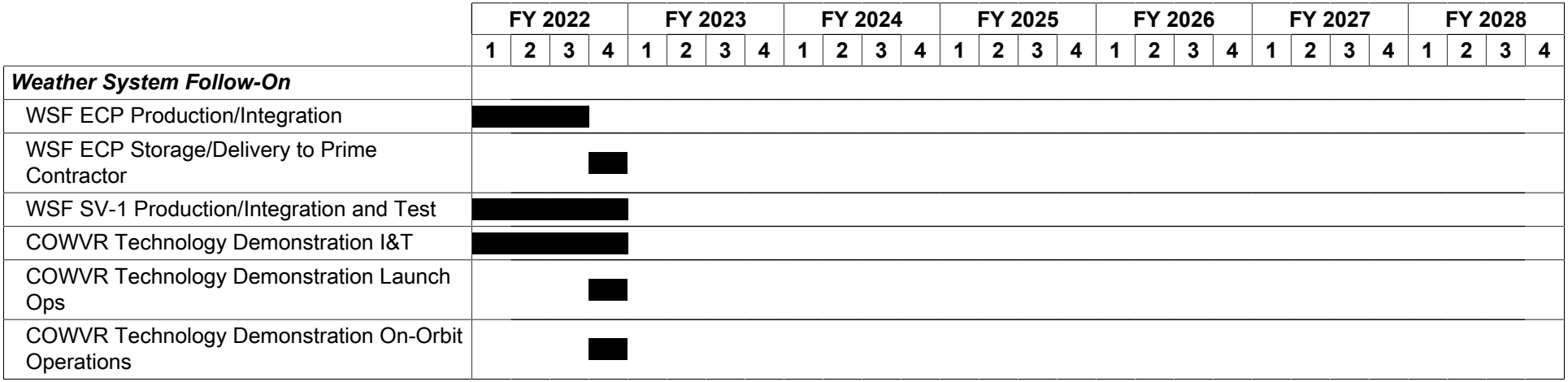

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 644289 / *Weather Satellite Follow-On*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Weather System Follow-On				
WSF ECP Production/Integration	1	2022	3	2022
WSF ECP Storage/Delivery to Prime Contractor	4	2022	4	2022
WSF SV-1 Production/Integration and Test	1	2022	4	2022
COWVR Technology Demonstration I&T	1	2022	4	2022
COWVR Technology Demonstration Launch Ops	4	2022	4	2022
COWVR Technology Demonstration On-Orbit Operations	4	2022	4	2022

Note

FY 2023+ scheduled activities are captured within the budget justification exhibit for program 1206422SF, Weather System Follow-On, Project 65A039, Weather Satellite Follow-On, R-1 Line #20.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206425SF / *Space Situation Awareness Systems*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	101.755	221.421	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	323.176
640290: *Deep Space Advanced Radar Concept*	-	101.755	221.421	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	323.176
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2024, Project 640290, Deep Space Advanced Radar Concept, efforts were transferred to PE 1206425SF, Space Situation Awareness Systems, Project 656565, Ground Based SDA, in order to properly align the budget activity to current efforts.

A. Mission Description and Budget Item Justification

Space Domain Awareness (SDA) is one of five core competencies of the Space Force and is the effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain that could affect space operations and thereby impact the security, safety, economy, or environment of our nation. As the foundation for space control, SDA encompasses surveillance of all space objects and activities; detailed surveillance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering indications and warning on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities.

This program element develops new network sensors and improved information integration capabilities across the space surveillance network (SSN) while companion program element 1203940SF fields, upgrades, operationalizes, operates, and maintains Space Force sensors and information integration capabilities within the SSN. Activities funded in this program element (1206425SF) also support efforts such as engineering studies and analyses, architectural engineering studies, trade studies, technology needs forecasting, modernization initiatives, systems engineering, system development, and test & evaluation, and may include prototyping and technology demonstration.

Deep Space Advanced Radar Capability (DARC) is a ground-based, SDA radar system to detect, track, and maintain custody of deep space objects 24/7, through the solar exclusion gap. DARC will augment the SSN as an additional sensor with increased capacity and capability for deep space object custody, providing full global coverage.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206425SF *I Space Situation Awareness Systems*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver DARC weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

The total cost of the DARC Rapid Prototype Middle Tier of Acquisition (MTA) effort is $844.6 million. DARC Site 1 is not fully funded across the Future Years Defense Program. The Department of the Air Force is assessing all options to address the funding shortfalls for MTA programs including additional funding in a future budget request, performance trades based on technical maturity, or transition to alternative pathways.

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

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	105.062	230.621	215.192	0.000	215.192
Current President's Budget	101.755	221.421	0.000	0.000	0.000
Total Adjustments	-3.307	-9.200	-215.192	0.000	-215.192
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-9.200			
• 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	-3.307	0.000			
• Other Adjustments	0.000	0.000	-215.192	0.000	-215.192

Change Summary Explanation

FY 2024: -1.414M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.
FY 2024: -213.778 Project 640290, Deep Space Advanced Radar Concept, BA 04 efforts were transferred to PE 1206425SF, Space Situation Awareness Systems, Project 656565, Ground Based SDA, BA 05 in order to properly align the budget activity to current efforts.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: DARC Site 1 Operational Capability	101.755	221.421	0.000
Description: The DARC MTA activity will develop, test, and deliver one DARC site with a current estimated completion date of CY 2025. It will also provide a foundation for up to two more future sites located strategically around the world to provide global deep space radar capability to support SDA. The system will be responsive to regularly scheduled and un-scheduled tasks to locate, identify, characterize deep space objects and report the results to Battle Management Command and Control locations and SSN.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awareness Systems*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: Continue Site 1 design and development activities including design reviews, hardware purchases, software development and integration, and construction. Complete Site 1 EA. Complete final Facility Design Review (90%) and Critical Design Review. Purchase, install and check out hardware including, but not limited to, the antennas, transmitters, receiver hardware, and associated processing, cabling, communications subsystems. Begin construction of Site 1 including roads, buildings, utilities, foundations, and installation of all antenna structures. Perform additional site development efforts such as the construction of facility-support and site infrastructure to include backup generator buildings, fuel storage (tank farms), electrical substations for power site distribution, wastewater treatment/septic & leach, non-potable water storage / fire protection distribution (site & buildings), water treatment (potable) and physical security equipment to meet protection level 3 (PL3) requirements. Finalize plans for and begin implementing physical security for Site 1, to include any required equipment such as site perimeter fencing, and standalone fencing for both antenna arrays and site main power station to meet site safety requirements. Begin preparation for and install of fiber optics (COMM) as well as connection to existing and/or new infrastructure such as power grid, backup generators, and main water line. Complete purchases for all long-lead facility equipment for Site 1 as rapidly as possible in order to minimize schedule, these will have been initiated in parallel with completing required EAs. Additionally, FY 2023 funding will allow the program to continue implementing system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of command and control (C2), resiliency measures and mission partner interfaces, space test/combat range events, and office support etc. ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to transfer of DARC effort to PE 1206425SF, Space Situation Awareness Systems, Project 656565, Ground Based SDA.			
Accomplishments/Planned Programs Subtotals	101.755	221.421	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206425SF *I Space Situation Awareness Systems*

E. Acquisition Strategy

Project utilizes existing DoD engineering and study contracts and activities to conduct science and technology development and data analysis activities. Preliminary/ critical design effort for the technology maturation and prototype commenced in FY 2017. A Broad Agency Announcement (BAA) was used to award seven Integrated System Engineering Team (ISET) contracts which allow for organizations to participate, advise the government, and gain insight into the prototype design and build. In May of 2019, DARC was designated as an MTA under Section 804 of the 2016 National Defense Authorization Act (NDAA). In 2020, DARC was directed to pursue a Rapid Prototyping Middle Tier Acquisition program for Site 1. The DARC Site effort will be executed through two separate contract elements: The Prime System Integrator (PSI) was awarded to Northrop Grunnman Inc. via a single, competitive award through the Space Enterprise Consortium (SpEC) Other Transaction Authority (OTA) agreement and third-party software development through multiple SpEC OTA agreements. The Space Force intends to develop and field two additional DARC sites in the future to culminate in a final operational system of three global sites to ensure SDA coverage. A follow-on acquisition pathway strategy based on the success of the Site 1 rapid prototype and an MTA transition plan are being developed for Sites 2 and 3 in accordance with DoDI 5000.80.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 640290 / *Deep Space Advanced Radar Concept*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DARC Non-Recurring Engineering (NRE)/ Advanced Hardware Purchase	Various	Various : Various	-	47.714	Jan 2022	-		0.000		-		0.000	0.000	47.714	-
DARC Technical Mission Analysis	RO	Various : Various	-	-		7.304	Jan 2023	0.000		-		0.000	0.000	7.304	-
DARC System Development	C/CPIF	Northrop Grumman : Colorado Springs, CO	-	43.990	Oct 2023	197.261	Jan 2023	0.000		-		0.000	0.000	241.251	-
		Subtotal	-	91.704		204.565		0.000		-		0.000	0.000	296.269	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DARC Prototype System and Sustainment Analyses	Various	Various : Various	-	0.150	May 2022	1.005	May 2023	-		-		-	0.000	1.155	-
		Subtotal	-	0.150		1.005		-		-		-	0.000	1.155	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	5.031	Nov 2021	10.791	Nov 2022	-		-		-	0.000	15.822	-
FFRDC	RO	MITRE Corp. : Colorado Springs, CO	-	4.670	Nov 2021	4.860	Nov 2022	-		-		-	0.000	9.530	-
Other Support	Various	Various : Colorado Springs, CO	-	0.200	Nov 2021	0.200	Nov 2022	-		-		-	0.000	0.400	-
		Subtotal	-	9.901		15.851		-		-		-	0.000	25.752	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206425SF / *Space Situation Awarenes s Systems*	Project (Number/Name) 640290 / *Deep Space Advanced Radar Concept*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	101.755		221.421		0.000		-		0.000	0.000	323.176	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 640290 / *Deep Space Advanced Radar Concept*

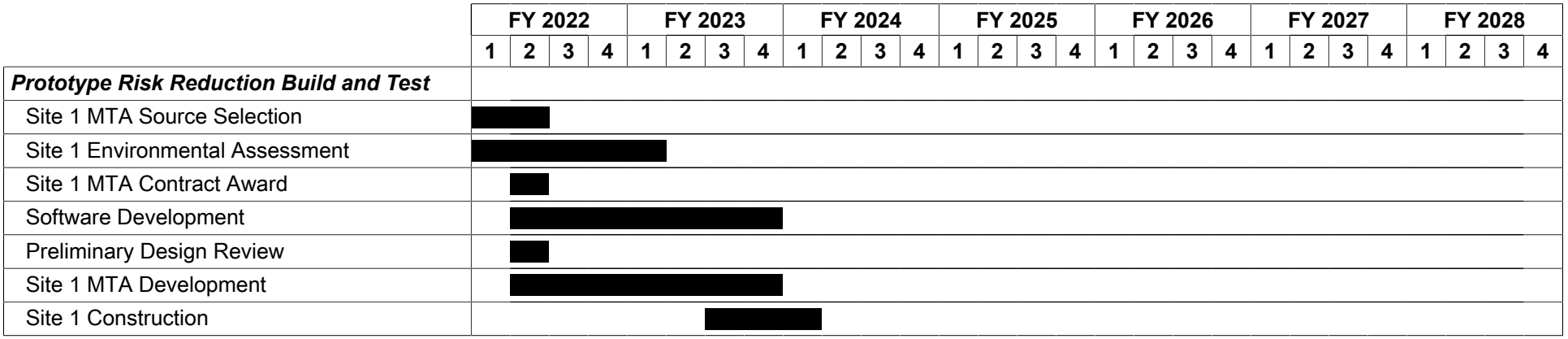

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 640290 / *Deep Space Advanced Radar Concept*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Prototype Risk Reduction Build and Test				
Site 1 MTA Source Selection	1	2022	2	2022
Site 1 Environmental Assessment	1	2022	1	2023
Site 1 MTA Contract Award	2	2022	2	2022
Software Development	2	2022	4	2023
Preliminary Design Review	2	2022	2	2022
Site 1 MTA Development	2	2022	4	2023
Site 1 Construction	3	2023	1	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206427SF *I Space Systems Prototype Transitions (SSPT)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	101.533	166.427	145.948	0.000	145.948	130.404	96.724	77.845	58.073	Continuing	Continuing
644415: *On-Board Resiliency*	-	0.000	50.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
645601: *Space Defense Capabilities*	-	96.533	111.274	140.948	0.000	140.948	130.404	96.724	77.845	58.073	0.000	711.801
645611: *Assault Breaker II*	-	5.000	5.153	5.000	0.000	5.000	0.000	0.000	0.000	0.000	0.000	15.153

Note

The program in BA4, PE 1206427SF, project 645601, Digital Engineering Interconnected, Cloud-based Ecosystem (DEICE) Tech Stack was a new start in FY 2023, and in FY 2024 has transferred to PE 1203010SF, Space Force Information Technology (IT), Data Analysis, Digital Solutions, project 645620, Digital Engineering to improve transparency.

A. Mission Description and Budget Item Justification

The Space System Prototype Transition (SSPT) Program will identify and address space technology and capability gaps in order to facilitate technology transition to military space prototypes and programs of record. It will conduct a wide array of activities to model, integrate, test, and provide launch integration and support on-orbit testing of prototype technologies. The supported activities include: systems engineering, technology planning, development, demonstrations and testing, as well as modeling, simulations and exercises to support the development and maturation of tactics and procedures. This includes the development and prototyping of critical technology within the Department of Defense, across other government agencies, academic institutions and industry partners that are identified and the necessary systems engineering to effectively employ such systems.

Specifically the SSPT Program establishes a cost-effective framework to identify, mature and transition demonstrations and prototypes to:

-Rapidly address identified technology or capability gaps
-Accelerate the maturation of systems intended for demonstrations/prototypes that enhance/compliment/replace an existing capability
-Support a more reliable, available, maintainable and survivable military space enterprise
-Energize the space industrial base supporting U.S. national security
-Focus S&T Innovation and facilitate its transition to military space programs of record

This program includes projects for Long Duration Propulsive Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) (LDPE) and its follow-on activities called Rapid On-Orbit Space Technology Evaluation Ring (ROOSTER), Tetra, Blackjack, Quasi-Zenith Satellite System (QZSS)-Hosted Payload (HP), Space Combat Cloud, Digital Engineering Interconnected, Cloud-based Ecosystem (DEICE) Tech Stack, and Assault Breaker II (ABII).

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206427SF *I Space Systems Prototype Transitions (SSPT)*

LDPE and ROOSTER provide a low-cost, rapid, and flexible on-orbit capability to host and deploy numerous prototypes and payloads utilizing excess payload margin available on US Space Force (USSF) launch missions. Each LDPE/ROOSTER on-orbit platform is currently designed to fly multiple payloads per mission, thus fully utilizing launch potential and providing the only recurring rideshare option for prototypes, demonstrations, and experiments to geosynchronous orbit. The LDPE acquisition baseline includes the following mission scope: LDPE-1, -2 and -3A. All missions beyond LDPE-3A are planned as part of ROOSTER activities. The objectives of the ROOSTER project are to enable rapid and cost-effective technology insertion into operational program of records through the on-orbit checkout and testing of prototypes, demonstrations and experimental payloads. Additionally, ROOSTER will work to mature operational concepts and Techniques, Tactics and Procedures (TTPs), such as on-obit refueling, for use within the USSF space enterprise architecture.

Tetra is a project that will provide a training platform for operators to develop and demonstrate TTPs for pathfinder mission sets. This project directly supports the evolution of operations to include space situational awareness and control in alignment with objectives from organizations such as the National Space Test and Training Center (NSTTC) and USSF Test and Evaluation (TE).

Blackjack is a joint technology demonstration project led by DARPA and the Space Force to evaluate military utility and concepts of operation for a Proliferated Low Earth Orbit (P-LEO) satellite constellation. Collaborative missions include developing Intelligence, Surveillance and Reconnaissance (ISR) payloads. The project leverages industry innovation in commercial P-LEO concepts by integrating military payloads onboard commercial commoditized satellite vehicles, demonstrating onboard data processing and autonomous tasking, and transmitting encrypted data through a mesh network of satellites in LEO with the goals of augmenting existing warfighter capability, increasing national security space resiliency, and decreasing per-unit satellite costs.

QZSS-HP is a "pacesetter" hosted payload that is a high priority for the U.S. and Japan, paving the way for future Allied collaborations. It enhances Geostationary Earth Orbit (GEO) Space Domain Awareness (SDA) capabilities over the Eurasian theater and facilitates resilient capabilities in the Space Surveillance Network (SSN).

Space Combat Cloud activity includes enterprise standards definition and synchronizes space-to-space C2 needs across the space community. Activity also includes technology maturation, network definition and prototype planning.

DEICE Tech Stack prototypes and develops the Space Force Digital Engineering Ecosystem (DEE) as a cloud-based, remotely accessible, multilevel security, interconnected infrastructure, providing the technical methodology used to store, access, analyze, and visualize evolving systems' data and models throughout systems' acquisition lifecycles. In FY 2024, this activity has transferred to PE 1203010SF, Space Force Information Technology (IT), Data Analysis, Digital Solutions, project 645620, Digital Engineering to improve transparency.

Space-to-Space Communications activity includes development of communications technologies to synchronize space-to-space C2 and data transport needs across the space community and enable system agnostic communication pathways via a mobile ad-hoc network.

ABII is an all-Service, classified, multi-year effort, led by DARPA, to analyze, research, and recommend material and non-material all domain counter-anti-access/area denial solutions to the Joint Requirements Oversight Council (JROC).

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206427SF *I Space Systems Prototype Transitions (SSPT)*

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SSPT capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	91.851	106.252	110.073	0.000	110.073
Current President's Budget	101.533	166.427	145.948	0.000	145.948
Total Adjustments	9.682	60.175	35.875	0.000	35.875
• 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	50.000			
• Reprogrammings	12.316	0.000			
• SBIR/STTR Transfer	-2.634	-4.825			
• Other Adjustments	0.000	0.000	35.875	0.000	35.875

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 644415: *On-Board Resiliency*		
Congressional Add: *On-Board Resiliency: USSF-SpRCO*	-	30.000
Congressional Add: *On-Board Resiliency: USSF-SSC*	-	20.000
Congressional Add Subtotals for Project: 644415	-	50.000
Congressional Add Totals for all Projects	-	50.000

Change Summary Explanation

FY 2022: -2.634M; SBIR Reduction.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206427SF *I Space Systems Prototype Transitions (SSPT)*

FY 2022: +12.316M; Above Threshold Reprogramming (ATR) to address disconnects associated with LDPE-2, BLACKJACK and TETRA.
FY 2023: +10.000M; Space to Space Communications
FY 2023: +5.000M; Rapid prototyping and space qualification of emerging CubeSat technologies
FY 2023: +50.000M; On-Board Resiliency
FY 2023: -4.875M; SBIR Reduction
FY 2024: -0.723M; to realign funding to Appropriation 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.
FY 2024: -13.832M; transfer DE Tech Stack to Space Force IT PE 1203010SF.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	Project (Number/Name) 644415 / *On-Board Resiliency*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
644415: *On-Board Resiliency*	-	0.000	50.000	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

Increase space vehicle survivability against current and future threats such as a suite of on-board capabilities with options for integration into their platforms. Develop technologies to increase satellite and enterprise resiliency such as enabling versatile communication pathways and responding to threats.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
Congressional Add: On-Board Resiliency: USSF-SpRCO ***FY 2023 Plans:*** Deliver NSA-certified, next generation encryption modules for space capabilities. KG-505 4.0 is the software upgrade and the KG-505A is the hardware change that broadens scope to meet enterprise cryptography and resilience needs, evolving from the original KG-505 requirements to include quantum resistant solutions for onboard resiliency. The KG-505 4.0 contract is scheduled for award 1 March 2023 and the KG-505A is scheduled for award 15 Apr 2023. The KG-505 4.0 will be included with the new production contract. Funds to build out the ground system for resiliency payload and for the system integration support of resilience activities on the ground system.	-	30.000
Congressional Add: On-Board Resiliency: USSF-SSC ***FY 2023 Plans:*** Develop technologies to increase satellite and enterprise resiliency such as enabling versatile communication pathways and responding to threats.	-	20.000
Congressional Adds Subtotals	-	50.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Continue funding development of prototype communication technology along with associated ground system. Prepare for and execute a source selection leading to a contract award(s) in 4Q FY23 for resiliency technologies. Fund ramp-up of program office including Prime contractor, FFRDC and systems engineering activities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	Project (Number/Name) 644415 / *On-Board Resiliency*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USSF-SSC	TBD	VARIOUS : TBD	-	-		20.000	Sep 2023	-		-		-	Continuing	Continuing	-
USSF-SpRCO	TBD	GDMS : TBD	-	-		30.000	Sep 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	-		50.000		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		50.000		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 644415 / *On-Board Resiliency*

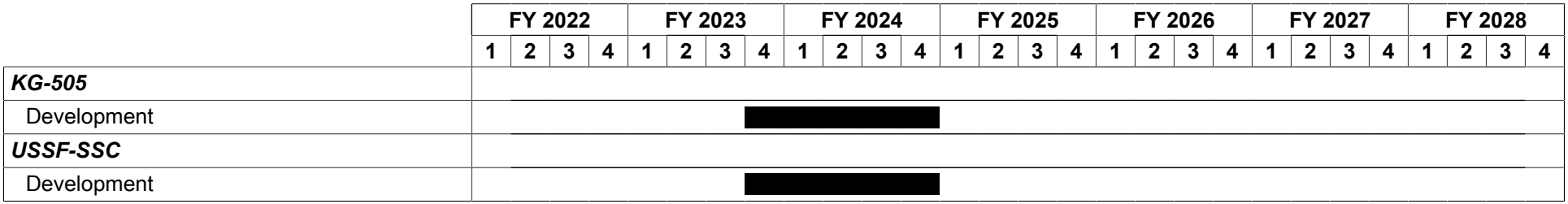

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 644415 / *On-Board Resiliency*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
KG-505				
Development	4	2023	4	2024
USSF-SSC				
Development	4	2023	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	Project (Number/Name) 645601 / *Space Defense Capabilities*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
645601: *Space Defense Capabilities*	-	96.533	111.274	140.948	0.000	140.948	130.404	96.724	77.845	58.073	0.000	711.801
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The program in BA4, PE 1206427SF, project 645601, Digital Engineering Interconnected, Cloud-based Ecosystem (DEICE) Tech Stack was a new start in FY 2023, and in FY 2024 has transferred to PE 1203010SF, Space Force Information Technology (IT), Data Analysis, Digital Solutions, project 645620, Digital Engineering to improve transparency.

A. Mission Description and Budget Item Justification

The Space System Prototype Transition (SSPT) Program will identify and address space technology and capability gaps in order to facilitate technology transition to military space prototypes and programs of record. It will conduct a wide array of activities to model, integrate, test, and provide launch integration and support on-orbit testing of prototype technologies. The supported activities include: systems engineering, technology planning, development, demonstrations and testing, as well as modeling, simulations and exercises to support the development and maturation of tactics and procedures. This includes the development and prototyping of critical technology within the Department of Defense, across other government agencies, academic institutions and industry partners that are identified and the necessary systems engineering to effectively employ such systems.

Specifically the SSPT Program establishes a cost-effective framework to identify, mature and transition demonstrations and prototypes to:

-Rapidly address identified technology or capability gaps
-Accelerate the maturation of systems intended for demonstrations/prototypes that enhance/compliment/replace an existing capability
-Support a more reliable, available, maintainable and survivable military space enterprise
-Energize the space industrial base supporting U.S. national security
-Focus S&T Innovation and facilitate its transition to military space programs of record

This program includes projects for Long Duration Propulsive Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) (LDPE) and its follow-on activities called Rapid On-Orbit Space Technology Evaluation Ring (ROOSTER), Tetra, Blackjack, Quasi-Zenith Satellite System (QZSS)-Hosted Payload (HP), Space Combat Cloud, Digital Engineering Interconnected, Cloud-based Ecosystem (DEICE) Tech Stack.

LDPE and ROOSTER provide a low-cost, rapid, and flexible on-orbit capability to host and deploy numerous prototypes and payloads utilizing excess payload margin available on US Space Force (USSF) launch missions. Each LDPE/ROOSTER on-orbit platform is currently designed to fly multiple payloads per mission, thus fully utilizing launch potential and providing the only recurring rideshare option for prototypes, demonstrations, and experiments to geosynchronous orbit. The LDPE acquisition baseline includes the following mission scope: LDPE-1, -2 and -3A. All missions beyond LDPE-3A are planned as part of ROOSTER activities. The

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

objectives of the ROOSTER project are to enable rapid and cost-effective technology insertion into operational program of records through the on-orbit checkout and testing of prototypes, demonstrations and experimental payloads. Additionally, ROOSTER will work to mature operational concepts and Techniques, Tactics and Procedures (TTPs), such as on-obit refueling, for use within the USSF space enterprise architecture.

Tetra is a project that will provide a training platform for operators to develop and demonstrate TTPs for pathfinder mission sets. This project directly supports the evolution of operations to include space situational awareness and control in alignment with objectives from organizations such as the National Space Test and Training Center (NSTTC) and USSF Test and Evaluation.

Blackjack is a joint technology demonstration project led by DARPA and the Space Force to evaluate military utility and concepts of operation for a Proliferated Low Earth Orbit (P-LEO) satellite constellation. Collaborative missions include developing Intelligence, Surveillance and Reconnaissance (ISR) payloads. The project leverages industry innovation in commercial P-LEO concepts by integrating military payloads onboard commercial commoditized satellite vehicles, demonstrating onboard data processing and autonomous tasking, and transmitting encrypted data through a mesh network of satellites in LEO with the goals of augmenting existing warfighter capability, increasing national security space resiliency, and decreasing per-unit satellite costs.

QZSS-HP is a "pacesetter" hosted payload that is a high priority for the U.S. and Japan, paving the way for future Allied collaborations. It enhances Geostationary Earth Orbit (GEO) Space Domain Awareness (SDA) capabilities over the Eurasian theater and facilitates resilient capabilities in the Space Surveillance Network (SSN).

Space Combat Cloud activity includes enterprise standards definition and synchronizes space-to-space C2 needs across the space community. Activity also includes technology maturation, network definition and prototype planning.

DEICE Tech Stack prototypes and develops the Space Force Digital Engineering Ecosystem (DEE) as a cloud-based, remotely accessible, multilevel security, interconnected infrastructure, providing the technical methodology used to store, access, analyze, and visualize evolving systems' data and models throughout systems' acquisition lifecycles. In FY 2024, this activity has transferred to PE 1203010SF, Space Force Information Technology (IT), Data Analysis, Digital Solutions, project 645620, Digital Engineering to improve transparency.

Space-to-Space Communications activity includes development of communications technologies to synchronize space-to-space C2 and data transport needs across the space community and enable system agnostic communication pathways via a mobile ad-hoc network.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Technology Maturation and Prototype Development	57.383	55.413	61.934
Description: Plan, develop, test and transition advanced technologies into space system prototypes and capabilities to meet known and emerging threats. Conduct architecture studies, modeling and simulation, technical development, integration and test activities in preparation for transition of critical technologies into prototypes or space programs of record. Develop advanced capabilities for rapid prototyping and integration into space system programs of record and, if requested, to warfighter Urgent Operational Needs (UONs) and Joint Urgent Operational Needs (JUONs). Develop, test and integrate on-orbit platforms for			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
checkout and testing of prototypes and experimental payloads to mature operational concepts and TTPs for future use in the USSF space enterprise architecture. Provide rideshare platform hosting opportunities to geosynchronous orbit. ***FY 2023 Plans:*** - ROOSTER: Continue prototype development, including ground segment and payload integration efforts. Begin Space Vehicle factory test campaign, launch vehicle mission unique integration efforts, and whole of program security accreditation efforts. - Tetra: Continue development of Tetra space vehicles to include development of Tetra-4 through integration and test and Tetra-5 through assembly. - QZSS-HP: Continue the international cooperation with Japan by testing the two SDA with the two Japanese Quasi-Zenith Satellites. - Pursue technology investment to support the space enterprise investment strategy: commercial and allied opportunities; cross mission data transport, proliferated payloads and buses; orbital maneuver; alternative orbits; dynamic communication networks; and Fighting PNT and SATCOM, etc. - Additionally, FY 2023 funding will allow the program 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. - Rapid prototyping and space qualification of emerging CubeSat technologies Congressional Add - On-Orbit Resiliency ***FY 2024 Plans:*** - ROOSTER: Complete prototype development efforts for ROOSTER-4 Space Vehicle. Complete Space Vehicle integration and factory test campaign and launch vehicle mission unique development/integration efforts. Receive whole of program security accreditation efforts required for launch and on-orbit operations. Award ROOSTER-5 contract and begin development of space vehicle platform. - Tetra: Continue development of Tetra space vehicles to include development of Tetra-5 through integration and test and awarding Tetra-6. - QZSS-HP: Continue the international cooperation with Japan by integrating, testing, and launching two SDA hosted payloads via two Japanese Quasi-Zenith Satellites. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to projected contract award of ROOSTER-5, and completion of the development of Tetra-5a prototypes and QZSS-HP launch activities.			
Title: Prototype Integration, Test and On-Orbit Prototype Demonstration	13.279	18.434	32.735

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024

Description: Provide rideshare opportunities for prototypes and experiments, fund mission-unique payload integration to the rideshare or launch system, and conduct launch base integration, testing and launch operations. Conduct prototype integration and testing into the designated Command and Control system and provide operational support to conduct prototype testing, demonstration and operations.

FY 2023 Plans:
- ROOSTER: Continue development of the first ROOSTER platform to support FY 2025 launch and execution of on-orbit operations of prototype and technology demonstration payloads. Begin on-orbit satellite vehicle operations procedures development, conduct operations training, rehearsals, and exercises.
- Tetra: Continue development and integration efforts for Tetra-2,3, 4,and 5 vehicles to include launch and operations of Tetra 3.
- Blackjack: Finalize remaining assembly, integration, and test and provide technical reach back engineering during on-orbit demonstration activities. Conduct technical reviews, integration and testing of prototypes with launch vehicle in support of launch and on-orbit demonstrations. Launch remaining satellites into LEO to complete the constellation, and conduct early orbit testing and full architecture demonstration.
- QZSS-HP: Finish integration and testing of hosted payload prototypes with Japan's QZSS satellite buses and launch vehicles in support of the Quasi-Zenith Satellite-6 launch in FY 2023. Start integration and testing of hosted payload prototypes in support of the Quasi-Zenith Satellite-7 launch in FY 2024.

FY 2024 Plans:
- ROOSTER: Complete development and assembly of the first ROOSTER platform (ROOSTER-4) to support FY 2025 launch and execution of on-orbit operations of prototype and technology demonstration payloads. Finalize and integrate ground segment and payloads to enable end-to-end system testing efforts. Finalize on-orbit satellite vehicle operations procedures development and conduct operations training, rehearsals, and exercises. Begin development on an integrated mission plan to support achievement of all prototype payload and space vehicle on-orbit objectives. Establish manifest of prototype and demonstration payloads for ROOSTER-5 mission.
- Tetra: Continue development, integration, launch and operations of Tetra Space Vehicles to include launch and operations of Tetra 1 and 4.
- QZSS-HP: Continue integration and testing in support of a Quasi-Zenith Satellite 7 launch in FY2024. Conclude the integration, test and launch of both hosted payloads in cooperation with the Japanese government. Support on-orbit Developmental Test activities post launch to enable warfighter capabilities for both hosted payloads.

FY 2023 to FY 2024 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 increased due to ROOSTER-4 and Tetra-5a integration activities, ground procedures, training and rehearsals. Increased activities for QZS-6 & 7, and Tetra -3 & 4 integration and launch operations.			
Title: Long Duration Propulsive ESPA (LDPE) ***Description:*** The LDPE platform provides a standard rideshare service for a wide variety of secondary payload options. It features 6 ports and accommodates ten to twelve fixed and/or separable prototype payloads. After the forward payload separates, the LDPE platform separates and propels to mission orbit, typically GEO, approximately 22,000 miles above the earth. The LDPE platform can maneuver to allow prototype/experimental payloads to be dropped off at different locations or remain hosted to the ring based on mission requirements. ***FY 2023 Plans:*** Support the transition of LDPE-1 and LDPE-2 to operational and/or test USSF units to conduct residual operations. Support the launch of LDPE-3A aboard the USSF-67 mission and conduct on-orbit test and demonstration to enable technology maturation of the platform and prototype/experimental payloads. Continue planned 12-month execution of LDPE-3A on-orbit prototype testing, demonstration, and operational support for LDPE hosted payloads. ***FY 2024 Plans:*** Complete planned 12-month execution of LDPE-2 and LDPE-3A on-orbit prototype testing, demonstration, and operational support for LDPE hosted payloads. Support the transition of LDPE-2 and LDPE-3A to operational and/or test USSF units to conduct residual operations. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to completion of LDPE-2 and 3A operational activities.	25.871	7.394	1.279
Title: Digital Engineering Interconnected, Cloud-based Ecosystem (DEICE) Tech Stack ***Description:*** The Digital Engineering (DE) tech stack provides a common cloud-base, remotely accessible, multi-level security, interconnected infrastructure. The DEICE tech stack provides specialized tools required to perform model based systems engineering (MBSE) activities to create system models, perform simulations, and analyze the results to accelerate the pace of acquisition across the lifecycle from requirements generation, to design reviews, through manufacturing and test, and finally supporting fielding with digital twins. The DEICE tech stack provides the program offices, government stakeholders, and industry partners with a common DE as a Service (DEaaS) capability. The building of the DEICE capabilities will be accomplished using 6-month increments based on Agile management techniques. The needed capabilities will be collected from across the SSC programs and stored in a Product Backlog. Twice a year, this list will be prioritized by an enterprise governance board to direct the activities of adding new capabilities to the Ecosystem. The capabilities will be delivered when competed, tested and approved. ***FY 2023 Plans:***	0.000	19.778	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- Prototype, develop, test and establish the Space Force Digital Engineering as a Service (DEaaS) Environments hosted on the Air Force Cloud One platform for cloud-computing and database storage (compute & store). - Develop and test the minimum viable product (MVP) for DEaaS by providing a virtual desktop with digital engineering tools and collaboration work spaces for the architects and systems engineers of the initial programs; Protected Anti-Jam Tactical SATCOM, Evolved Strategic SATCOM, and Space Integration Office System of Systems Engineering Division. - Continue development and testing of DEaaS with Increment 1 to link to DEaaS Environments with acquisition and operational databases, and add additional programs into the DEaaS Environment from across SSC. - Implement Integration and Operational practices for system monitoring and security procedures. - 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 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 has transferred to PE 1203010SF, Space Force Information Technology (IT), Data Analysis, Digital Solutions, project 645620, Digital Engineering to improve transparency.			
Title: Space-to-Space Communications ***Description:*** - Space-to-Space Communications activity includes development of communications technologies to synchronize space-to-space C2 and data transport needs across the space community and enable system agnostic communication pathways via a mobile ad-hoc network. ***FY 2023 Plans:*** Approve acquisition strategy, release RFP, and begin source selection for terminal development. ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A	-	10.255	0.000
Title: CubeSat Technologies ***Description:*** - Rapid prototyping and space qualification of emerging CubeSat technologies Congressional Add ***FY 2023 Plans:***	-	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Congressional Add ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A			
Title: Solar Power ***Description:*** - Solar Power ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** - ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased as a new project added to the PE	-	0.000	40.000
Title: Space-to-Space Communications Follow-on ***Description:*** Continue Space-to-Space Communications activity includes development of communications technologies to synchronize space-to-space C2 and data transport needs across the space community and enable system agnostic communication pathways via a mobile ad-hoc network. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** - Award contracts and begin development activities to enable the future Space-to-Space Data Transport network. Develop high-power amplifiers, low-SWaP ASIC photonic modems, and scalable affordable components for enterprise terminals. Continue elements begun under Space Combat Cloud, to include proliferating the enterprise standards, developing network topology and mesh CONOPS, and evolve concepts, preliminary designs, and enterprise architectural solutions. Continue program office and other related support activities that may include, but are not limited to, studies, technical analyses, experimentation, prototyping, operational testing, and participation/integration into joint warfighting exercises. ***FY 2023 to FY 2024 Increase/Decrease Statement:***	-	0.000	5.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 increased due to the continuations to Space-to-Space Communications FY23 Congressional Add program.			
Accomplishments/Planned Programs Subtotals	96.533	111.274	140.948

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

The Tetra-5 contract award included three separate space vehicles, one funded by SSPT (5a) and the other two by AFRL (5b & 5c).

D. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible. The SSPT program consists of numerous projects in which the program office will leverage rapid prototyping authorities to the maximum extent possible.

LDPE is an ACAT III program and all systems are on contract and on schedule to achieve their projected Initial Launch Capability (ILC). The acquisition strategy for the follow-on effort to LDPE, called ROOSTER was approved in 2Q FY22. Contract award for ROOSTER-4 is projected for 2Q FY 2023 which supports the ROOSTER-4 ILC of 2nd Quarter FY 2025.

Tetra's acquisition strategy is based on an annualized satellite procurement, development, and launch integration effort. Each Tetra satellite is a unique design intended to further the capabilities of small-satellites and mature emerging technologies. The first two unique Tetras were procured simultaneously as the first award on Space Enterprise Consortium (SpEC) Other Transaction Authority (OTA), followed by two subsequent Tetra missions. Tetra 5a awarded in FY 2022.

For the Digital Engineering Interconnected, Cloud-based Ecosystem (DEICE) Tech Stack effort, the Space Force plans to employ agile software development practices and techniques, such as flexible requirements, frequent user interaction, and rapid delivery. The program will acquire tools and capabilities through an agile-based Rapid Delivery Framework that develops, integrates, and delivers new features and capabilities through 180 day program increments. To provide the cloud-based environment, an existing contract with Cloud One providers will be utilized to provide the software licenses, computer hosting, and cybersecurity. In addition, FFRDCs will provide expertise to develop needed Digital Engineering capabilities as well as optimizing the software configurations to support needed features. Finally, a current SBIR Phase 3 contract will be used to implement new Digital Engineering capabilities based on industry best practices including the management of the Product Backlog, assisting with on-boarding new programs, building training for new users, providing system admin support, and creating scripts and features allowing Digital Engineering activities to be automated.

Space-to-Space Communications acquisition strategy currently being developed will employ competitive procedures to the maximum extent possible.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LDPE-1, 2 & 3A Launch Vehicle Integration & Ops	Various	Various: Various : TBD	-	21.544	Jan 2022	4.144	Dec 2022	0.267	Jan 2024	-		0.267	0.000	25.955	-
LDPE-2, 3A Launch Support Activities	Various	Various : Various : TBD	-	3.920	Jan 2022	0.780	Dec 2022	1.001	Nov 2023	-		1.001	0.000	5.701	-
ROOSTER Development	C/FFP	Northrop Grumman : VA : TBD	-	5.186	Jul 2022	21.494	Jan 2023	21.269	Jan 2024	-		21.269	0.000	47.949	-
ROOSTER Ops, LV, Payload Integration	C/CPFF	Northrop Grumman : VA : TBD	-	0.500	Jul 2022	7.428	Jan 2023	13.460	Jan 2024	-		13.460	0.000	21.388	-
ROOSTER Launch Support Activities	C/Various	Various : Various : TBD	-	-		-		8.472	Nov 2023	-		8.472	0.000	8.472	-
Tetra 3 & 4 Development	C/FFP	York Space Systems : CO : TBD	-	3.509	Jan 2022	0.747	Jan 2023	-		-		-	0.000	4.256	-
Tetra 5a Development	C/FFP	Orion Space Solutions: CO : TBD	-	10.300	Jul 2022	10.695	Feb 2023	8.292	Jan 2024	-		8.292	0.000	29.287	-
Tetra 6 Development	C/CPAF	TBD : TBD : TBD	-	-		-		9.687	Jan 2024	-		9.687	Continuing	Continuing	-
Tetra-1, 3, 4 & 5a Prototype Integration, Test & On-Orbit Prototype Demonstration	C/Various	Various : Various : TBD	-	5.524	Jan 2022	4.772	Jan 2023	7.230	Jan 2024	-		7.230	0.000	17.526	-
Tetra-1, 3 & 4 Payload Integration into LDPE/ ROOSTER Ring	C/CPAF	Various : Various : TBD	-	0.234	Jan 2022	0.851	Jan 2023	-		-		-	0.000	1.085	-
Blackjack Assembly, Integration & Test	MIPR	Various : Various : TBD	-	11.597	Jan 2022	2.500	Jan 2023	-		-		-	0.000	14.097	-
Blackjack Launch/Support Activities	MIPR	Various : Various : TBD	-	4.900	Jan 2022	-		-		-		-	0.000	4.900	-
QZSS-HP Development	Various	Various : Various : TBD	-	11.921	Oct 2021	13.459	Nov 2022	14.042	Jan 2024	-		14.042	0.000	39.422	-
QZSS-HP Launch Support Activities	Various	Various : Various : TBD	-	2.121	Apr 2022	2.848	Nov 2022	3.573	Nov 2023	-		3.573	0.000	8.542	-
Space Combat Cloud	C/Various	Boston : MA : TBD	-	4.782	May 2022	-		-		-		-	0.000	4.782	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Digital Engineering Ecosystem	Various	Not specified. : TBD	-	-		12.558	Jan 2023	-		-		-	0.000	12.558	-
Digital Engineering MITRE	TBD	Not specified. : TBD	-	-		1.520	Jan 2023	-		-		-	0.000	1.520	-
Space-to-Space Communications	C/TBD	TBD : TBD : TBD	-	-		10.255	Apr 2023	-		-		-	Continuing	Continuing	-
CubeSat	C/TBD	TBD : TBD : TBD	-	-		0.000	Apr 2023	-		-		-	Continuing	Continuing	-
Solar Power	C/CPAF	TBD: TBD : TBD	-	-		-		40.000	Mar 2024	-		40.000	Continuing	Continuing	-
Classiified Effort	C/CPAF	Not specified. : TBD	-	-		-		5.020	Mar 2024	-		5.020	Continuing	Continuing	-
Technical Mission Analysis	Various	Various : Various : TBD	-	2.726	Jan 2022	3.329	Jan 2023	3.388	Jan 2024	-		3.388	0.000	9.443	-
		Subtotal	-	88.764		97.380		135.701		-		135.701	Continuing	Continuing	N/A

Remarks

The Tetra-5 contract award included three separate space vehicles, one funded by SSPT (5a) and the other two by AFRL (5b & 5c).

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Digital Engineering Test Environment	TBD	Not specified. : TBD	-	-		5.000	Jan 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	-		5.000		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Various : Various : TBD	-	2.622	Jan 2022	3.528	Jan 2023	1.282	Jan 2024	-		1.282	0.000	7.432	-
A&AS	Various	Various : Various : TBD	-	4.550	Nov 2021	4.977	Nov 2022	3.341	Nov 2023	-		3.341	0.000	12.868	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	Project (Number/Name) 645601 / *Space Defense Capabilities*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Other Support	Various	Various : Various : TBD	-	0.597	Nov 2021	0.389	Nov 2022	0.624	Jan 2024	-		0.624	0.000	1.610	-
		Subtotal	-	7.769		8.894		5.247		-		5.247	0.000	21.910	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	96.533		111.274		140.948		-		140.948	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

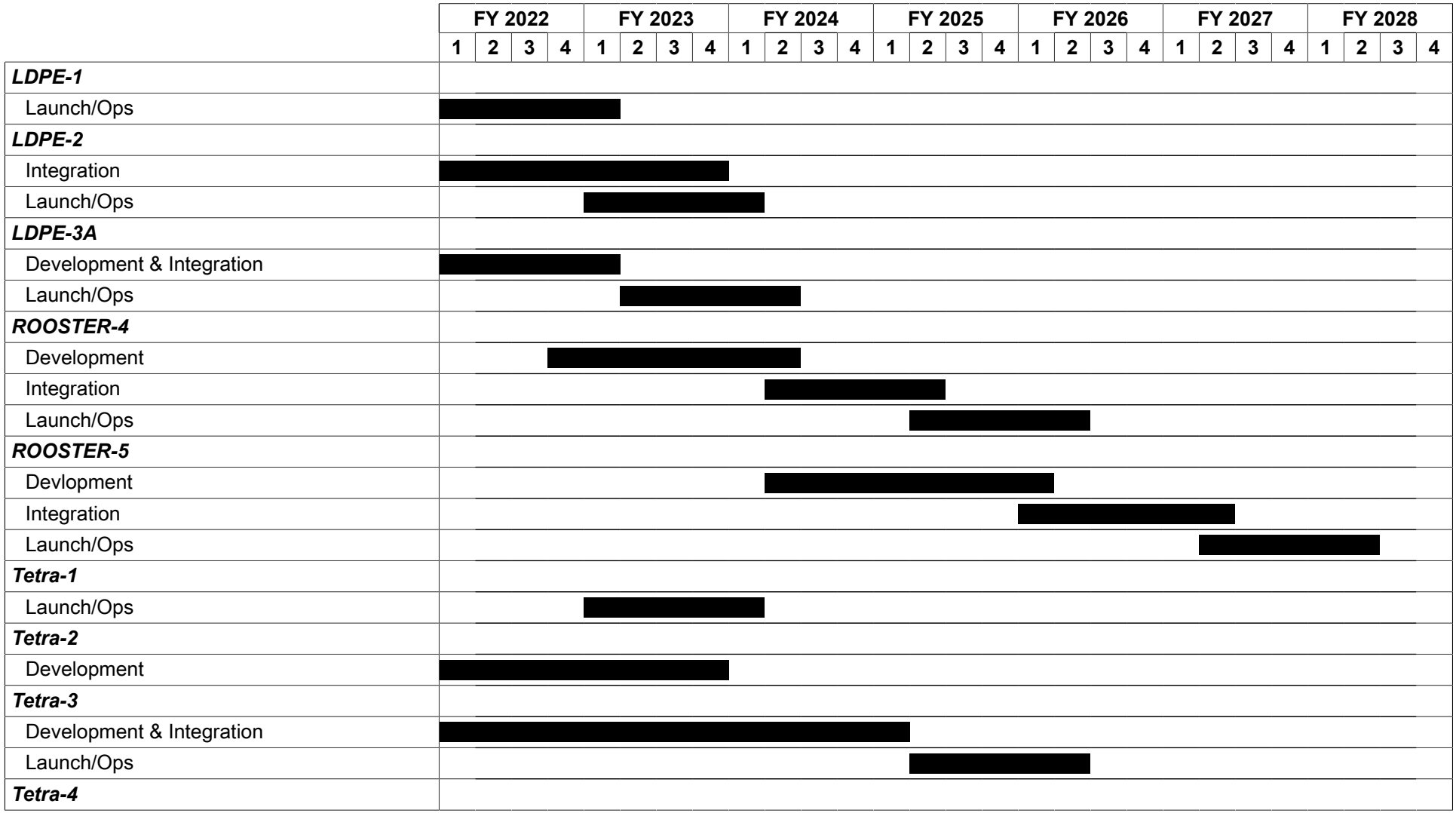

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

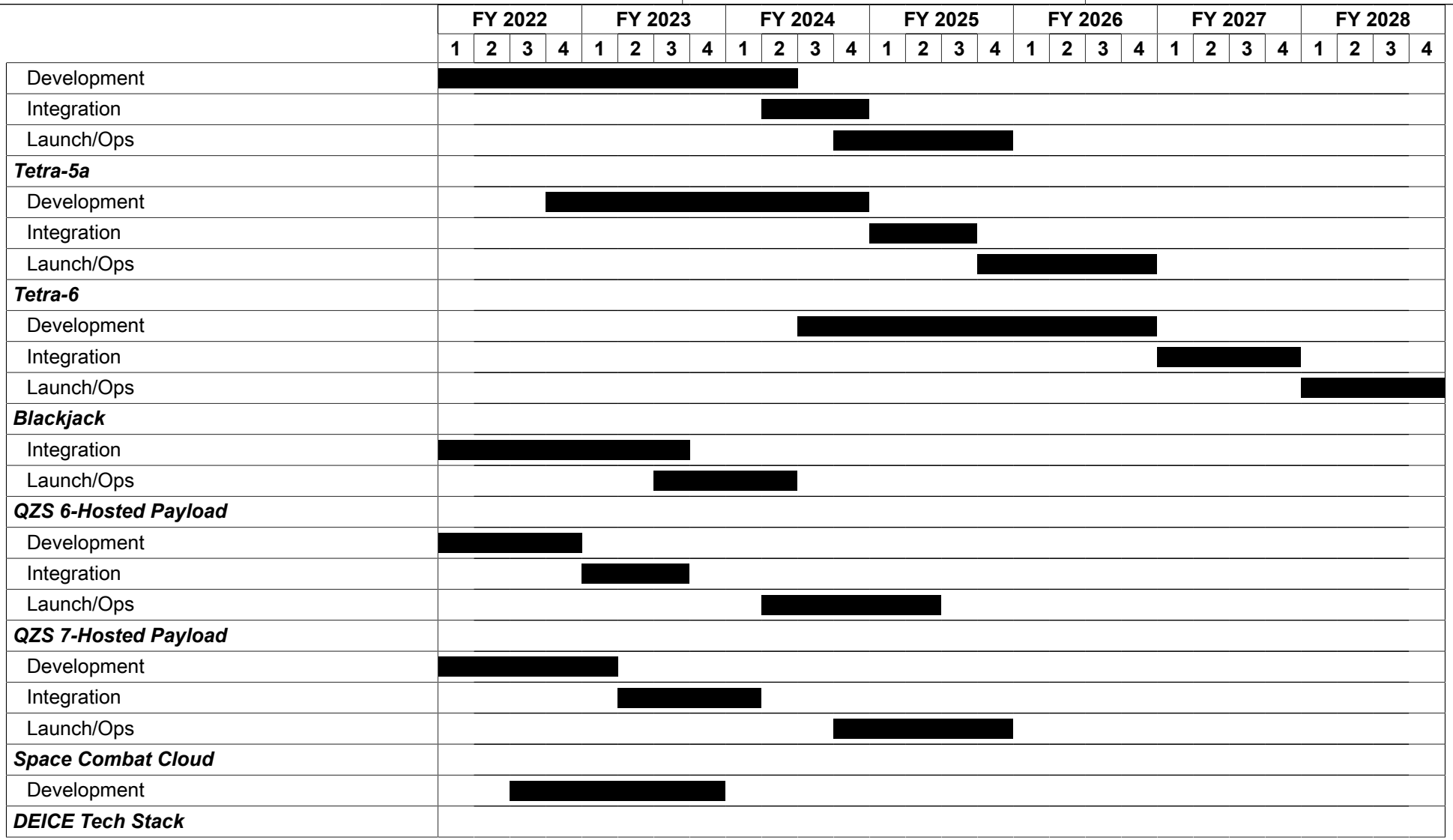

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

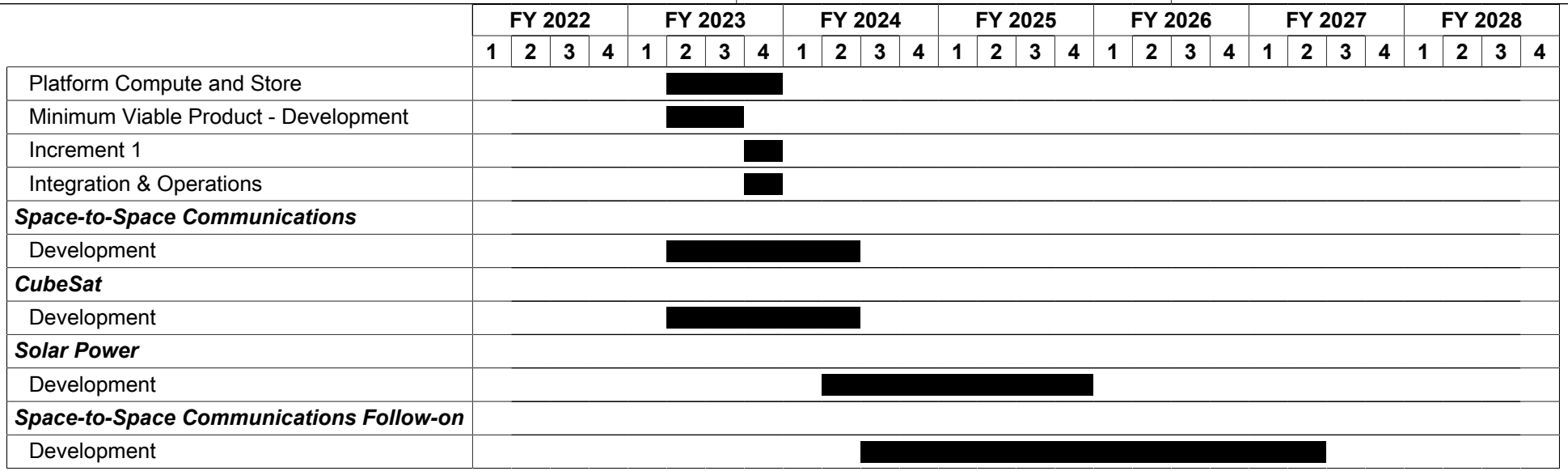

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
LDPE-1				
Launch/Ops	1	2022	1	2023
LDPE-2				
Integration	1	2022	4	2023
Launch/Ops	1	2023	1	2024
LDPE-3A				
Development & Integration	1	2022	1	2023
Launch/Ops	2	2023	2	2024
ROOSTER-4				
Development	4	2022	2	2024
Integration	2	2024	2	2025
Launch/Ops	2	2025	2	2026
ROOSTER-5				
Devlopment	2	2024	1	2026
Integration	1	2026	2	2027
Launch/Ops	2	2027	2	2028
Tetra-1				
Launch/Ops	1	2023	1	2024
Tetra-2				
Development	1	2022	4	2023
Tetra-3				
Development & Integration	1	2022	1	2025

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Launch/Ops	2	2025	2	2026
Tetra-4				
Development	1	2022	2	2024
Integration	2	2024	4	2024
Launch/Ops	4	2024	4	2025
Tetra-5a				
Development	4	2022	4	2024
Integration	1	2025	3	2025
Launch/Ops	4	2025	4	2026
Tetra-6				
Development	3	2024	4	2026
Integration	1	2027	4	2027
Launch/Ops	1	2028	4	2028
Blackjack				
Integration	1	2022	3	2023
Launch/Ops	3	2023	2	2024
QZS 6-Hosted Payload				
Development	1	2022	4	2022
Integration	1	2023	3	2023
Launch/Ops	2	2024	2	2025
QZS 7-Hosted Payload				
Development	1	2022	1	2023
Integration	2	2023	1	2024
Launch/Ops	4	2024	4	2025
Space Combat Cloud				

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645601 / *Space Defense Capabilities*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Development	3	2022	4	2023
DEICE Tech Stack				
Platform Compute and Store	2	2023	4	2023
Minimum Viable Product - Development	2	2023	3	2023
Increment 1	4	2023	4	2023
Integration & Operations	4	2023	4	2023
Space-to-Space Communications				
Development	2	2023	2	2024
CubeSat				
Development	2	2023	2	2024
Solar Power				
Development	2	2024	4	2025
Space-to-Space Communications Follow-on				
Development	3	2024	2	2027

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	Project (Number/Name) 645611 / *Assault Breaker II*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
645611: *Assault Breaker II*	-	5.000	5.153	5.000	0.000	5.000	0.000	0.000	0.000	0.000	0.000	15.153
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Assault Breaker II (ABII) is an all-Service, classified, multi-year effort, led by DARPA, to analyze, research, and recommend material and non-material all domain counter-anti-access/area denial solutions to the Joint Requirements Oversight Council (JROC).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Assault Breaker II	5.000	5.153	5.000
Description: Assault Breaker II is an all-Service, classified, multi-year effort, led by DARPA, to analyze, research, and recommend material and non-material all domain counter-anti-access/area denial solutions to the JROC. ***FY 2023 Plans:*** Provide warfighter analysis, experiments, and development of modelling and simulation tools to support warfighting objectives established by DARPA. ***FY 2024 Plans:*** DARPA MOA updated extending funding and personnel support through FY 2024. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to 5.000M, reference updated DARPA MOA extending funding and personnel support through FY 2024.			
Accomplishments/Planned Programs Subtotals	5.000	5.153	5.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Funds are sent to DARPA via a Military Interdepartmental Purchase Request (MIPR).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645611 / *Assault Breaker II*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Assault Breaker II	MIPR	Radiance Technologies : Huntsville, AL	-	5.000	Dec 2021	5.153	Dec 2022	5.000	Dec 2023	-		5.000	Continuing	Continuing	-
		Subtotal	-	5.000		5.153		5.000		-		5.000	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	5.000		5.153		5.000		-		5.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645611 / *Assault Breaker II*

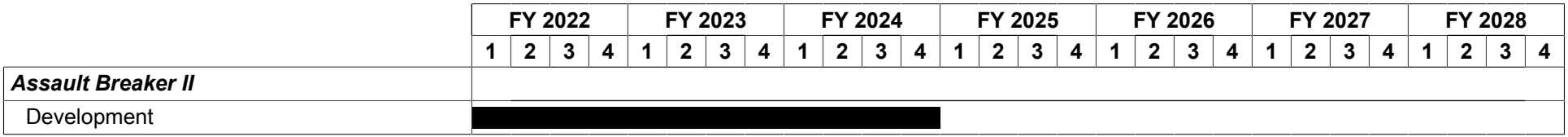

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206427SF / *Space Systems Prototype Transitions (SSPT)*	**Project (Number/Name)** 645611 / *Assault Breaker II*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Assault Breaker II				
Development	1	2022	4	2024

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206438SF / *Space Control Technology*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	34.760	50.303	58.374	0.000	58.374	62.086	62.483	63.443	65.734	Continuing	Continuing
642611: *Technology Insertion Planning and Analysis*	-	34.760	50.303	31.621	0.000	31.621	36.124	36.128	36.867	38.201	Continuing	Continuing
646438: *Joint Space Integration Technology*	-	0.000	0.000	26.753	0.000	26.753	25.962	26.355	26.576	27.533	Continuing	Continuing

Note

In FY 2024, a portion of Project 642611, Technology Insertion Planning and Analysis efforts was transferred to Project 646438, Joint Space Integration Technology for transparency.

A. Mission Description and Budget Item Justification

This project supports a range of activities including systems engineering, technology planning, development, demonstrations and prototyping, and testing, as well as modeling, simulations and exercises to support development and maturation of tactics and procedures for a responsive and resilient Space Control mission area. This includes technology development and prototyping for Defensive Counterspace (DCS) and Offensive Counterspace (OCS) and the necessary systems engineering for the warfighter to effectively employ such systems.

Specifically supported are DCS and Space Domain Awareness (SDA) activities, which include developing threat warning payloads for monitoring, detecting, identifying, tracking, assessing, verifying, categorizing, and characterizing objects and events in space. Additionally, Integration and Technology Futures program supports the development of payload prototypes and space defense force packages for protecting U.S. space systems, resources, and operations from enemy attempts to negate, interfere, or destroy them.

Specific OCS activities include disruption, denial, or degradation (and associated Electronic Support) of adversary space systems that may be used for purposes hostile to U.S. national security interests. Rapid Reaction Capabilities in response to immediate warfighter needs in the Space Control mission area are developed within the Rapid Reaction Branch (RRB). Depending on the magnitude of Combatant Command Urgent Operational Needs (UON), this program may not include necessary funding for all contingency deployments. As required, necessary funding will be requested through established Joint Urgent Operational Need (JUON) and Overseas Contingency Operations (OCO) processes.

Joint Space Technology Integration leverages knowledge of the space environment and impacts on weapon systems to prototype, develop, test, and field joint multi-domain software and modeling solutions to fill capability gaps for Combatant Commanders. Military Application of the Space Environment (MASE) project consolidates and integrates current space environment science and technology advancements to provide capability for joint force systems in all domains to address immediate and evolving threats to U.S. forces operating in harm's way. The data provided supports rapid and agile demonstrations, exercises, and war games that provide essential validation of delivered capabilities to improve operational effectiveness.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206438SF *I Space Control Technology*

The FY 2024 funding request was reduced by 4.260M to account for the availability of prior year execution balances.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SCT weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	35.931	57.953	62.765	0.000	62.765
Current President's Budget	34.760	50.303	58.374	0.000	58.374
Total Adjustments	-1.171	-7.650	-4.391	0.000	-4.391
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-7.500			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	2.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.171	-2.150			
• Other Adjustments	0.000	0.000	-4.391	0.000	-4.391

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 642611: *Technology Insertion Planning and Analysis*		
Congressional Add: *NEXT-C Gridded Ion Thruster Development*	2.902	2.000
Congressional Add Subtotals for Project: 642611	2.902	2.000
Congressional Add Totals for all Projects	2.902	2.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206438SF *I Space Control Technology*

Change Summary Explanation

FY 2024: -0.412M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +0.281M inflation increase for non-pay and non-fuel purchases.

FY 2024: -4.260M due to higher AF priorities.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206438SF / *Space Control Technology*	Project (Number/Name) 642611 / *Technology Insertion Planning and Analysis*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
642611: *Technology Insertion Planning and Analysis*	-	34.760	50.303	31.621	0.000	31.621	36.124	36.128	36.867	38.201	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2024, a portion of Project 642611, Technology Insertion Planning and Analysis efforts was transferred from Project 646438, Joint Space Integration Technology for transparency.

A. Mission Description and Budget Item Justification

This project supports a range of activities including systems engineering, technology planning, development, demonstrations and prototyping, and testing, as well as modeling, simulations and exercises to support development and maturation of tactics and procedures for a responsive and resilient Space Control mission area. This includes technology development and prototyping for Defensive Counterspace (DCS) and Offensive Counterspace (OCS) and the necessary systems engineering for the warfighter to effectively employ such systems.

Specifically supported are DCS and Space Domain Awareness (SDA) activities, which include developing threat warning payloads for monitoring, detecting, identifying, tracking, assessing, verifying, categorizing, and characterizing objects and events in space. Additionally, Integration and Technology Futures program supports the development of payload prototypes and space defense force packages for protecting U.S. space systems, resources, and operations from enemy attempts to negate, interfere, or destroy them.

Specific OCS activities include disruption, denial, or degradation (and associated Electronic Support) of adversary space systems that may be used for purposes hostile to U.S. national security interests. Rapid Reaction Capabilities in response to immediate warfighter needs in the Space Control mission area are developed within the Rapid Reaction Branch (RRB). Depending on the magnitude of Combatant Command Urgent Operational Needs (UON), this program may not include necessary funding for all contingency deployments. As required, necessary funding will be requested through established Joint Urgent Operational Need (JUON) and Overseas Contingency Operations (OCO) processes.

Joint Space Technology Integration leverages knowledge of the space environment and impacts on weapon systems to prototype, develop, test, and field joint multi-domain software and modeling solutions to fill capability gaps for Combatant Commanders. Military Application of the Space Environment (MASE) project consolidates and integrates current space environment science and technology advancements to provide capability for joint force systems in all domains to address immediate and evolving threats to U.S. forces operating in harm's way. The data provided supports rapid and agile demonstrations, exercises, and war games that provide essential validation of delivered capabilities to improve operational effectiveness. In FY 2024, the Joint Space Integration Technology effort was transferred out of Project 642611 into a new Project 646438 for transparency.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SCT weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Rapid Reaction Branch	17.178	12.708	18.672
Description: Develops advanced capabilities for rapid prototyping and integration into space control programs of record and, if requested, to warfighter UONs and JUONs. Conducts prototype capability development, testing, training and rapid transition of technology and techniques to space control systems. Sustains deployed quick reaction capabilities until transition to program of record or mission completion.			
FY 2023 Plans: Develop, test, train, field, transition and sustain UON capabilities supporting USEUCOM/USAFE or in response to emergent requirements from other Combatant Commands. Conduct initial technical development and integration activities against relevant threat systems and technologies in preparation for operational requirements. Develop and test advanced prototypes in support of activities within the Space Control Technology portfolio. Based on technological advances relevant to the mission area, develop, integrate and evaluate next generation capabilities into (GRA) Increment 5. Develop, test, train, deliver and sustain urgent/ emergent operational needs using Increment 4 or Increment 5 GRA technologies as appropriate for urgent need time-lines, and start Increment 6. Integrate information assurance constructs and controls into developmental platforms to expedite fielding. Execute field development & test activities, at all locations, to verify system performance in the operational environment. Enhance fielded rapid reaction capabilities in response to evolving threats and operator feedback. Additionally, FY 2023 funding will allow the program to continue establishment of Remote Development Sites in USCENTCOM and USINDOPACOM. Lastly, the funding will allow for implementing system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of command and control (C2), resiliency measures and mission partner interfaces, space test/combat range events, and office support etc.			
FY 2024 Plans: Develop, test, train, field, transition and sustain advanced rapid reaction capabilities in response to emergent requirements from multiple Combatant Commands. Conduct initial technical development and integration activities against relevant threat systems			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
and technologies in preparation for operational requirements. Develop and test advanced prototypes in support of activities within the Space Control Technology portfolio. Based on technological advances relevant to the mission area, develop, integrate and evaluate next generation capabilities into Ground Reference Architecture (GRA) Increment 6. Develop, test, train, deliver and sustain urgent/emergent operational needs using Increment 5 or Increment 6 GRA technologies as appropriate for urgent need timelines, and start Increment 6. Integrate information assurance constructs and controls into developmental platforms and architecture to expedite fielding. Execute remote and field development & test activities using remote development sites to verify system performance in the operational environment and stay abreast of emerging technologies. Enhance fielded rapid reaction capabilities in response to evolving threats and operator feedback. Additionally, FY 2024 funding will support three remote development site activities located in the USEUCOM, USCENTCOM, and USINDO-PACOM AORs further enabling the program to pace the threat and rapidly delivers critical warfighting capabilities in the contested space domain. Activities may include, but are not limited to: on-site security and communications support, technical analysis, risk reduction experiments and prototyping, development, integration and test of C2 architecture, travel and administrative office and laboratory support. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to simultaneous support to three remote development site activities.			
Title: Integration and Technology Futures	14.680	10.939	12.949
Description: Foundational architecture and prototype development to enable the integration, interoperability and compatibility of new Space Control Technology into space systems. Funds sensor and other capability technologies for transition into programs to meet space control mission requirements. ***FY 2023 Plans:*** Capture OCS and DCS enterprise capabilities in digital engineering models that represent the space enterprise assets, operations, related key performance characteristics, and threat response. Exercise the digital engineering models and establish secure networks for data sharing with mission partners to analyze the performance, operational capabilities, and interdependencies of space systems at the enterprise level to inform the counterspace mission areas. Define standards and perform various digital engineering functions, tools, procedures, and best practices to accelerate acquisition of successful and affordable counterspace systems. Conduct IRON JAR space experimentation activities with programs of record and mission partners to demonstrate and evaluate space technologies, mature space operations processes, conduct operator training, develop tactics, techniques, and procedures (TTPs), and validate digital engineering models. Identify and prioritize solution development of new space technologies. FY 2023 funding will allow the program to rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of C2, resiliency measures and mission partner interfaces, space test/combat range events, and office support etc. ***FY 2024 Plans:*** Capture OCS and DCS enterprise capabilities in digital engineering models that represent the space enterprise assets, operations, related key performance characteristics, and threat response. Exercise the digital engineering models and establish secure networks for data sharing with mission partners to analyze the performance, operational capabilities, and interdependencies of space systems at the enterprise level to inform the counter-space mission areas. Define standards and perform various digital engineering functions, tools, procedures, and best practices to accelerate acquisition of successful and affordable counter-space systems. Conduct IRON JAR space experimentation activities with programs of record and mission partners to demonstrate and evaluate space technologies, mature space operations processes, conduct operator training, develop tactics, techniques, and procedures (TTPs), and validate digital engineering models. Identify and prioritize solution development of new space technologies. FY 2023 funding will allow the program to rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of C2, resiliency measures and mission partner interfaces, space test/combat range events, and office support etc. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments, prototype development, technology transition, integration and test of command and control (C2), resiliency measures and mission partner interfaces, space test/combat range events, and office support etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to activities above.			
Title: Military Application of the Space Environment (MASE) ***Description:*** MASE provides commanders an operational risk assessment tool to improve air and maritime campaign mission effectiveness. Develops, tests, and delivers weapon system tailored visualizations/decision aids supporting operational level mission planning and tactical execution. ***FY 2023 Plans:*** Research, develop and validate enhanced regional ionospheric and signal propagation models to predict (forecast) space domain impacts on weapon systems. Integrate model output into weapon system tailored visualizations to improve multi-domain mission	0.000	24.656	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
planning and execution. Conduct demonstrations of new capabilities and validate results during campaign planning, exercises, and war games. Develop, test, and train new (or updated) tactics, techniques, and procedures for use by operational users. Integrate new traditional and non-traditional data sources into models to improve support to decision makers. Rapidly develop, test, and deploy new system features in response to Combatant Commander needs and a continuously evolving threat to U.S. forces. ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to the MASE portion of Project 642611, Technology Insertion Planning and Analysis, being transferred to Project 646438, Joint Space Integration Technology.			
Accomplishments/Planned Programs Subtotals	31.858	48.303	31.621

	FY 2022	FY 2023
Congressional Add: NEXT-C Gridded Ion Thruster Development	2.902	2.000
FY 2022 Accomplishments: Project will partner with NASA to develop gridded ion thruster hardware based on the NASA Evolutionary Xenon Thruster - Commercial (NEXT-C) hardware development contract. The activity will include both in-house risk reduction tasks and contracted activities with industry through an existing contract mechanism. The objective for the project is to develop and test key components of a higher Thrust-to-Power (T/P) NEXT derivative for dual commercial and military applications. Development is planned to include the two key components of a propulsion system, including NEXT-C electric propulsion device and the associated higher power processing unit (PPU). ***FY 2023 Plans:*** Project will continue partnership with NASA to develop and improve gridded ion thruster hardware based on the NASA Evolutionary Xenon Thruster - Commercial (NEXT-C) hardware development contract. The objective for the project is to develop and test key components of a higher Thrust-to-Power (T/P) NEXT derivative for dual commercial and military applications. Development is planned to include the two key components of a propulsion system, including NEXT-C electric propulsion device and the associated higher power processing unit (PPU).		
Congressional Adds Subtotals	2.902	2.000

C. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

C. Other Program Funding Summary ($ in Millions)

Remarks

D. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible. NEXT-C Gridded Ion Thruster Development will be awarded on existing NASA Glenn Research Center contract.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SCT Counterspace Technology Prototyping/ Rapid Reaction Development	Various	Various : Various	-	16.253	Oct 2021	11.399	Dec 2022	16.606	Oct 2023	-		16.606	Continuing	Continuing	-
SCT Integration and Technology Futures	C/Various	Various : Various	-	12.629	Nov 2021	10.000	Dec 2022	12.282	Oct 2023	-		12.282	Continuing	Continuing	-
NEXT-C Gridded Ion Thruster Development	MIPR	NASA Glenn Research Ctr : Cleveland, OH	-	2.902	Aug 2022	2.000	Sep 2023	-		-		-	Continuing	Continuing	-
MASE	Various	Various : Various	-	-		22.248	Nov 2022	-		-		-	Continuing	Continuing	-
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		1.107	Oct 2023	-		1.107	Continuing	Continuing	-
		Subtotal	-	31.784		45.647		29.995		-		29.995	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	2.976	Jan 2022	4.656	Jan 2023	1.626	Jan 2024	-		1.626	Continuing	Continuing	-
		Subtotal	-	2.976		4.656		1.626		-		1.626	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	34.760		50.303		31.621		-		31.621	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

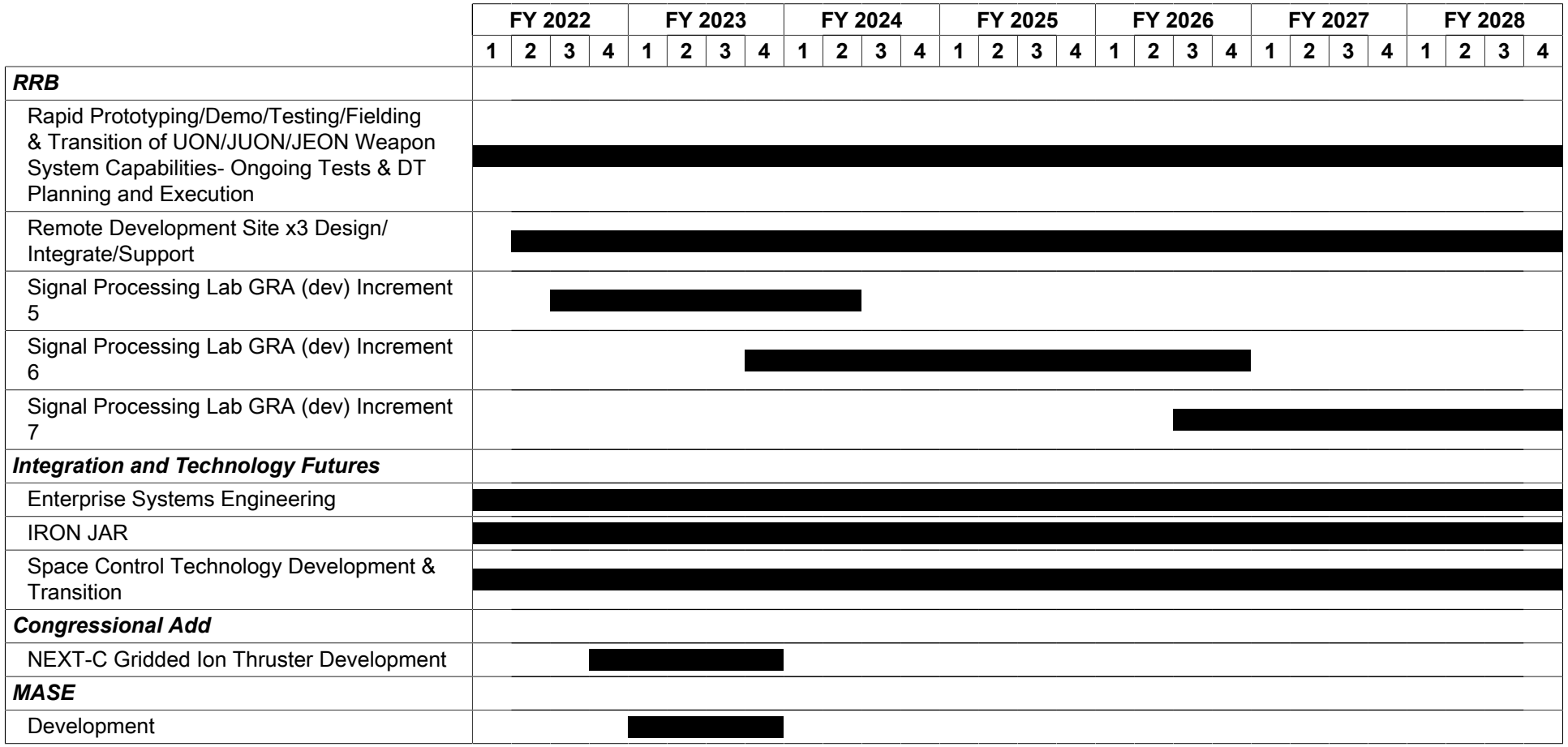

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
RRB				
Rapid Prototyping/Demo/Testing/Fielding & Transition of UON/JUON/JEON Weapon System Capabilities- Ongoing Tests & DT Planning and Execution	1	2022	4	2028
Remote Development Site x3 Design/Integrate/Support	2	2022	4	2028
Signal Processing Lab GRA (dev) Increment 5	3	2022	2	2024
Signal Processing Lab GRA (dev) Increment 6	4	2023	4	2026
Signal Processing Lab GRA (dev) Increment 7	3	2026	4	2028
Integration and Technology Futures				
Enterprise Systems Engineering	1	2022	4	2028
IRON JAR	1	2022	4	2028
Space Control Technology Development & Transition	1	2022	4	2028
Congressional Add				
NEXT-C Gridded Ion Thruster Development	4	2022	4	2023
MASE				
Development	1	2023	4	2023

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206438SF / *Space Control Technology*	Project (Number/Name) 646438 / *Joint Space Integration Technology*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
646438: *Joint Space Integration Technology*	-	0.000	0.000	26.753	0.000	26.753	25.962	26.355	26.576	27.533	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2024, a portion of Project 642611, Technology Insertion Planning and Analysis efforts was transferred to Project 646438, Joint Space Integration Technology for transparency.

A. Mission Description and Budget Item Justification

Joint Space Technology Integration leverages knowledge of the space environment and impacts on weapon systems to prototype, develop, test, and field joint multi-domain software and modeling solutions to fill capability gaps for Combatant Commanders. Military Application of the Space Environment (MASE) project consolidates and integrates current space environment science and technology advancements to provide capability for joint force systems in all domains to address immediate and evolving threats to U.S. forces operating in harm's way. The data provided supports rapid and agile demonstrations, exercises, and war games that provide essential validation of delivered capabilities to improve operational effectiveness.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SCT weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF. In CY 2021 0.160M was expended for civilian pay expenses in this program element.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Military Application of the Space Environment (MASE)	-	0.000	26.753
Description: MASE is not a new start as it was previously funded in Appropriation 3620, RDT&E, Space Force, PE 1206438S, Space Control Technology, Project 642611, Technology Insertion Planning and Analysis.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 646438 / *Joint Space Integration Technology*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
The goal, mission and purpose of the Military Application of the Space Environment (MASE) Program is to design, develop, and field a decision aid to support air and maritime scheme of maneuver in a battlespace and satisfy the needs of multiple combatant commanders, service components, and the intelligence community. MASE provides commanders an operational risk assessment tool to improve air and maritime campaign mission effectiveness. Develops, tests, and delivers weapon system tailored visualizations/decision aids supporting operational level mission planning and tactical execution. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** Research, develop and validate software for enhanced modeling and simulation of regional ionospheric and signal propagation effects to forecast space domain impacts on joint force weapon systems. Integrate model output into weapon system tailored visualizations to improve multi-domain mission planning and execution. Complete software development of Major Release 1.3 and begin development of software for Major Release 1.4 of new capabilities and validate results during campaign planning, exercises, and war games. Develop, test, and provide training for new or updated tactics, techniques, and procedures enhanced by MASE for operational users. Integrate new traditional and non-traditional data sources into models to improve space warfighting decision processes. Rapidly develop, test, and deploy new system features in response to continuously evolving threats to U.S. forces. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to transfer of MASE effort from PE 1206427SF, Space Systems Prototype Transitions (SSPT).			
Accomplishments/Planned Programs Subtotals	-	0.000	26.753

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible. The SE&I contract uses the Defense Technical Information Center (DTIC) Information Analysis Center (IAC) Multiple Award Contract (MAC) and runs March 2020-March 2025. The software development contract uses the Modeling, Simulation & Analysis (MS&A) for Space and Cyberspace Capabilities (MSCC) contract and runs July 2019-July 2024. All modeling, simulation and demonstration contracts are awarded through the Air Force Research Lab's (AFRL) competitive processes. The application infrastructure/online services are a combination of MACs through the USAF PlatformOne Program, the Operational Intelligence, Surveillance and Reconnaissance (ISR) DevSecOps NextGen (ODIN)

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 646438 / *Joint Space Integration Technology*

Program and the USAF Commercial Cloud Enterprise (C2E) Program. Test and evaluation tasks will be accomplished on existing competitively awarded USSF, USAF, and USN contracts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 646438 / *Joint Space Integration Technology*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MASE Systems Engineering & Integration (SE&I)	C/CPFF	Booz Allen Hamilton : Colorado Springs, CO	-	-		-		5.933	Oct 2023	-		5.933	Continuing	Continuing	-
MASE Software Development	C/CPFF	DSoft Technologies : Colorado Springs, CO	-	-		-		2.134	Oct 2023	-		2.134	Continuing	Continuing	-
MASE Modeling, Simulation and Demonstration	Various	Various : Various	-	-		-		11.679	Oct 2023	-		11.679	Continuing	Continuing	-
MASE Application Infrastructure/Online Services	Various	Various : Various	-	-		-		1.412	Oct 2023	-		1.412	Continuing	Continuing	-
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		0.936	Oct 2023	-		0.936	Continuing	Continuing	-
		Subtotal	-	-		-		22.094		-		22.094	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MASE Developmental/ Operational Testing	Various	Various : Various	-	-		-		3.467	Dec 2023	-		3.467	Continuing	Continuing	-
		Subtotal	-	-		-		3.467		-		3.467	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : El Segundo, CA	-	-		-		0.832	Nov 2023	-		0.832	Continuing	Continuing	-
FFRDC	RO	Aerospace Corp. : El Segundo, CA	-	-		-		0.260	Nov 2023	-		0.260	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206438SF / *Space Control Technology*	Project (Number/Name) 646438 / *Joint Space Integration Technology*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Other Support	Various	Various : El Segundo, CA	-	-		-		0.100	Oct 2023	-		0.100	Continuing	Continuing	-
		Subtotal	-	-		-		1.192		-		1.192	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		26.753		-		26.753	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 646438 / *Joint Space Integration Technology*

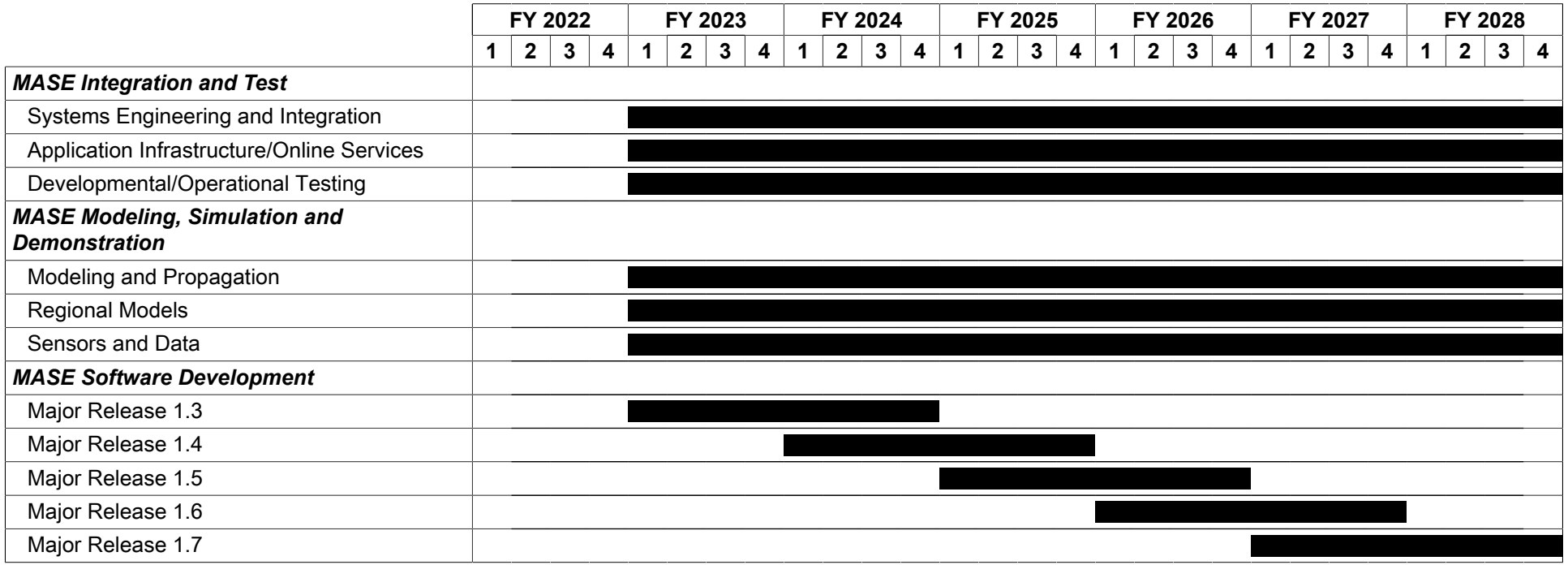

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206438SF / *Space Control Technology*	**Project (Number/Name)** 646438 / *Joint Space Integration Technology*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MASE Integration and Test				
Systems Engineering and Integration	1	2023	4	2028
Application Infrastructure/Online Services	1	2023	4	2028
Developmental/Operational Testing	1	2023	4	2028
MASE Modeling, Simulation and Demonstration				
Modeling and Propagation	1	2023	4	2028
Regional Models	1	2023	4	2028
Sensors and Data	1	2023	4	2028
MASE Software Development				
Major Release 1.3	1	2023	4	2024
Major Release 1.4	1	2024	4	2025
Major Release 1.5	1	2025	4	2026
Major Release 1.6	1	2026	4	2027
Major Release 1.7	1	2027	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206458SF / *Tech Transition (Space)*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	50.000	0.000	164.649	0.000	164.649	228.147	301.881	219.654	156.327	Continuing	Continuing
649493: *Resilient Architecture Design and Evaluation*	-	0.000	0.000	15.067	0.000	15.067	60.035	82.743	199.200	156.327	Continuing	Continuing
64S444: *Experimentation (Space)*	-	50.000	0.000	149.582	0.000	149.582	168.112	219.138	20.454	0.000	Continuing	Continuing

A. Mission Description and Budget Item Justification

The Tech Transition (Space) Program addresses the gap between initial system-level technology or concept development and demonstration, and successful acquisition and operational capability implementation. This program also matures new warfighting concepts to rapidly develop and experiment with fieldable prototypes to assess military utility of transition-ready weapon systems. Following the guidance in the National Defense Strategy, the Department of the Air Force has institutionalized Experimentation and Prototyping to achieve smarter, faster, and more efficient acquisitions that move technologies rapidly to support the most critical warfighting capabilities. Project 64S444, Experimentation (Space), explores new space-related concepts and their applications in potential future operating environments within a system-of-systems context, taking risks early in the acquisition process to drive a more optimized and efficient acquisition process and significantly reduce overall acquisitions costs. The Tech Transition Program allows acquisition program managers (the capability developers) and warfighters (the capability recipients and end users) to prototype, integrate, and demonstrate candidate technologies and assess them in an operational system-of-systems environment in partnership with Combatant Commanders, Major and Field Commands, Program Executive Officers, schoolhouses, simulation facilities, and development planning organizations.

This Program was a Congressionally-directed new start in FY 2022. It is a parallel effort to United States Air Force Program Element (PE) 0604858F, Tech Transition Program, Project 645350, Experimentation, and continues space-related work executed in that Program in prior fiscal years.

By FY28, the Projects quantify the performance and resilience of a Hybrid SATCOM architecture in an operational environment by connecting flexible terminals (from multiple vendors) to multiple SATCOM paths spanning low, medium, and geosynchronous orbits. Each of these new SATCOM pathways offer unique attributes to the DOD. The terminal flexibility will allow rapid incorporation of new commercial SATCOM vendors as they emerge, thus ensuring low-cost SATCOM options for DOD in the foreseeable future. The Resilient Architecture Design and Evaluation project coupled with Hybrid SATCOM terminals will prototype and test techniques for dynamic networking, enhancing cybersecurity, and rapid switching capabilities between vendors, including developing a billing approach between vendors. The knowledge will transition to USSF to inform contract structures for operations that enable switching between multiple vendors at minimum cost. Together, these Projects will directly inform COCOMS, MAJCOMS, and PEOs in the acquisition and sustainment of Hybrid SATCOM capability for multiple Joint Force applications using commercial service level agreements and advanced cybersecurity architectures.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206458SF *I Tech Transition (Space)*

0606398F, 0605831F, and/or 0606017F. This effort is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment. This type of 6.4 effort has been shown effective to reduce both the time and cost of transitioning the new capabilities to operations.

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

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	50.000	0.000	0.000	0.000	0.000
Current President's Budget	50.000	0.000	164.649	0.000	164.649
Total Adjustments	0.000	0.000	164.649	0.000	164.649
• 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	164.649	0.000	164.649

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 64S444: *Experimentation (Space)*		
Congressional Add: *Program Increase - Arctic Communications*	50.000	-
Congressional Add Subtotals for Project: 64S444	50.000	-
Congressional Add Totals for all Projects	50.000	-

Change Summary Explanation

FY2024 funding increased compared to FY2023 by 164.649 million. Funding increased due to the addition of Hybrid SATCOM terminal efforts and architecture experimentation and the addition of resilient architecture design and evaluation program.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206458SF / *Tech Transition (Space)*	Project (Number/Name) 649493 / *Resilient Architecture Design and Evaluation*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
649493: *Resilient Architecture Design and Evaluation*	-	0.000	0.000	15.067	0.000	15.067	60.035	82.743	199.200	156.327	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Resilient Architecture Design and Evaluation project conducts experimentation within an interconnected hybrid SATCOM architecture to validate the performance, scalability and resilience of providing the Joint Force with multiple separate communications paths. To achieve these resiliency gains, the hybrid network requires 1) on-demand management of multi-band, multi-orbit DoD, allied and commercial data links; and 2) management and control capabilities to orchestrate paths through the space and ground networks. The effort validates the "Resilience by Design" approach in the Space Warfighting Analysis Center (SWAC) Space Data Transport Force Design through a combination of 1) modeling and simulation; 2) hardware- and software-in-the-loop analysis; and 3) terrestrial and on-orbit simulation. The project leverages Hybrid SATCOM terminal prototyping in the Experimentation (Space) project along with direct relationships with commercial providers to demonstrate dynamic networking, understand commercial offerings, assess security and resiliency, and inform future acquisition approaches.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Resilient Architecture Design and Evaluation	-	0.000	15.067
Description: Prototype and optimize a cyber-secure multi-orbit space-based data transport capability that is resilient by design, as a core element of the USSF Hybrid Space Architecture for enterprise capability. Through collaborative modeling and simulation, prototype software and hardware in the loop systems, and on-orbit operational experimentation, validate critical underlying assumptions of the USSF Future Force Design elements built upon the integration of allied and commercial SATCOM capabilities across decoupled paths. Prototype existing high-TRL capabilities into operational experiments to identify and resolve key unknowns regarding network topology management, data forwarding, quality of service, availability, security, and scalability. The product is mature architecture models that are validated with quantitative performance and scalability data suitable to develop USSF requirements and reduce risk to future acquisition.			
FY 2023 Plans: N/A			
FY 2024 Plans: Perform modeling/simulation and operational experimentation to validate performance, security and software-defined wide area networking data forwarding and routing paths. In collaboration with the Space Warfighting Analysis Center, USSF requirements, architecture and program offices, and other stakeholders, advance toward on-orbit demonstration of architectural elements			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206458SF / *Tech Transition (Space)*	**Project (Number/Name)** 649493 / *Resilient Architecture Design and Evaluation*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
assessed as low readiness or high risk to the future force design. Establish approaches to feed findings back into the Force Design and forward into acquisition. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding increased compared to FY2023 by 15.067 million. Funding increased due to the addition of architecture experimentation.			
Accomplishments/Planned Programs Subtotals	-	0.000	15.067

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The AFRL at Kirtland Air Force Base, New Mexico manages and executes Resilient Architecture Design and Evaluation effort following the existing internetworking experimentation acquisition strategy. Baseline modeling and simulation and hardware-/software-in-the-loop development and experimentation is primarily conducted by a Government team of FFRDCs and Service Laboratories to avoid vendor lock-in or reduced competition from industry. Prototyping agreements jointly executed with the Defense Innovation Unit provide access to accurate models of established commercial data transport capabilities as well as services under development, ensuring the technical vision for the future architecture is well-anchored in market realities. Competitive procurements of required hardware prototypes for terrestrial or space experimentation will occur through rapid prototyping and experimentation authorities. All funding vehicles are constructed to enable seamless transition to requirements, program development, and acquisition offices as appropriate to enable incremental fielding and avoid loss of momentum as the new architectures solidify. Access to the AFRL simulation environment is similarly available for further Government use.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206458SF / *Tech Transition (Space)*	Project (Number/Name) 649493 / *Resilient Architecture Design and Evaluation*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Resilient Architecture Design and Evaluation	Various	Various : Various : TBD	-	-		-		9.033	Oct 2023	-		9.033	Continuing	Continuing	-
		Subtotal	-	-		-		9.033		-		9.033	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Resilient Architecture Design and Evaluation	Various	Various: Various : TBD	-	-		-		4.033	Jan 2024	-		4.033	Continuing	Continuing	-
		Subtotal	-	-		-		4.033		-		4.033	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	Various	Various: TBD : TBD	-	-		-		2.001		-		2.001	Continuing	Continuing	-
		Subtotal	-	-		-		2.001		-		2.001	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		15.067		-		15.067	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206458SF / *Tech Transition (Space)*	**Project (Number/Name)** 649493 / *Resilient Architecture Design and Evaluation*

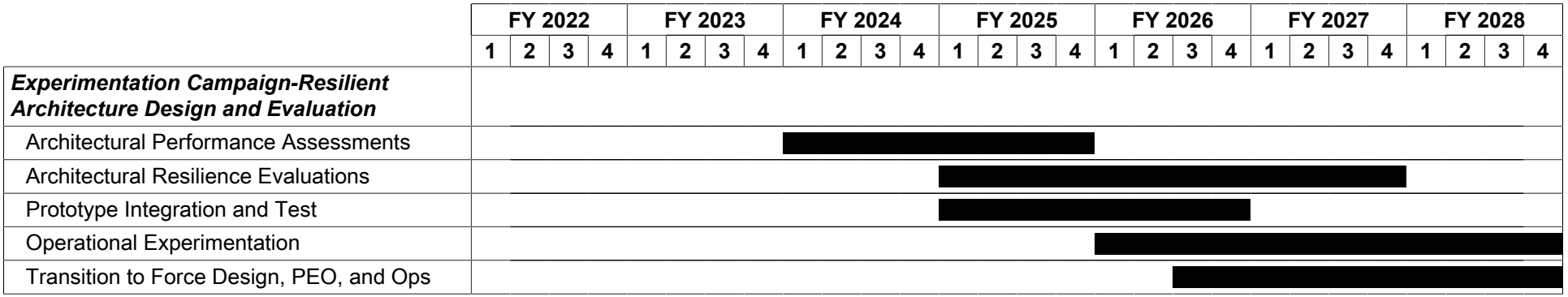

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206458SF / *Tech Transition (Space)*	**Project (Number/Name)** 649493 / *Resilient Architecture Design and Evaluation*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Experimentation Campaign-Resilient Architecture Design and Evaluation				
Architectural Performance Assessments	1	2024	4	2025
Architectural Resilience Evaluations	1	2025	4	2027
Prototype Integration and Test	1	2025	4	2026
Operational Experimentation	1	2026	4	2028
Transition to Force Design, PEO, and Ops	3	2026	4	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206458SF / *Tech Transition (Space)*	Project (Number/Name) 64S444 / *Experimentation (Space)*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
64S444: *Experimentation (Space)*	-	50.000	0.000	149.582	0.000	149.582	168.112	219.138	20.454	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Experimentation (Space), Project 64S444, efforts conduct experimentation and field prototyping of Hybrid Satellite Communications (SATCOM) for Joint operational implementation. In FY22, this included experimentation for Arctic Communications, leveraging Air Force Research Laboratory (AFRL) Global Lightning efforts. In FY24 through FY28, the Experimentation (Space) efforts will extend Hybrid SATCOM capabilities to an expanded set of DOD platforms, and enable assured communications through both commercial and military satellite constellations in multiple orbital regimes, while accessing multiple frequency bands to maintain resilient connectivity and security. The Hybrid SATCOM terminal effort implements and experimentally flight tests multi-band, multi-constellation, multi-orbit SATCOM terminals at three ground installations and on nine different aircraft types. Specific platforms and platform details are available through proper channels. The Project also demonstrates the ability of Hybrid SATCOM terminals to seamlessly switch between vendors and satellite constellations. The Hybrid SATCOM terminal prototyping will include secure connectivity using National Security Agency-approved approaches, and authority approvals at least to the interim levels needed for experimentation as required for DOD communications.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Experimentation Space	-	0.000	149.582
Description: Experimentation Space addresses significant gaps identified by COCOMs, MAJCOMs, and Department Air Force (DAF) Senior Leaders, often by quickly leveraging emerging capability into DOD systems. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** Develop first prototypes for the Hybrid SATCOM Terminals that can be integrated on air and ground platforms, and perform the required integration assessments on 5 of the 9 platforms. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2024 funding increased compared to FY2023 by 169.4 million. Funding increased due to the addition of Hybrid SATCOM efforts.			
Accomplishments/Planned Programs Subtotals	-	0.000	149.582

	FY 2022	FY 2023
Congressional Add: Program Increase - Arctic Communications	50.000	-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206458SF / *Tech Transition (Space)*	**Project (Number/Name)** 64S444 / *Experimentation (Space)*

	FY 2022	FY 2023
FY 2022 Accomplishments: Conduct Congressionally directed effort.		
Congressional Adds Subtotals	50.000	-

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Air Force Research Lab (AFRL) at Wright-Patterson Air Force Base, Ohio manages and executes Experimentation (Space) efforts. The contracting approach includes full-and-open competition using the existing Defense Experimentation Using the Commercial Space Internet (DEUCSI) Acquisition Strategy. The effort will be executed using a combination of existing contracts and new contracts to be issued under the DEUCSI solicitation.

The Prime Contractors will be expected to establish sub-contracts with multiple commercial vendors to secure access to a wide range of technology options, so as to allow the government to operationalize this capability as an integrated unit. With awards to a qualified integration contractor for each platform, the prototype units will be integrated onto a single platform of each type, complete operational worthiness approvals, interim authorities to test (IATT), and test in an operational environment to validate the design. For commercial SATCOM applications, the service will be acquired through the terminal prototype contracts for a limited duration to support the experimentation (typically 1 year).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206458SF / *Tech Transition (Space)*	Project (Number/Name) 64S444 / *Experimentation (Space)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Congressional Add Arctic Comm terminals	Various	Various : Various	-	40.000	Jul 2022	-		-		-		-	Continuing	Continuing	-
Hybrid SATCOM Terminals Contractor 1	Various	Various : Various	-	-		-		61.942	Oct 2023	-		61.942	Continuing	Continuing	-
Hybrid SATCOM Terminals Contractor 2	Various	Various : Various	-	-		-		38.377	Nov 2023	-		38.377	Continuing	Continuing	-
Hybrid SATCOM Terminals Contractor 3	Various	Various : Various	-	-		-		28.255	Oct 2023	-		28.255	Continuing	Continuing	-
		Subtotal	-	40.000		-		128.574		-		128.574	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Congressional Add Arctic Comm Test and Evaluation	Various	Various : Various	-	10.000	Dec 2022	-		-		-		-	Continuing	Continuing	-
Hybrid SATCOM Terminals	Various	Various : Various	-	-		-		18.055	Jan 2024	-		18.055	Continuing	Continuing	-
		Subtotal	-	10.000		-		18.055		-		18.055	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Management Administration	Various	Various : TBD	-	-		-		2.953	Nov 2023	-		2.953	Continuing	Continuing	-
		Subtotal	-	-		-		2.953		-		2.953	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	50.000		-		149.582		-		149.582	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206458SF / *Tech Transition (Space)*	Project (Number/Name) 64S444 / *Experimentation (Space)*	

	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206458SF / *Tech Transition (Space)*	**Project (Number/Name)** 64S444 / *Experimentation (Space)*

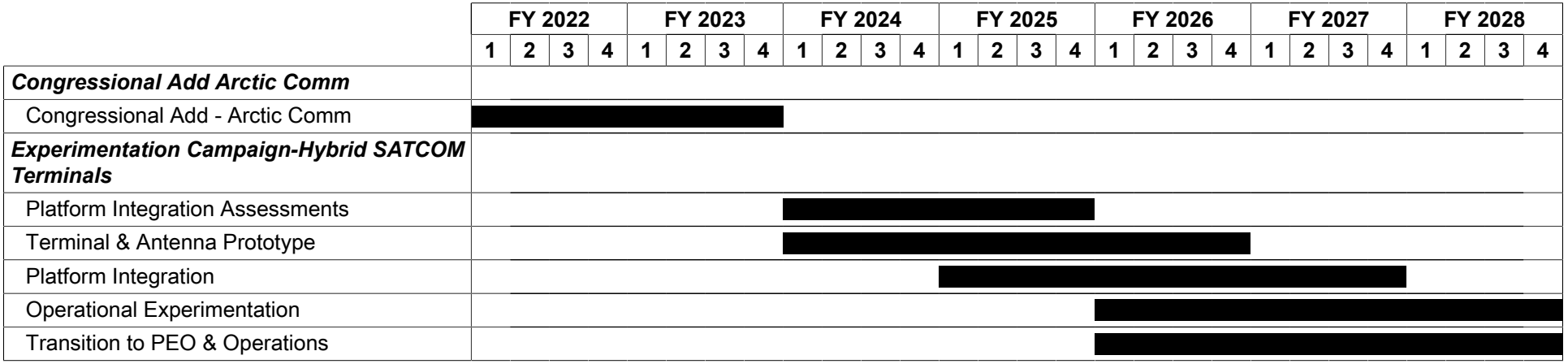

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206458SF / *Tech Transition (Space)*	**Project (Number/Name)** 64S444 / *Experimentation (Space)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Congressional Add Arctic Comm				
Congressional Add - Arctic Comm	1	2022	4	2023
Experimentation Campaign-Hybrid SATCOM Terminals				
Platform Integration Assessments	1	2024	4	2025
Terminal & Antenna Prototype	1	2024	4	2026
Platform Integration	1	2025	4	2027
Operational Experimentation	1	2026	4	2028
Transition to PEO & Operations	1	2026	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206730SF / *Space Security and Defense Program*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	53.896	69.169	59.784	0.000	59.784	51.360	52.575	53.651	55.583	Continuing	Continuing
64A025: *Space Protection Program*	-	53.896	69.169	59.784	0.000	59.784	51.360	52.575	53.651	55.583	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Program Element (PE) 1206730SF, Space Security and Defense Program (SSDP) funds activities executed by the Joint Department of Defense (DoD)/ United States Space Force (USSF) and Office of the Director of National Intelligence (ODNI) organization Space Security and Defense Program. The Program and organization were established to function as the center of excellence for options and strategies (materiel, non-materiel, cross-Title, cross-domain) leading to a more resilient National Security Space (NSS) Enterprise. The organization and its activities operate under the authority of the Deputy Secretary of Defense (DEPSECDEF) and Principal Deputy Director of National Intelligence (PDDNI). SSDP's unique position with both the DoD and ODNI, authorities from both the DEPSECDEF and PDDNI, and broad NSS-scoped mission-set provides a crucial and objective protection competency to advance the highest priority efforts to deliver economical, programmatically-executable, and operationally-relevant space protection solutions for the Nation.

SSDP-funded activities support NSS stakeholders including the DoD, Intelligence Community (IC), civil, commercial, and international space entities/missions supporting current and future national security operations in both peacetime and throughout all phases of conflict. In this capacity, SSDP employs these funds to lead and collaborate on NSS susceptibility and vulnerability assessments, and threat mitigation processes. Its breadth of activities span the capability to conduct rigorous foundational analyses in order to understand red counterspace threat and blue operations environments, and to plan and execute projects to discover, analyze, and validate near-term and far-term options to detect, track, and mitigate and/or render these threats (including emerging space and transmedium threats) ineffective. SSDP analytic products to mitigate/defeat adversary counterspace threats either manifest themselves in validated materiel solution recommendations to corporate decision processes (including system and/or architectural requirements and potential investment opportunities), or as non-materiel recommendations such as Tactics, Techniques, and Procedures (TTP), Concepts of Operations (CONOPS), and/or space policy, or a combination of both. Regardless, SSDP threat analyses and models of all sorts are shared across the NSS enterprise to ensure efficiency and speed of analysis, and ultimately produce results in more resilient space effects for national security missions.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage and execute SSDP and/or deliver products for emergent or unanticipated weapon system capabilities.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206730SF *I Space Security and Defense Program*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	53.896	59.169	60.151	0.000	60.151
Current President's Budget	53.896	69.169	59.784	0.000	59.784
Total Adjustments	0.000	10.000	-0.367	0.000	-0.367
• 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	0.000	-0.367	0.000	-0.367

Change Summary Explanation

FY23 Congressional add ($10M) for the program to address the increasing number and complexity of emerging space and transmedium threats (Anti-Satellite Weapons, hypersonics, space-delivered effects, reentering debris, high altitude balloons, high-speed high-altitude objects, and other anomalous objects). FY23 language from all three relevant Senate Committees (SASC, SSCI, SAC-D) requested SSDP address this broader range of threats as part of the program's enduring scope.

FY 2024: -$0.367M; reduction for higher USSF priorities.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Protection and Survivability	53.896	69.169	59.784
Description: SSDP applies a holistic analytical approach to improve the resilience of NSS space effects for national security missions. ***FY 2023 Plans:*** In FY 2023 SSDP resources completed and/or or transitioned FY 2022 activities, and initiated emerging or backlogged priorities to answer key questions aligned with three enduring objective areas: Defend the Legacy Architecture, Pivot to Offense, and Prepare for the Future Fight. Foundational work matured and drove threat assessments with NSS stakeholders, and informed concepts, doctrine, policy, space control force designs and space control fire control solutions. The Program continued to emphasize Digital Engineering through its Model-Based Systems Engineering (MBSE) products applied to red and blue system design and mission analyses and simulations, and in support of wargaming. SSDP remained committed to identify and answer the most crucial questions afflicting the NSS stakeholders it represents and serves, with ever-maturing technical rigor as the counterspace and space protection landscape continued to unfold and evolve.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206730SF *I Space Security and Defense Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024

Foundational space protection and threat definition analyses and products continued to promulgate MBSE standards to maximize the utility of SSDP analyses across the NSS enterprise. The program prioritized modeling and simulation to inform priority space protection capabilities, warfighting concepts, doctrine, policy, and the NSS capability area designs they are designed to protect and defend.

Program efforts to inform NSS investments that defend legacy capabilities, inform survivability for next-generation satellites, and establish initial offensive force designs that informed budget and requirements continued to progress in FY 2023. For instance, SSDP executed several space control activities resulting in recommendations and design-specific system/technology solutions and concepts which the organization shared with key NSS stakeholders. NSS stakeholders also benefited from SSDP progress to inform Electronic Warfare (EW) force designs and to scope supporting Command and Control interests which the organization will prioritize for additional analyses. Similarly, NSS stakeholders were able to dramatically improve space mission resilience due to SSDP's enterprise-level fire control assessments and resulting recommendations. Moreover, SSDP's discovery work to dissect and refine red and blue kill chains, detect/track/mitigate emerging space and transmedium threats, produce relevant design reference missions, and analyze multi-domain space and terrestrial scenarios subsequently revealed additional protection priorities the program will investigate for NSS, along with opportunities for future prototyping and/or demonstration endeavors. FY 2023 leveraged the successes and discoveries of FY 2022 efforts, and moved SSDP toward the next priority analyses; enabling more flexibility for the U.S. to mitigate adversary counterspace capabilities without increased risk of escalation.

SSDP's prior years' activities and accomplishments not only advanced the landscape of space protection, but also emphasized understanding and preparing for the future fight. In FY 2023 the program continued to delve into new technology solutions to increase resiliency for NSS space platforms and effects. The future fight requires options that enable the US to more flexibly hold adversary capabilities at risk without increased risk of escalation.

FY 2024 Plans:

In FY 2024 SSDP activities will remain focused on identifying and answering NSS stakeholder priorities across three still-relevant objective areas; Survivability and Defense, Offensive Space Control, and Preparing for the Future Fight. As with prior years, the program's holistic approach to these analyses and resulting recommendations will demand threat knowledge, Space Domain Awareness and Fire Control, costing, policy, and wargaming analyses to the appropriate extent and practicality.

NSS stakeholders will continue to benefit from SSDP-benchmarked digital engineering products (including MBSE) for both space protection analyses and threat definition documentation. Recognizing the demand for SSDP analyses, the program will continue to invest in knowledge management infrastructure to make analyses more readily available and will continue to invest in developing and sustaining analytic capabilities to support its NSS Enterprise stakeholders.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206730SF *I Space Security and Defense Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
In addition to ongoing and new Space Control, EW, and Future Technology investment recommendations, FY 2024 will deliver initial digital engineering capabilities to the USSF including a Model Library with available blue systems and red threat models with complementary designs for the Analysis Environment and Government-Owned MBSE-compliant Simulation Engines. These deliverables are intended to be used for not only USSF Force Design and Wargaming activities, but also the test, training, and doctrine communities. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding decreased due to FY23 Congressional add ($10M) of funding to establish an enduring capability to address emerging space and transmedium threats, as well as to develop new analysis products, experiments, and prototypes to inform budget, requirements, TTPs, and new intelligence collection capabilities to avoid strategic surprise and enhance current and future programs to counter these national security threats.			
Accomplishments/Planned Programs Subtotals	53.896	69.169	59.784

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

N/A

E. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible. The program consists of numerous efforts/ projects.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206730SF / *Space Security and Defense Program*	Project (Number/Name) 64A025 / *Space Protection Program*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Protection and Survivability	Various	Various : TBD	-	47.665	May 2022	62.524	Jan 2023	52.822	Oct 2023	-		52.822	Continuing	Continuing	-
		Subtotal	-	47.665		62.524		52.822		-		52.822	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Program Support and Infrastructure	Various	Various : TBD	-	2.138	Mar 2022	2.326	Nov 2022	2.493	Oct 2023	-		2.493	Continuing	Continuing	-
Oversight, Advisory and other Technical Support	Various	Various : TBD	-	4.093	Mar 2022	4.319	Nov 2022	4.469	Oct 2023	-		4.469	Continuing	Continuing	-
		Subtotal	-	6.231		6.645		6.962		-		6.962	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	53.896		69.169		59.784		-		59.784	Continuing	Continuing	N/A

Remarks

N/A

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206730SF / *Space Security and Defense Program*	**Project (Number/Name)** 64A025 / *Space Protection Program*

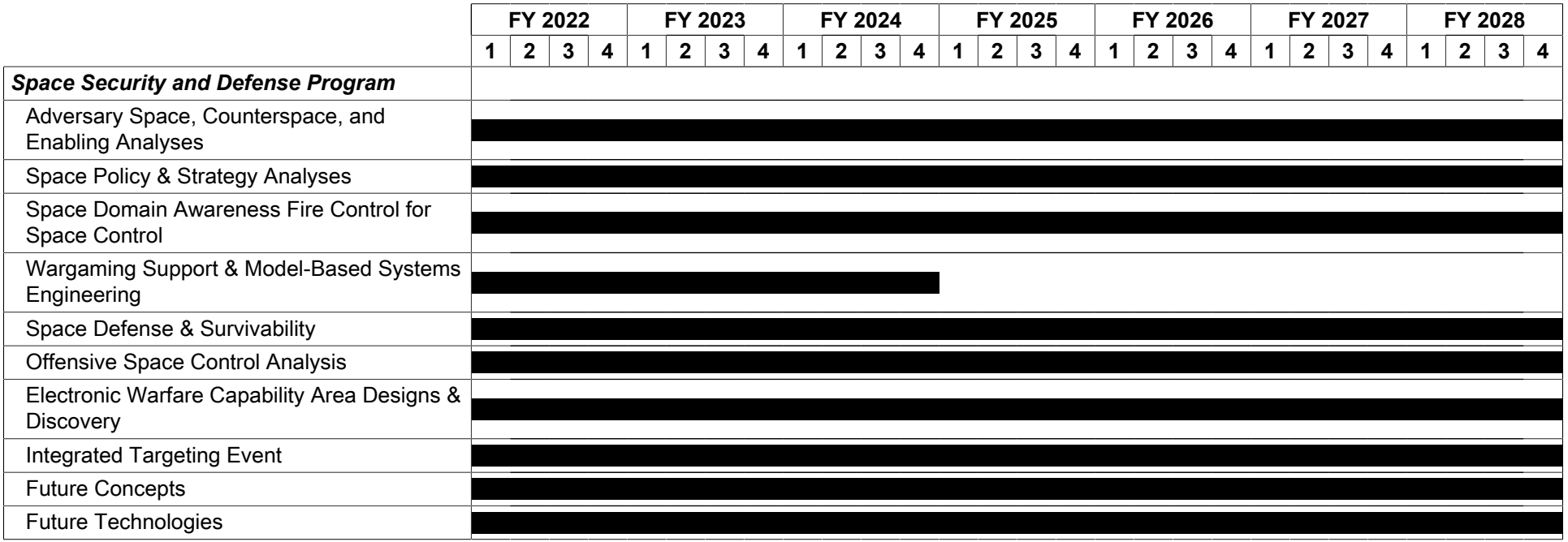

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206730SF / *Space Security and Defense Program*	**Project (Number/Name)** 64A025 / *Space Protection Program*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Security and Defense Program				
Adversary Space, Counterspace, and Enabling Analyses	1	2022	4	2028
Space Policy & Strategy Analyses	1	2022	4	2028
Space Domain Awareness Fire Control for Space Control	1	2022	4	2028
Wargaming Support & Model-Based Systems Engineering	1	2022	4	2024
Space Defense & Survivability	1	2022	4	2028
Offensive Space Control Analysis	1	2022	4	2028
Electronic Warfare Capability Area Designs & Discovery	1	2022	4	2028
Integrated Targeting Event	1	2022	4	2028
Future Concepts	1	2022	4	2028
Future Technologies	1	2022	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	96.942	110.801	76.554	0.000	76.554	88.871	38.525	36.177	87.552	0.000	535.422
643726: *PTES*	-	96.942	110.801	45.917	0.000	45.917	33.562	13.360	5.949	6.867	0.000	313.398
643733: *PTW Over Commercial*	-	0.000	0.000	30.637	0.000	30.637	55.309	25.165	30.228	80.685	0.000	222.024

A. Mission Description and Budget Item Justification

New Project 643733 was created starting in FY 2024 for Protected Tactical Waveform (PTW) Over Commercial to develop an anti-jam (AJ) communications capability via PTW Over Commercial constellations for tactical users in all Services and International Partners (IP). This is a continuation of efforts that began in the Protected Tactical Enterprise Service (PTES) Project 643726 to enable multi-domain operations for tactical warfighters in congested and contested environments using various orbits.

The global threat of electronic warfare attacks against space systems will expand in the coming years in both number and types of weapons. Threat development will very likely focus on jamming capabilities against dedicated military satellite communications (MILSATCOM). To address this critical threat, and in pursuit of more precise solutions for disaggregated strategic and tactical SATCOM, U.S Strategic Command (USSTRATCOM) and Air Force Space Command (AFSPC) initiated the Protected Anti-jam Tactical SATCOM (PATS) family-of-systems incremental approach, including PTES and Protected Tactical SATCOM (PTS), to mitigate adversarial jamming effects by using the PTW. The United States Space Force (USSF) is developing PTES to establish the foundational ground system that will enable PTW-based protected communications of PATS. PTES is a software intensive program needed to achieve the PATS architecture by developing the critical ground infrastructure to operationalize the PTW via military and commercial satellite systems for tactical users in all Services. As part of the PATS integrated, incremental approach, PTES ground system development will initially enable PTW over the Wideband Global Satellite Communications (WGS) system to provide an operational AJ communications capability. PTES will extend PATS development to provide PTW service using commercial satellites in various orbits and purpose-built PTS system with onboard PTW processing. The ability to securely access both military and commercial capabilities in multiple orbits will provide tactical warfighters alternate protected SATCOM paths for greater network resiliency.

The PTES program is developing a Mission Management System (MMS), a Key Management System (KMS), and Joint Hub Variants (JHs) to enable PTW via transponded WGS satellites, and to commercial SATCOM with JH Variants (JHVs). The systems will be extensible to support commercial and military SATCOM systems in the future. The user equipment will consist of existing wideband terminals with upgraded PTW modems. Production-representative PTW modems for user terminals were developed by the Protected Tactical Service Field Demonstration (PTSFD) and separately acquired by each Service and by IPs. The Navy Wideband Anti-Jam Modem System (WAMS), the Air Force-Army Anti-Jam Modem (A3M), and other stakeholders rely on PTES to provide PTW ground infrastructure. A3M provides the Air Force and Army with a secure, wideband, AJ SATCOM terminal modem for tactical SATCOM operations. The WAMS modem is the Navy's next generation software-defined wideband modem for both transponded and processed satellite. The user terminal segment, not included in this acquisition, utilizing low-cost PTW modem upgrades enabled by the A3M and WAMS programs are designed to become an integral part of the growing PATS enterprise.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*

The PTES Prototype Development was designated as a Rapid Prototype (RP) in June 2018 from the National Defense Authorization Act (NDAA) for Fiscal Year 2016 (Public Law 114-92) under Middle Tier of Acquisitions (MTA) for Rapid Prototyping/Rapid Fielding (Section 804) to operationalize the PTW intially with WGS. A new Project, 643733 PTW Over Commercial, was created in this Program Element in FY 2024 to segregate funding allocated to develop the capability to deliver PTW to the warfighter by leveraging commercial satellites. This continues efforts begun in FY 2023 under Project 643726, PTES Prototype Development. To meet the warfighter requirements for protected tactical MILSATCOM and the capability gaps identified in these studies, RDT&E funding is required for architectural development, acquisition strategy development, system requirements and system trades analysis, and engineering, manufacturing, developing, testing and evaluating PTES and PATS systems and segments.

For the PATS WGS capability, the PTES system addresses an operational need in the Pacific region by achieving Initial Operational Capability (IOC) in FY 2024. IOC provides ground elements for PTW over WGS and consists of PTES installation at two WGS DoD SATCOM Teleport sites utilizing one WGS satellite. At Full Operational Capability (FOC) in FY 2026, PTES will provide worldwide PTW operations using up to all WGS satellites. For the PTW Over Commercial, the PTES system will achieve IOC providing resilient commercial capacity and path diversity across ground elements for PTW over commercial architectures in CY 2026. PTES will reach FOC in CY 2028 providing robust PTW operations using commercial satellites in various orbits. The PTES team will execute additional studies and proof of concept demonstrations to inform commercial requirements and MMS, KMS development.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver PTES weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force					Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*			R-1 Program Element (Number/Name) PE 1206760SF *I Protected Tactical Enterprise Service (PTES)*		
B. Program Change Summary ($ in Millions)	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**
Previous President's Budget	100.320	121.069	91.814	0.000	91.814
Current President's Budget	96.942	110.801	76.554	0.000	76.554
Total Adjustments	-3.378	-10.268	-15.260	0.000	-15.260
• Congressional General Reductions	0.000	-0.350			
• Congressional Directed Reductions	0.000	-9.918			
• 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	-3.378	0.000			
• Other Adjustments	0.000	0.000	-15.260	0.000	-15.260

Change Summary Explanation

FY 2023: -9.918M Congressional mark

FY 2023: -0.350M Congressional General Reduction

FY 2024: -0.603M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: -15.000M; to realign resilient architecture funding to Air Force Research Laboratory (AFRL), APPN 3620, PE 1206458SF, Tech Transition (Space).

FY 2024: +0.343M; inflation adjustment

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	Project (Number/Name) 643726 / *PTES*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
643726: *PTES*	-	96.942	110.801	45.917	0.000	45.917	33.562	13.360	5.949	6.867	0.000	313.398
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

PTES will deliver a software-intensive ground system to provide worldwide, AJ protected communications to warfighters who are currently unable to operate through interference by using the PTW. PTES delivers the foundational ground system to enable PTW-based protected communications for all PATS capabilities in a incremental approach by operationalizing the PTW over WGS and later for PTW Over Commercial and the future PTS system. In this Project, the PTES ground system will provide an operational AJ communications capability using PTW service over the existing WGS system. This effort also includes the development of PTES program elements such as the MMS, a KMS, and JHs, which will be extensible to PTW via transponded commercial satellites. This effort informs, supports, and reduces risk to future PATS development that will provide the PTW service using commercial satellites and purpose-built PTS with onboard PTW processing. The development for PTW over WGS in this Project, 643726, segregates efforts established in FY 2024 as a new Project, 643733, for the PTW Over Commercial increment of PTES. This new Project continues FY 2023 efforts begun in Project 643726 for the next instantiation of the PATS architecture to enable PTW service through commercial satellites with processing that will occur on the ground.

PTES will develop the MMS and KMS software, and the JH hardware. A JH is the unmanned computing and communications hardware located at a SATCOM Gateway which will provide the PTW signal processing, reachback network connectivity, and near-real-time networked control to direct the connected terminals. The JHs will require installation at large SATCOM Gateways and the system will be integrated and tested with PTW-capable modems that will be separately procured by the Navy, Air Force, and Army. In addition, the KMS and JH End Cryptographic Units (ECU) must be certified by the National Security Administration (NSA). The ECUs are required to generate transmission security (TRANSEC) and cover for all channels/data flows, encrypt/decrypt waveform messages, securely receive/store key material from NSA's Key Management Infrastructure, as well as to synchronize and process key streams for hundreds of simultaneous users.

Driven by emerging threats in the Pacific theater, PTES will complete the MTA RP effort with an operational demonstration of an AJ tactical communications capability using user-provided terminals in support of any Service or formation in Indo-Pacific Command (INDOPACOM) or any operationally-relevant environment in FY 2023. A future acquisition pathway will continue PTES development to reach IOC for an early operational prototype over WGS in FY 2024 and FOC in FY 2026 for worldwide PTW operations using up to all WGS satellites.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: PTES Prototype Ground and Software Development	96.942	110.801	31.370
Description: This Major Thrust, previously titled "PTES Prototype Development", has been segregated into another Major Thrust and new Project in FY 2024 to differentiate efforts between the PTES development contractor and the PTW Over Commercial effort. Develop and field the ground system for enabling capabilities of adaptive, AJ, wideband SATCOM under the PATS effort. Utilize Agile software development to deliver a prototype consisting of three PTES segments: MMS, KMS and JHs, to include			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643726 / *PTES*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
ECUs, integrated into existing SATCOM Gateways to enable the PTW AJ communications capability via transponded WGS satellites for tactical users currently unable to operate through interference. Support the build, test, and installation of hardware required to prototype a tactical, AJ communications capability demonstrated in an operationally relevant environment and to operate the system at IOC and FOC. Efforts include performing and assisting the PTES team in system integration and conducting contractor-led factory tests, including risk reduction and end-to-end tests of the complete PTES prototype. ***FY 2023 Plans:*** Conduct Risk Reduction Test 4 upon completion of Software Build 4 of the PTES Prototype Development. Complete Software Build 5 and commence Software Build 6. Conduct key developmental and operational tests, conducted by the 45th Test Squadron and STAR Delta 12 / 4th Test and Evaluation Squadron, which will support two SATCOM gateways leading up to IOC in FY 2024. Continue to test and deliver MMS, KMS, and Key Loading Initialization Facility (KLIF) functionality on multiple system-level integration and testing events on the Government approved Core Data Center operational environment. The FY 2023 funding achieves PTES functionality and early operational automation on-time for IOC that was traded in the interest of achieving a mean product during the rapid prototyping phase. 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 2024 Plans:*** Continue FY 2023 plans for agile process prototyping, including automation for global coverage, new theaters, and PTS integration for FY 2024. Achieve IOC in an operational environment that builds upon the operational demonstration in FY 2023 (MTA completion). Complete the development of Software Build 6 and commence Software Build 7 focused on continuously delivering increased cloud-hosted MMS and KMS functionality needed for FOC. Continuously test deployed software before being promoted to operations. Perform additional testing and integration activities with other PTW-capable modems necessary to expand PTW capability to other services and user groups. Rapidly respond to implement system resiliency and situational awareness as 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to completion of initial PTW operational capability deliveries, achieving IOC, and transferring activity out from this Major Thrust into the PTES System Development, Baseline, Integration and Test Major Thrust and into Project 643733 for PTW Over Commercial.			
Title: PTES System Development Baseline, Integration, and Test	-	0.000	14.547
Description: This is not a New Start as this activity was previously included in the PTES Prototype Development Major Thrust. The PTES team will support integration of all PTES segments, including government-led end-to end tests of the complete PTES			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643726 / *PTES*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
system. Lead key Development Test/Operational Test (DT/OT), conducted by the 45th Test Squadron (TS) and STAR Delta 12 / 4th Test and Evaluation Squadron, which will support two SATCOM gateways leading up to IOC in FY 2024. Manage the PTES technical baseline through acquiring, designing, testing, and integrating key system segments as well as external interfaces as part of the larger SATCOM enterprise. Witness PTES contractor-led tests and execute government-led testing continuing until FOC. Support the Joint Satellite Engineering Center (JSEC) and Joint Interoperability Command (JITC) to ensure risk-reduction is demonstrated, system interfaces are validated, and data needed to support cybersecurity system authorization and interoperability certifications will be obtained. Manage system capability development hand-in-hand with operator involvement to provide information for technical, integration, and programmatic decisions. The PTES team will execute additional studies and proof of concept demonstrations to inform commercial requirements, build out needed improvements to the MMS, and establish needed interoperability with commercial systems required to support Joint Force needs. Tobyhanna Army Depot is part of the PTES System Development Baseline, Integration and Test Major Thrust, and will be responsible for key loading and initialization of PTW capable modems. ***FY 2023 Plans:*** FY 2023 plans were previously included in PTES Prototype Development Major Thrust. ***FY 2024 Plans:*** Conduct Government prioritized software development, software build testing and integration activities for IOC and FOC fielding. Lead DT/OT evaluation for PTES hardware and software ground elements enabling FOC for PTW over WGS and to inform evaluations extending to PTW over commercial architectures. Witness PTES contractor-led factory tests focusing on PTES specification requirements. Support cyber efforts, such as those required to obtain Interim Approval to Test (IATT) and Approvals to Operate (ATO), software qualification testing, regression testing, capability demonstrations, and risk reduction tests. Build-out and support cloud-hosted software on a Government approved Core Data Center that leverages existing secure resources. Complete DT/OT test events for IOC build and begin DT/OT test events for FOC build. Support pre-operational checkout phase. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to support evolving ground and software development required for full IOC and FOC capabilities. FY 2024 also increased due to transferring government test and integration activities previously included in the PTES Prototype Development Major Thrust.			
Accomplishments/Planned Programs Subtotals	96.942	110.801	45.917

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643726 / *PTES*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 BA01 PTES00: *PTES HUB*	7.406	42.464	56.482	-	56.482	56.052	11.846	0.000	0.000	0.000	174.250

Remarks

D. Acquisition Strategy

USSF is developing PATS in an evolutionary manner to introduce PTW capabilities providing anti-jam (AJ) communications via military and commercial satellite systems for tactical users in all Services, initially providing service over the existing military WGS satellite system and then adding commercial and purpose-built AJ PTS satellites. The PTES Prototype Development was designated as a RP in June 2018 from the NDAA for Fiscal Year 2016 (Public Law 114-92) under MTA for Rapid Prototyping/ Rapid Fielding (Section 804) to kick off the design, development, integration and testing with PTW service via WGS. Following an operational demonstration of the MTA RP capability within five years from the development, contracts and agreements will continue these efforts utilizing a future acquisition pathway into production of the capability to achieve FOS with WGS and to extend the PTW to commercial satellites. The PTES program competitively awarded a single Cost-Plus Incentive Fee (CPIF) contract to Boeing on 26 November 2018 to develop and field the PTES, through declaration of FOC planned for 1QFY2026. The MTA-RP effort consists of the initial deployment of the PTES ground system supporting the PATS WGS Phase with PTW leveraging codified MTA authorities and Agile software development practices to rapidly field an operational leave-behind AJ capability via WGS using PTW ahead of IOC. Boeing and sub-contractors will be responsible for developing all PTES segments (MMS, KMS, and JH) and performing all system integration, including end-to-end tests of the complete PTES prototype. Raytheon is the major sub-contractor to develop the ECU. The program office will secure Cloud and Infrastructure services from approved and secure Government sources. Tobyhanna Army Depot will be responsible for key loading and initialization of PTW capable modems. The 45th TS (PTES DT), STAR Delta 12 / 4th Test and Evaluation Squadron (PTES OT), JSEC, and JITC support test events. This effort will also be leveraged by the commercial satellite and the future PTS efforts to use the PTW. Acquisition plans are in development/pending approval to transition the MTA from a RP capability towards providing a PTW worldwide capability through FOC utilizing the Software Acquisition Pathway (SWP) in FY 2023.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643726 / *PTES*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PTES Prototype Ground and Software Development	C/CPIF	Boeing : El Segundo, CA	-	74.316	Dec 2021	87.650	Oct 2022	31.370	Oct 2023	-		31.370	0.000	193.336	-
PTES System Development Baseline, Integration and Test	Various	Various : Various	-	-		-		3.085	Nov 2023	-		3.085	0.000	3.085	-
Tobyhanna Army Depot	MIPR	Tobyhanna Army Depot : Tobyhanna, PA	-	-		-		1.145	Mar 2024	-		1.145	0.000	1.145	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	5.810	Nov 2021	4.350	Jan 2023	2.250	Jan 2024	-		2.250	0.000	12.410	-
Enterprise SE&I	Various	Various : Various	-	10.040	Dec 2021	10.570	Nov 2022	2.833	Oct 2023	-		2.833	0.000	23.443	-
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		1.607		-		1.607	0.000	1.607	-
		Subtotal	-	90.166		102.570		42.290		-		42.290	0.000	235.026	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Planning & Execution DT/OT	Various	Various : Various	-	4.490	Dec 2021	5.600	Nov 2022	1.810	Nov 2023	-		1.810	0.000	11.900	-
		Subtotal	-	4.490		5.600		1.810		-		1.810	0.000	11.900	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace : El Segundo, CA	-	0.160	Nov 2021	0.120	Jan 2023	0.120	Jan 2024	-		0.120	0.000	0.400	-
A&AS	Various	Various : Various	-	2.006	Nov 2021	2.421	Jan 2023	1.607	Jan 2024	-		1.607	0.000	6.034	-
Other Support	Various	Various : Various	-	0.120	Nov 2021	0.090	Oct 2022	0.090	Oct 2023	-		0.090	0.000	0.300	-
		Subtotal	-	2.286		2.631		1.817		-		1.817	0.000	6.734	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643726 / *PTES*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	96.942		110.801		45.917		-		45.917	0.000	253.660	N/A

Remarks

FY 2023 funds previously included for PTW Over Commercial effort will transfer to Project 643733 (new) in this Program Element starting in FY 2024 to segregate funding allocated to develop the capability to deliver PTW to the warfighter by leveraging commercial satellites. Tobyhanna Army is an effort included in the PTES System Development Baseline, Integration & Test Support Major Thrust, and will be responsible for key loading and initialization of PTW capable modems.

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643726 / *PTES*

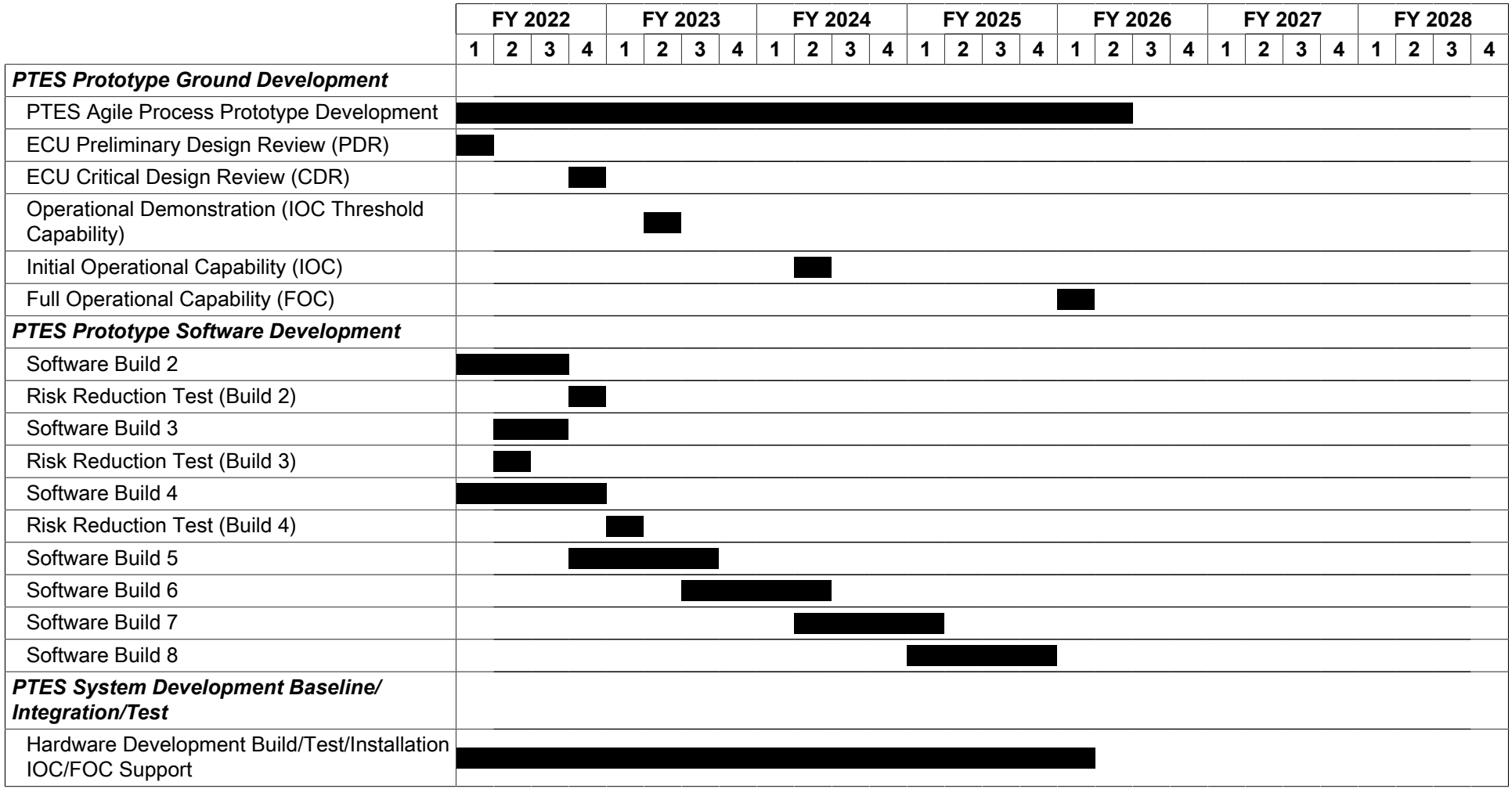

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643726 / *PTES*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
PTES Prototype Ground Development				
PTES Agile Process Prototype Development	1	2022	2	2026
ECU Preliminary Design Review (PDR)	1	2022	1	2022
ECU Critical Design Review (CDR)	4	2022	4	2022
Operational Demonstration (IOC Threshold Capability)	2	2023	2	2023
Initial Operational Capability (IOC)	2	2024	2	2024
Full Operational Capability (FOC)	1	2026	1	2026
PTES Prototype Software Development				
Software Build 2	1	2022	3	2022
Risk Reduction Test (Build 2)	4	2022	4	2022
Software Build 3	2	2022	3	2022
Risk Reduction Test (Build 3)	2	2022	2	2022
Software Build 4	1	2022	4	2022
Risk Reduction Test (Build 4)	1	2023	1	2023
Software Build 5	4	2022	3	2023
Software Build 6	3	2023	2	2024
Software Build 7	2	2024	1	2025
Software Build 8	1	2025	4	2025
PTES System Development Baseline/Integration/Test				
Hardware Development Build/Test/Installation IOC/FOC Support	1	2022	1	2026

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	Project (Number/Name) 643733 / *PTW Over Commercial*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
643733: *PTW Over Commercial*	-	0.000	0.000	30.637	0.000	30.637	55.309	25.165	30.228	80.685	0.000	222.024
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Project 643733 was created starting in FY 2024 for PTW Over Commercial to deliver PTW to the warfighter in various orbits utilizing commercial (to include international) SATCOM constellations enabling more resilient by design architectures. This is not a New Start and is a continuation of efforts that began in the PTES Project 643726 in FY 2023 to build upon efforts to operationalize PTW over WGS. This Project reflects the next instantiation of the PATS architecture's integrated, incremental approach to enable PTW service through commercial satellites with processing that will occur on the ground. This Project will expand the development of PTES program elements to include requirement, architecture, and interface development to leverage PTES MMS/KMS systems and JH Variants (JHVs) to enable PTW via transponded commercial satellites. In FY 2024, resilient architecture funding to support this development was realigned to AFRL to improve theater allied and commercial integration for increased SATCOM flexibility for the warfighter.

The objective of PTW Over Commercial is to upgrade the established PTES ground system to provide an operational AJ capability in various orbits including Geosynchronous Orbit (GEO) and Medium Earth Orbit (MEO) by utilizing emerging satellite technologies. Leverages PTES development to design, build, integrate, and test an AJ communications capability for a PTW utility over commercial SATCOM constellations to support filling critical tactical SATCOM gaps and improve overall theater warfighting SATCOM flexibility and resiliency. To do this, this Project will also leverage and build on emerging commercial satellite technologies through assessment, experimentation, and development efforts. The PTW Over Commercial effort will execute studies, proof of concept demonstrations, and tests to inform commercial requirements, build out needed improvements to the PTES ground system, and establish needed interoperability with commercial and international systems required to support Joint Force needs.

The PATS Commercial capability of the PTES system will achieve IOC by FY 2026 providing resilient commercial capacity and path diversity across ground elements for PTW over commercial SATCOM architectures. For IOC, PATS users are planned and managed using the PTES MMS/KMS and operate for at least one month using a JH or JHV beyond the baseline PTES JH inventory to provide SATCOM using the PTW over one commercial or IP SATCOM satellite. PTES will provide robust PTW operations using multiple commercial satellites at FOC by FY 2028.

Collective and complimentary efforts will work to solve complex problems of interoperability, key management, and data sharing that drive the affordability, scalability and performance of USSF's future hybrid architecture.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: PTW Over Commercial - Studies/Demonstrations	0.000	0.000	3.250
Description: This is not a New Start as this activity was previously included in the PTES Prototype Development Major Thrust. Assess emerging commercial SATCOM technologies in multiple orbits for tactical applications and PTES integration. Execute			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643733 / *PTW Over Commercial*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
additional studies and proof of concept demonstrations to inform commercial requirements and MMS, KMS development for PTES integration with commercial GEO and MEO SATCOM technologies. Conduct three studies, including tests and demonstrations, to prepare and reduce risk for the PTW Over Commercial effort. Analyze, integrate, and test PTES system with small satellites (small sats) to evaluate the PTES architecture for GEO small sat applications. Perform a risk reduction study to evaluate PTW applications over the mPower constellation in MEO and demonstrate integration of PTES system with mPower satellites using the PTW. Perform a study to refine requirements for the JHV to understand the specific upgrades needed to implement PTW over commercial satellites using PTES JHVs in GEO and MEO constellations. ***FY 2023 Plans:*** FY 2023 plans were previously included in PTES Prototype Development Major Thrust. ***FY 2024 Plans:*** Continues FY 2023 efforts that began in the PTES Prototype Development, Project 643726. Execute and complete three studies/ demonstrations awarded in FY 2023 for: integrating/testing the PTES system with small sats to define tasks to integrate, test, and demonstrate emerging GEO communications small sats for protected tactical SATCOM applications; demonstrating MEO capabilities with a live PTW demonstration with initial mPower satellites without data loss, and service management concepts to burn down technical risks for PTW over mPower; and analyzing requirements for software upgrades, and potential Hardware upgrades required to implement PTW over commercial satellites in MEO and GEO. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to transferring scope from PTES Project 643726.			
Title: PTW Over Commercial - mPower ***Description:*** This is not a New Start as this activity was previously included in the PTES Prototype Development Major Thrust. Implement and operationalize PTW on commercial SATCOM systems in MEO. Procure all associated equipment to enable non-PTW and PTW communications across the mPower MEO commercial constellation as platforms transition to non-GEO SATCOM and PTW capability to address the emerging threat environment. Procure mPower terminal systems dedicated for DoD use and install at six different DoD SATCOM Ground Entry Point (GEP) sites to enable dedicated DoD connectivity to the SES mPower MEO commercial SATCOM constellation. Installations include demonstrations of AJ communications and resilience through the hybrid SATCOM architecture of commercial, international, and sovereign systems in support of USSF future space architecture. ***FY 2023 Plans:*** FY 2023 plans were previously included in PTES Prototype Development Major Thrust. ***FY 2024 Plans:***	0.000	0.000	10.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643733 / *PTW Over Commercial*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continues efforts that began in the PTES Prototype Development, Project 643726. Develop PTES system firmware/software changes to enable operations over MEO constellation of mPower commercial satellites. Procure mPower terminal systems to support one GEP site installation in FY 2024, including install for the terminal systems. Support site preparation for hardware delivery and installation and test/checkout activities for site acceptance, including demonstrating anti-jam communications through the hybrid SATCOM architecture. Support current DoD O3b Enterprise users, migrate that service to mPower. Coordinate with industry, FFRDC, and IPs to execute studies, proof-of-concept demonstrations, and prototype development, that will result in delivery of an operational capability. Activities include, but are not limited to, requirement definition studies, capability demonstrations, testbed integration and end-to-end testing. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to mPower terminal system procurement and installation at one DoD SATCOM GEP sites, to include test/checkout activities for site acceptance. FY 2024 also increased due to transferring scope from PTES Project 643726.			
Title: PTW Over Commercial - PTES Upgrades	-	0.000	17.387
Description: This is not a New Start as this activity was previously included in the PTES Prototype Development Major Thrust. Builds upon PTES system development, which will enable the PTW and provide AJ communications capability over Commercial constellations for tactical users in all Services and IPs. Procure and install additional PTES JHV at DoD SATCOM GEP and apply software changes to MMS to support PTW over Commercial in various orbits. Utilize other established elements of the PTES ground system and leverage ongoing development to design, build, integrate, and test end-to-end system capabilities. Includes requirement, architecture and interface development to leverage, modify and enhance PTES MMS and JHV system elements to plan and operate over a variety of terminals. ***FY 2023 Plans:*** FY 2023 plans were included in PTES Prototype Development Major Thrust. ***FY 2024 Plans:*** Continues efforts that began in the PTES Prototype Development Project 643726. Continue development to transition from a prototype capability towards providing a PTW capability through IOC and FOC, to include development of mission planning functionality over commercial GEO and MEO constellations. Develop PTES JHV and make the necessary MMS software changes to support PTW over commercial in various orbits based upon comprehensive study results. Finalize characterization of Doppler impacts to PTW for full implementation into PTES system in MEO constellations. Demonstrate production software and integrate into PTES baseline system. Conduct analysis and perform integration and compatibility testing with terminals capable of handling GEO and MEO constellations. Coordinate with industry, FFRDC, and IPs to execute prototype development, that will result in			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643733 / *PTW Over Commercial*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
delivery of an operational capability. Activities include, but are not limited to, software upgrades, capability demonstrations, testbed integration, prototype development, and end-to-end testing. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to purchase of additional PTES hub/modem and software modifications supporting USSF priority to improve theater SATCOM resiliency for the warfighter. FY 2024 also increased due to transferring scope from PTES Project 643726.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	30.637

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 PTES00: *PTES HUB*	7.406	42.464	56.482	-	56.482	56.052	11.846	0.000	0.000	0.000	174.250

Remarks

D. Acquisition Strategy

The PTW Over Commercial acquisition strategy strives to provide SATCOM enterprise resiliency enhancements by efficiently using existing designs with reduced nonrecurring engineering by leveraging, where possible, existing contracts and government relationships, to include but not limited to the USSF, US Army, Air Force Research Laboratory (AFRL), Space Warfighting Analysis Center (SWAC), USSF Commercial Satellite Communications Office (CSCO), and the Defense Information Systems Agency (DISA). PTES plans to coordinate with industry, FFRDC, and IPs to execute three studies/demonstrations that will inform delivering an operational capability in this Commercial instantiation of PATS. A Firm Fixed Price (FFP) contract was awarded to Astranis on 27 September 2023 to evaluate PTW SATCOM applications for GEO small sats within PTES architecture. To inform and develop PTW capability in MEO, PTES plans for Massachusetts Institute of Technology/Lincoln Labs (MIT/LL) to conduct a demonstration of PTW implemented over initial mPower commercial MEO satellites, the first allied hybrid government/commercial SATCOM solution. For the acquisition/integration of PTES with the mPower constellation, PTES will procure mPower gateways via CSCO's contract with NATO Support and Procurement Agency (NSPA), which funds mPower bandwidth capacity in the COMSATCOM PE 1206445SF, Project 650140. Plans and execution activities will remain tightly coordinated with SSC International Affairs (IA). The Commercial PTW-PTES acquisition approach plans to leverage the PTES RP MTA acquisition strategy and existing CPIF development contract vehicle with Boeing to award a study to analyze PTW over commercial hardware and software requirements for MEO/GEO constellations and to modify JHVs. A Boeing contract modification will also be awarded to develop the Commercial PTW capability by upgrading existing software that was developed under the PTES RP MTA to enable AJ communications capability over commercial constellations in various orbits. This effort supports the acquisition of gateways by upgrading the PTES system to integrate JHV with mPower terminals. This collective strategy will be done in full cooperation with SSC, early adopters, and other stakeholders to build the forward on-ramps for acquisition.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	Project (Number/Name) 643733 / *PTW Over Commercial*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PTW Over Commercial - Studies/Demos (Small Sats)	SS/FFP	Astranis : San Francisco, CA	-	-		-		1.990	Nov 2023	-		1.990	0.000	1.990	-
PTW Over Commercial - Studies/Demos (MEO)	TBD	MIT/LL : Boston, MA	-	-		-		1.200	Oct 2023	-		1.200	0.000	1.200	-
PTW Over Commercial - Studies/Demos (JHVs)	SS/CPIF	Boeing : El Segundo, CA	-	-		-		0.060	Oct 2023	-		0.060	0.000	0.060	-
PTW Over Commercial - mPower	MIPR	CSCO : Ft Meade, MD	-	-		-		10.000	Jan 2024	-		10.000	0.000	10.000	-
PTW Over Commercial - PTES Upgrades	SS/CPIF	Boeing : El Segundo, CA	-	-		-		14.733	Apr 2024	-		14.733	0.000	14.733	-
SBIR/STTR	Allot	TBD : TBD	-	-		-		1.072	Mar 2024	-		1.072	0.000	1.072	-
		Subtotal	-	-		-		29.055		-		29.055	0.000	29.055	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	SS/TBD	MITRE : Hanscom AFB, MA	-	-		-		0.050	Nov 2023	-		0.050	0.000	0.050	-
A&AS	Various	Various : Various	-	-		-		1.532	Nov 2023	-		1.532	0.000	1.532	-
		Subtotal	-	-		-		1.582		-		1.582	0.000	1.582	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		30.637		-		30.637	0.000	30.637	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643733 / *PTW Over Commercial*

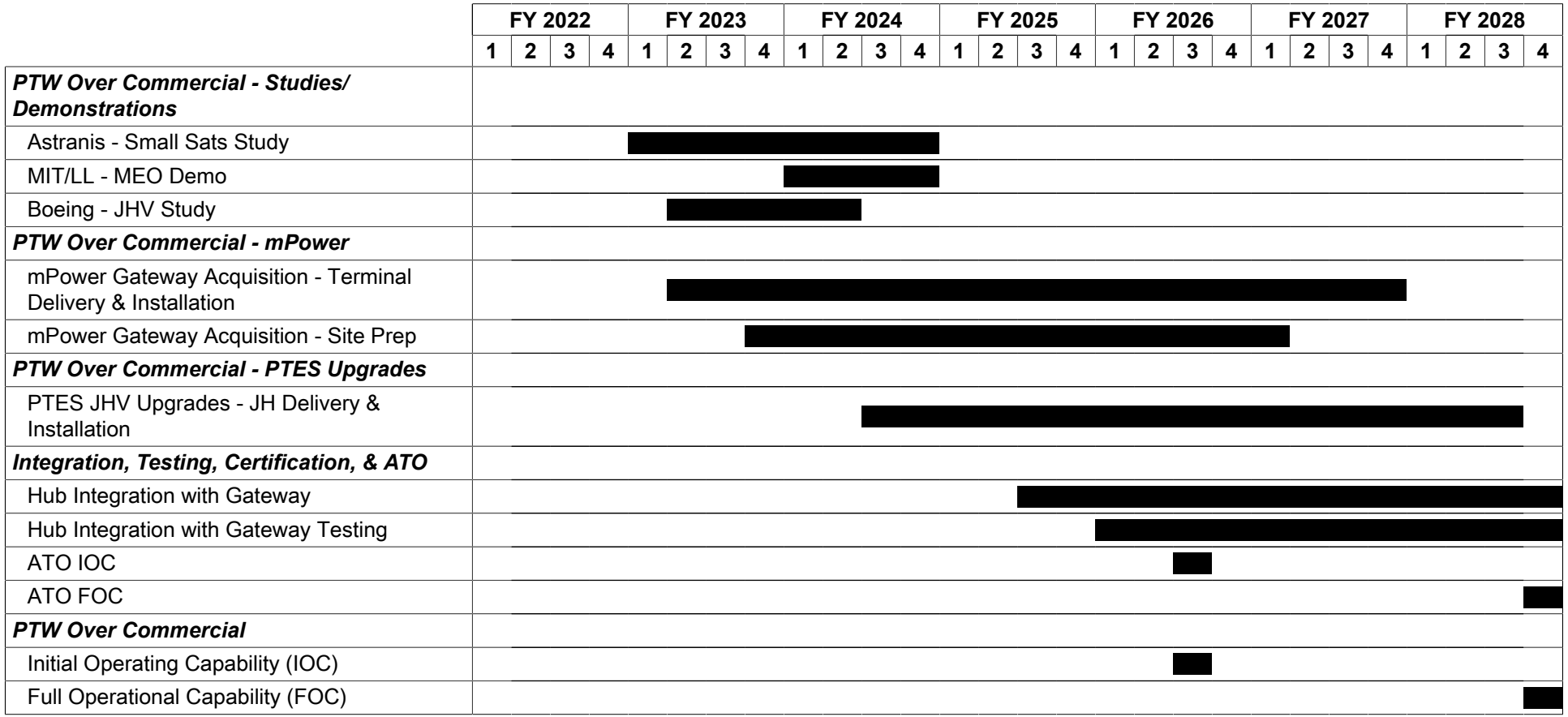

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206760SF / *Protected Tactical Enterprise Service (PTES)*	**Project (Number/Name)** 643733 / *PTW Over Commercial*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
PTW Over Commercial - Studies/Demonstrations				
Astranis - Small Sats Study	1	2023	4	2024
MIT/LL - MEO Demo	1	2024	4	2024
Boeing - JHV Study	2	2023	2	2024
PTW Over Commercial - mPower				
mPower Gateway Acquisition - Terminal Delivery & Installation	2	2023	4	2027
mPower Gateway Acquisition - Site Prep	4	2023	1	2027
PTW Over Commercial - PTES Upgrades				
PTES JHV Upgrades - JH Delivery & Installation	3	2024	3	2028
Integration, Testing, Certification, & ATO				
Hub Integration with Gateway	3	2025	4	2028
Hub Integration with Gateway Testing	1	2026	4	2028
ATO IOC	3	2026	3	2026
ATO FOC	4	2028	4	2028
PTW Over Commercial				
Initial Operating Capability (IOC)	3	2026	3	2026
Full Operational Capability (FOC)	4	2028	4	2028

Note

All schedule events continue efforts begun in FY 2023, included in Project 643726 PTES Prototype Development funding/schedule line items in FY 2023.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206761SF / *Protected Tactical Service (PTS)*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	221.355	252.078	360.126	0.000	360.126	348.387	345.422	464.180	482.389	0.000	2,473.937
643728: *Protected Tactical SATCOM*	-	221.355	252.078	360.126	0.000	360.126	348.387	345.422	464.180	482.389	0.000	2,473.937
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The global threat of electronic warfare attacks against space systems will expand in the coming years in both number and types of weapons. Threat development will very likely focus on jamming capabilities against dedicated military satellite communications (SATCOM). To address this critical threat, and in pursuit of more precise solutions for disaggregated strategic and tactical SATCOM, U.S Strategic Command (USSTRATCOM) and Air Force Space Command (AFSPC) initiated the Protected Anti-jam Tactical SATCOM (PATS) family-of-systems. The PATS integrated approach includes the Protected Tactical Satellite Communications (PTS) and Protected Tactical Enterprise Service (PTES) programs to mitigate adversarial jamming effects by using the Protected Tactical Waveform (PTW). The PTS program is the disaggregated tactical communications follow-on to the Advanced Extremely High Frequency (AEHF) program. The United States Space Force (USSF) is developing the PTS system to provide tactical users increased protection with worldwide and polar, beyond-line-of-sight, Anti-Jam (AJ), low-probability-of-intercept communications in benign and highly-contested anti-access/area denial environments utilizing the PTW. The PTS system's on-board payload/signal processing, antenna design, and advanced beam-forming using a distributed, diversified, and agile constellation of hostable payloads and high capacity free-flyers enables reliable tactical SATCOM within close proximities to adversarial jammers. The system also employs interfaces consistent with USSF's on-going resilience initiatives enhancing mission assurance and interoperability. The program's modular, flexible, scalable, and protected tactical payload constellation architecture will increase resiliency through distribution across a larger number of space platforms (e.g., hostable, free-flyer, international partnerships). The PTES program (PE 1206760SF, Project 643726) establishes the ground infrastructure for PTS, which operationalizes the PTW.

For the initial PTS phase, USSF is utilizing FY 2016 National Defense Authorization Act (NDAA), Middle Tier of Acquisition (MTA) for Rapid Prototyping (RP) authority and Section 815, Other Transaction Authority (OTA), to achieve an affordable, rapid, operational capability for the tactical warfighter. This strategy employs rapid payload development to progressively and incrementally deploy prototypes with residual capabilities demonstrated in an operational environment. These RP payloads demonstrate innovative AJ technologies with modular and scalable payloads to meet validated military needs for protected tactical communications. This includes technical baseline development, systems engineering trade analyses, internal/external system integration and development, candidate system architecture evaluations, risk reduction demonstrations, prototyping concepts development, system testing, and enabling technologies maturation. The PTS Engineering, Manufacturing, and Development (EMD) Phase will follow the PTS RP Phase to develop purpose-built "hub in space" satellites with full signal processing and switching capability that allows direct connectivity between users.

The PTS RP and EMD Phases include a Space Segment, Ground Segment, and Gateway Segment. For the Space Segment, the USSF strategy utilizes a payload-centric focus to enable an affordable, resilient space architecture. This enables hosting and rideshare opportunities with other US government, commercial, International Partner (IP) satellites or integration onto a commodity satellite bus. For the Ground Segment, PTS develops satellite command and control and leverages the PTES RP

activity for mission and key management planning. The PTS Gateway Segment enables tactical warfighters reach back to global DoD Information Network. The PTS user Terminal Segment, not included in this PTS acquisition, will be procured by the military services utilizing low-cost PTW modem upgrades enabled by the Air Force-Army Anti-Jam Modem (A3M) ACAT III program and the Navy Wideband Anti-Jam Modem System (WAMS) technology demonstration program. PTS also develops the National Security Agency (NSA)-certified and space-flight qualified production-ready Space Hub End Cryptographic Unit (ECU). Starting the ECU as a single, early risk-reduction effort targets a high-risk area of the PTS development and enables PTS program success.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space System Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver PTS weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

The total cost of the PTS RP Middle Tier of Acquisition effort is $970.6 million. The PTS RP program is fully funded across the Future Years Defense Program. PTS activities are projected to be designated as Major Capability Acquisition programs in FY24.

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

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	229.329	294.828	360.442	0.000	360.442
Current President's Budget	221.355	252.078	360.126	0.000	360.126
Total Adjustments	-7.974	-42.750	-0.316	0.000	-0.316
• Congressional General Reductions	0.000	-0.750			
• Congressional Directed Reductions	0.000	-42.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-7.974	0.000			
• Other Adjustments	0.000	0.000	-0.316	0.000	-0.316

Change Summary Explanation

FY 2022: -$7.974M SBIR/STTR Transfer

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761SF *I Protected Tactical Service (PTS)*

FY 2023: -$42.000M Congressional Mark
FY 2023: -$0.750M Congressional General Reduction
FY 2024: -$1.928M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity, +$1.612M inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: PTS Rapid Prototype (RP) Design and Development	185.807	188.619	73.417

Description: Rapid prototyping of the PTS Space Segment for two PTS RP payloads and payload and bus command and control (C2) development/upgrades at the operating centers for the Ground Segment. Develop, demonstrate, test, and evaluate PTS hardware/software systems and key system components. Design and develop modular, scalable payloads to support hosted or free-flyer configurations. Includes integration to host vehicle or purchase of a bus for free-flier configuration. Demonstrate prototype payload on-orbit performance. Evaluate PTS concept of operations with user participation and enable potential residual operational capability. Mature and validate user requirements. Support development, risk reduction efforts, and integration of PTS to deliver two prototype payloads available for launch in FY 2024, one as a hosted payload and one as a free-flyer.

FY 2023 Plans:
Continue build, integration and testing for two competing prototype payloads. Complete prototype payload build, integration and testing. Continue build and integration of government furnished software and hardware. Continue development, build, integration and test/demonstrations of ground and gateway terminal with payload prototypes to reduce system level risk, to include Mission Management System (MMS) and Key Management System (KMS) upgrades and Command and Control (C2)/Gateway development. Begin payload to space vehicle integration and testing. Conduct space vehicle to launch vehicle integration studies/coordination. Begin the next phase of the PTS effort to competitively award to one contractor. Continue Engineering and Manufacturing Development (EMD) Phase acquisition planning. Receive approval of EMD Acquisition Strategy and permission to release Request for Proposal. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to; program office support, studies, technical analysis, experimentation, prototyping, etc.

FY 2024 Plans:
Continue prototyping and risk reduction efforts. Conduct final build, integration, and test activities to complete two PTS prototype payloads to be available for launch in FY 2025 as payloads on Boeing's WGS-11 (hosted) and Northrup Grumman Corporation (NGC)'s ESPAStar-HP satellites (free-flyer). Conduct cybersecurity testing and receive interim authorization to test (IATT). Conduct payload to space vehicle integration and testing. Conduct space vehicle to launch vehicle integration for two PTS RP payloads. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761SF *I Protected Tactical Service (PTS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
domain. Activities include, but are not limited to; program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to the completion of two PTS RP payloads design and development, and transferring activity out of this Major Thrust into new Major Thrusts for PTS Ground Segment development, PTS Gateway Segment development, and EMD Phase.			
Title: PTS RP Space Hub End Cryptographic Unit (ECU) ***Description:*** Develop a single, National Security Agency (NSA) certified, space-flight qualified, production-ready Space Hub ECU for integration with the PTS payloads. Conduct and design development to alleviate critical path risks to the launch of PTS payloads. Conduct requirements reviews, functional and design reviews, PTS interface development, Interface Control Document (ICD) coordination, and payload integration with PTS vendors. ***FY 2023 Plans:*** Continue ECU build and final testing of flight-ready production units to receive NSA certification and then deliver ECU to payload contractors for integration. Support ECU design/certification activities with the NSA to deliver a certified ECU, to include conducting quick-reaction troubleshooting/deficiency resolution for ECU during payload integration. ***FY 2024 Plans:*** Conduct quick-reaction troubleshooting/deficiency resolution for ECU during final integration and test of two PTS prototype payloads. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to support ECU integration into PTS payload and deficiency resolution during testing.	6.110	3.418	5.757
Title: PTS RP Ground Development ***Description:*** This is not a New Start but a segregated effort started under the PTS Rapid Prototype Design and Development Major Thrust. Develops and incorporates MMS/KMS modifications of the PTES program ground capability to plan and manage PTS, the associated cryptographic material and the SATCOM links they enable. Also develops and incorporates modifications to mission management systems of the WGS program ground capability (i.e. Common Network Planning Software (CNPS) and Wideband SATCOM Trend Analysis and Anomaly Resolution System (WSTARS)). ***FY 2023 Plans:*** FY 2023 plans were previously included in the PTS Rapid Prototype Design and Development Major Thrust. ***FY 2024 Plans:***	0.000	0.000	18.257

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761SF / *Protected Tactical Service (PTS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue MMS/KMS upgrades to modify PTES Ground Segment to conduct PTS prototype payload MMS/KMS for on-orbit operations. Conduct integration and testing between the payloads and the PTES MMS/KMS, interoperability/interface and control of the ECU to the Payload, and compatibility with PATS user terminals. Support integration and testing by quickly responding with troubleshooting and deficiency resolution. Continue development, modifications, and integration of the WGS CNPS planning system and the WSTARS, which provides the overarching management of all sub-systems, providing situational awareness to all users of the Wideband SATCOM Operations Management System (WSOMS). ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to ramp up of PTES modifications to be ready for launch of PTS prototype at the end of FY 2024, as part of the PTS RP Design and Development.			
Title: PTS RP Gateway Development ***Description:*** This is not a New Start but a segregated effort started under the PTS Rapid Prototype Design and Development Major Thrust. Develop the Gateway Segment, also called PTS Ground Entry Terminal-Prototype (PGET-P), for integration with the PTS system. Conduct requirements reviews, functional and design reviews, PTS interface development, and Interface Control Document (ICD) coordination, and integration with PTW modems (i.e. A3M and WAMS) ***FY 2023 Plans:*** FY 2023 plans were previously included in the PTS Rapid Prototype Design and Development Major Thrust. ***FY 2024 Plans:*** Conduct integration and test of PGET prototype. Conduct integration and test/demonstrations with PTW modems and payload prototypes to reduce system level risk. Deliver and install at site location in preparation for prototype payload launch. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to ramp up of final integration and test activities, delivery and install of PGETs to site locations for two PTS prototype payloads, as part of the PTS RP Design and Development.	0.000	0.000	5.420
Title: PTS Engineering and Manufacturing Development (EMD) Phase ***Description:*** This is not a New Start but continues follow-on EMD Phase activities associated with providing full PTS on-orbit capability previously included in the PTS RP Design and Development Major Thrust. Includes EMD Phase acquisition planning to develop, build, test, and evaluate the next iteration of the PTS EMD Phase Payloads to support hosted or free-flyer configurations. Includes efforts to develop the Space, Ground, and Gateway Segments, as well as the Space Hub ECU. Initiate EMD phase of PTS space, ground, and gateway segments and key system components. Develop, build, test, and evaluate next PTS payloads to support hosted or free-flyer configurations available for launch in FY 2028 and FY 2029. Includes payload and bus control	-	0.000	161.252

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761SF *I Protected Tactical Service (PTS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
development/upgrades at the operating centers. Deliver Initial Operational Capability (IOC) for protected communications against threats in FY 2030 with operational payloads. Continue to mature PTS concept of operations with user participation. ***FY 2023 Plans:*** FY 2023 plans were previously included in the PTS Rapid Prototype Design and Development Major Thrust. ***FY 2024 Plans:*** Award up to two payload contracts to begin design of PTS EMD Phase Payloads available for launch in FY 2028 and FY 2029 following acquisition planning efforts begun in FY 2023 previously included in the PTS RP Design and Development Major Thrust. Conduct design and development of next PTS payloads to support hosted or free-flyer configurations. Includes integration to host vehicle or purchase of a bus for free-flier configuration. Develop, demonstrate, test, evaluate, and purchase PTS hardware and software systems. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to reflect transfer of PTS development from Middle Tier Acquisition - RP (MTA-RP) to Major Capability Acquisitions (MCA) pathway and the awarding of EMD phase contracts.			
Title: Protected Tactical Testbed	8.742	21.510	11.740
Description: Protected Tactical Testbed provides a government gold standard of reference for risk reduction and experimentation on critical technology elements for the space payload, terminals and networking segments of the PATS system. It enables system integration capabilities with industry and FFRDC partners for interoperability testing and conducting experiments to mature the PATS operations, with a focus on the PTW. Supports the PTS RP and EMD Phases. ***FY 2023 Plans:*** Demonstrate interoperability between the Payload and the PTES MMS, interoperability/interface and control of the ECU to the Payload, and compatibility with PATS user terminals. Conduct PTW Lead Service duties to demonstrate that PTW will support the department's Core Waveform program, to include verification of the PTW modem interoperability with the joint force. Joint SATCOM Engineering Center (JSEC) executes and enables critical testing activities for prototype payload contractors. Ensures the development process and impending product adhere to the tenets defined by the established requirements. Continue multi-service development of PATS user terminals (A3M and Navy WAMS) and final development stages of the PTES delivery. Continue use in outreach efforts to potential coalition partners and other emerging users to demonstrate capability using their space, ground, and user terminal assets. ***FY 2024 Plans:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761SF *I Protected Tactical Service (PTS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue to demonstrate interoperability between the PTS payload and the PTES MMS, interoperability/interface and control of the ECU to the PTS payload, and compatibility with PATS user terminals. Continue PTW Lead Service duties to demonstrate that PTW will support the department's Core Waveform program, to include verification of the PTW modem interoperability with the joint force. JSEC executes and enables critical testing activities for prototype payload contractors. Ensures the development process and impending product adhere to the tenets defined by the established requirements. Continue multi-service development of PATS user terminals A3M and Navy WAMS and final development stages of the PTES delivery. Continue use in outreach efforts to potential coalition partners and other emerging users to demonstrate capability using their space, ground, and user terminal assets. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to reduced JSEC cost-share requirements with other PATS segments.			
Title: Technical Baseline Management, System Integration and Test Support	20.696	38.531	84.283
Description: Perform as Government system integrator function through acquiring, designing, testing, and integrating key segments and interfaces. Mature technical baseline and interface requirements for the system. Conduct architectural engineering and system level integration planning supporting the PTS RP and EMD Phases for the Space, Ground, and Gateway Segments. Support, configure, and conduct integrated testing of the major PTS subsystems, segments, and end-to-end system, to include supporting testing conducted by the 96th Test Wing (TW). Manage the PTS open system architecture, refine interface requirements, and validate concept of operations through integrated system performance demonstrations. ***FY 2023 Plans:*** Continue prototype capability development and interface maturity demonstrations of two prototype payloads. Incorporate critical lessons from demonstrations into maturation and refinement of the technical baseline and system architecture. Engineering trades identified during ongoing progress demonstrations will continue to provide the necessary mitigation steps for program risks. Continue to manage key system interfaces for prototype Ground, Space, and Gateway Segments. Conduct Lead System integration and test for these components, along with the Space Hub ECU interfaces to the prototype payload contractors. Conduct key interface tests between the PTS prototype and emulators/simulators to reduce risk to PATS level integration with PTES and other partner programs. Continue testing, characterizing, and demonstrating anti-jam communication capabilities. Continue Ground CONOPS architecture development. Begin coordinating with national and international agencies for orbital slots and frequency allocation. Conduct launch planning and activities to include Space Vehicle (SV) and Launch Vehicle (LV) integration studies and coordination. ***FY 2024 Plans:*** Continue to provide SV integration and test support for two PTS prototype payloads availability for launch in FY 2025. Continue to manage and test key system interfaces for PTS prototype Ground, Space, and Gateway Segments as well as PATS ground and			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206761SF *I Protected Tactical Service (PTS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
terminal segments to reduce integration risks. Continue to provide SV integration and test support to capability development and interface maturity of PTS prototype. Conduct key interface tests between the PTS prototype and emulators/simulators to reduce risk to PATS level integration with PTES and other partners' protected SATCOM programs. Conduct final launch integration activities to include SV to LV coordination for two PTS prototype payloads. Continue concept of operations development. Continue launch planning and activities and finalize coordination with national and international agencies for orbital slots and frequency allocation. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to supporting the PTS RP Phase with SV integration and the PTS EMD Phase for design/development, both beginning in FY 2024.			
Accomplishments/Planned Programs Subtotals	221.355	252.078	360.126

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The PTS team utilizes the FY 2016 NDAA MTA guidance for Rapid Prototyping/Rapid Fielding and Section 815 OTA guidance in developing the acquisition strategy. This strategy places an emphasis on the rapid prototyping, production, and incremental iteration of PTS capability. This strategy takes the form of a series of successively honed and tailored spirals, focusing on payload development and hosting opportunities and incorporating lessons learned from Milstar, Enhanced Polar System (EPS), EPS-Recapitalization (EPS-R), AEHF, PTES, and commercial SATCOM practices. The program was initiated in June 2019 when the Space Hub ECU was competitively awarded as a Cost-Plus Inventive-Fee (CPIF) contract to L3-Harris under the Space Enterprise Consortium (SpEC) using OTA. For the Space Segment, PTS RP development of payloads 1-2 were competitively awarded as Firm-Fixed Price (FFP) contracts under the SpEC using OTA to NGC, Lockheed Martin, and Boeing. After completion of the prototype payload Preliminary Design Review (PDR) phase in March 2020, Boeing and NGC were selected to continue building their payloads for launch. Additionally, the Ground Segment (Mission Management/Key Management upgrades) efficiently leverages Boeing's existing PTES contract (competitively awarded CPIF development contract) for PTES software updates and contracts with the US Army Project Management Integrated Enterprise Network (PM IEN) for modifications of WGS mission management systems. The Gateway Segment leverages agreements with the Naval Information Warfare Center (NIWC), PdM SATCOM (US Army), and MIT/LL. The 96th TW supports testing and initial operations and JSEC executes and enables critical testing activities for prototype payload contractors. Plans to transition the MTA to a Major Capability Acquisition (MCA) for the future EMD Phase to reach IOC/FOC are pending approval by the Assistant Secretary of the Air Force for Space Acquisitions and Integration, including the strategy for awarding the Space, Ground, and Gateway Segment development efforts required for the EMD Phase.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206761SF / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PTS RP Development (Hosted)	C/FFP	Boeing : El Segundo, CA	-	168.648	Nov 2021	180.588	Nov 2022	31.497	Oct 2023	-		31.497	0.000	380.733	-
PTS RP Development (Free-Flyer)	C/FFP	Northrop Grumman : Redondo Beach, CA	-	-		-		41.920	Oct 2023	-		41.920	Continuing	Continuing	-
Space Hub End Cryptographic Unit (ECU)	C/CPIF	L3Harris East : Camden, NJ	-	6.111	Jan 2022	3.417	Jan 2023	4.330	Oct 2023	-		4.330	0.000	13.858	-
NSA (ECU Support)	MIPR	TBD : TBD	-	-		-		1.427	Oct 2023	-		1.427	Continuing	Continuing	-
PTS RP Ground Segment Development	C/FFP	Boeing : El Segundo, CA	-	-		-		12.934	Nov 2023	-		12.934	Continuing	Continuing	-
PTS RP Ground Segment Development - CNPS	MIPR	TBD : TBD	-	-		-		5.223	Nov 2023	-		5.223	Continuing	Continuing	-
PTS RP Ground Segment Development - WSTARS	MIPR	TBD : TBD	-	-		-		0.100	Nov 2023	-		0.100	Continuing	Continuing	-
PTS RP Gateway Segment Development	Various	Various : Various	-	-		-		5.420	Oct 2023	-		5.420	0.000	5.420	-
PTS EMD Phase - Payload Development	TBD	TBD : TBD	-	-		-		154.610	Mar 2024	-		154.610	Continuing	Continuing	-
PTS EMD Phase - ECU	TBD	TBD : TBD	-	-		-		1.161	Mar 2024	-		1.161	Continuing	Continuing	-
PTS EMD Phase - Ground/ Gateway Development	TBD	TBD : TBD	-	-		-		5.504	Mar 2024	-		5.504	Continuing	Continuing	-
Protected Tactical Testbed	Various	Various : Various	-	8.742	Dec 2021	21.510	Dec 2022	8.400	Nov 2023	-		8.400	Continuing	Continuing	-
JSEC (Protected Tactical Testbed Support)	MIPR	TBD : TBD	-	-		-		3.340	Nov 2023	-		3.340	Continuing	Continuing	-
Technical Baseline Management and System Integration Test Support	Various	Various : Various	-	-		-		19.797	Oct 2023	-		19.797	Continuing	Continuing	-
Technical Mission Analysis (TMA)	RO	Aerospace : El Segundo, CA	-	11.423	Nov 2021	12.428	Nov 2022	20.713	Jan 2024	-		20.713	Continuing	Continuing	-
Enterprise SE&I	Various	Various : Various	-	17.792	Jan 2022	24.904	Jan 2023	14.630	Oct 2023	-		14.630	Continuing	Continuing	-
MIT/LL (SE&I Support)	MIPR	MIT/LL : Boston, MA	-	-		-		2.750	Jan 2024	-		2.750	Continuing	Continuing	-
SBIR/STTR	TBD	TBD : TBD	-	-		-		12.604	Mar 2024	-		12.604	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206761SF / *Protected Tactical Service (PTS)*	Project (Number/Name) 643728 / *Protected Tactical SATCOM*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	212.716		242.847		346.360		-		346.360	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	MIPR	Aerospace : El Segundo, CA	-	1.090	Nov 2021	1.334	Nov 2022	2.933	Jan 2024	-		2.933	0.000	5.357	-
A&AS	Various	Various : Various	-	7.521	Nov 2021	7.397	Nov 2022	10.733	Nov 2023	-		10.733	0.000	25.651	-
Other Support	Various	Various : Various	-	0.028	Nov 2021	0.500	Nov 2022	0.100	Jan 2024	-		0.100	0.000	0.628	-
		Subtotal	-	8.639		9.231		13.766		-		13.766	0.000	31.636	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	221.355		252.078		360.126		-		360.126	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206761SF / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*

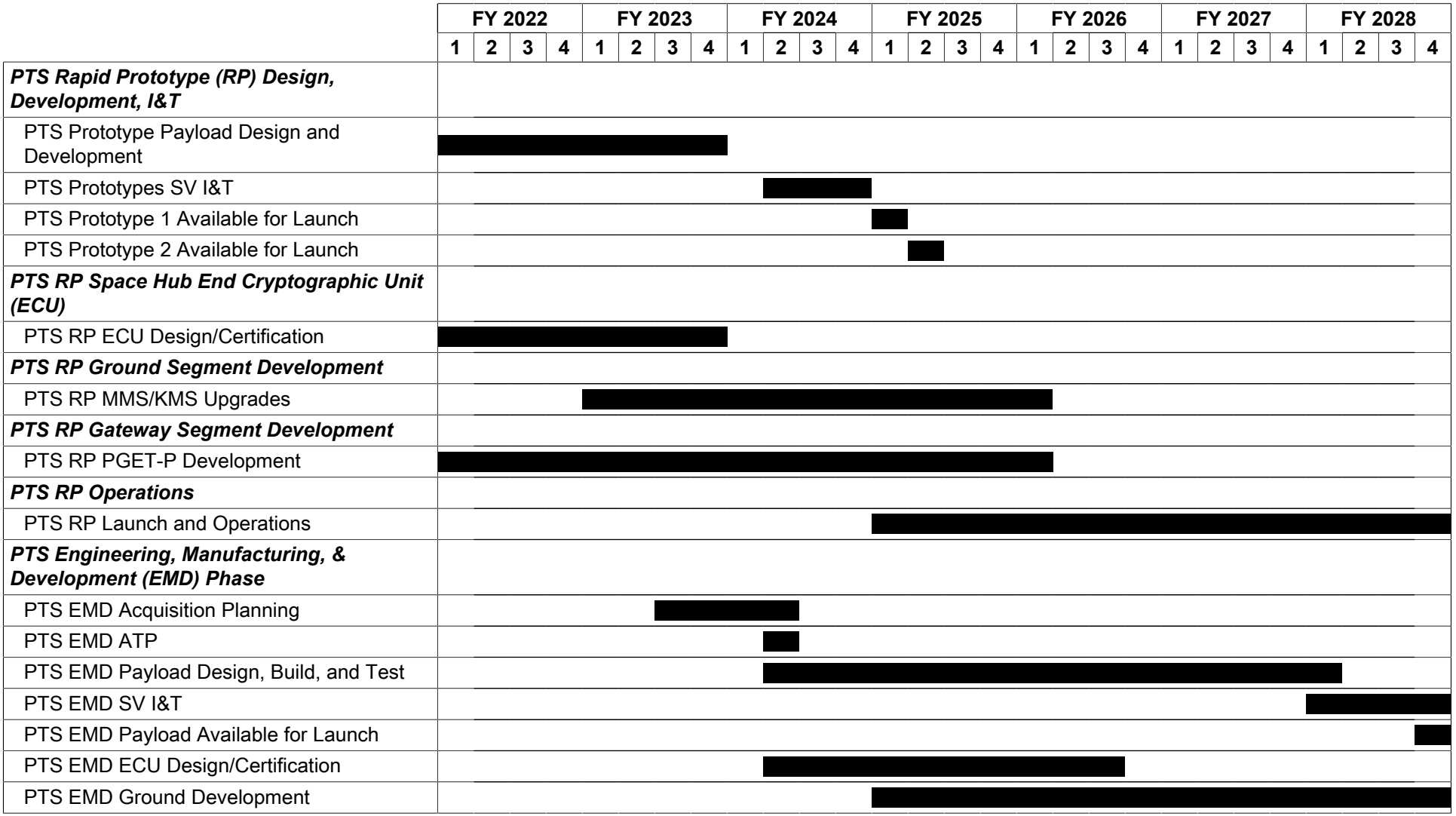

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206761SF / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*

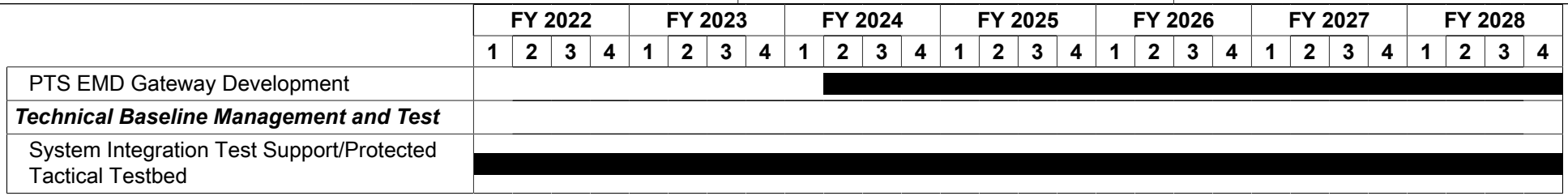

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206761SF / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
PTS Rapid Prototype (RP) Design, Development, I&T				
PTS Prototype Payload Design and Development	1	2022	4	2023
PTS Prototypes SV I&T	2	2024	4	2024
PTS Prototype 1 Available for Launch	1	2025	1	2025
PTS Prototype 2 Available for Launch	2	2025	2	2025
PTS RP Space Hub End Cryptographic Unit (ECU)				
PTS RP ECU Design/Certification	1	2022	4	2023
PTS RP Ground Segment Development				
PTS RP MMS/KMS Upgrades	1	2023	1	2026
PTS RP Gateway Segment Development				
PTS RP PGET-P Development	1	2022	1	2026
PTS RP Operations				
PTS RP Launch and Operations	1	2025	4	2028
PTS Engineering, Manufacturing, & Development (EMD) Phase				
PTS EMD Acquisition Planning	3	2023	2	2024
PTS EMD ATP	2	2024	2	2024
PTS EMD Payload Design, Build, and Test	2	2024	1	2028
PTS EMD SV I&T	1	2028	4	2028
PTS EMD Payload Available for Launch	4	2028	4	2028
PTS EMD ECU Design/Certification	2	2024	3	2026
PTS EMD Ground Development	1	2025	4	2028
PTS EMD Gateway Development	2	2024	4	2028

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206761SF / *Protected Tactical Service (PTS)*	**Project (Number/Name)** 643728 / *Protected Tactical SATCOM*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Technical Baseline Management and Test				
System Integration Test Support/Protected Tactical Testbed	1	2022	4	2028

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206855SF / *Evolved Strategic SATCOM (ESS)*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	166.231	519.047	632.833	0.000	632.833	1,272.983	1,349.837	1,793.505	1,719.699	Continuing	Continuing
643725: *Evolved Strategic SATCOM (ESS)*	-	166.231	519.047	632.833	0.000	632.833	1,272.983	1,349.837	1,793.505	1,719.699	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

ESS will meet the requirements for strategic communications and capability gaps identified in the Protected Satellite Communications Services (PSCS) Analysis of Alternatives (AoA), the Protected Follow-on for Resiliency (PAFR) Study and the Strategic Tiger Team. The ESS architecture and functionality will be designed in accordance with the United States Strategic Command's signed ESS Concept of Operations and the Joint Requirements Oversight Council's validated Capability Development Document (CDD) satisfying the legacy Advanced Extremely High Frequency (AEHF) strategic requirements and mission performance with enhancements for increased resiliency and cybersecurity. The ESS system continues and adds to the strategic Satellite Communications (SATCOM) mission of the AEHF program by providing space and mission control segments for worldwide and arctic DoD strategic, secure, jam-resistant, communications for ground, sea, and air assets.

ESS will support strategic mission requirements to provide the National Command Authority (NCA) and Combatant Commanders with highly-reliable, secure Military Satellite Communications. ESS will support a strategic need date in FY 2032 in all operational environments and will be compatible with the existing architectures. The ESS system will satisfy emerging requirements using modular open system approaches to support incremental enhancements.

Space Segment Prototyping: For more rapid and resilient strategic capability risk reduction, the ESS Program Office is executing its approved Space Segment acquisition strategy that leverages Middle Tier Acquisition (MTA) authorities from the 2016 National Defense Authorization Act (NDAA) for rapid prototyping, while maintaining the continuity of the AEHF strategic mission.

Ground Resilient Integration & Framework for Operational NC3 (GRIFFON): GRIFFON is the Ground Segment and the System of Systems (SoS) Integration (SoSI) component of the ESS System. Ground acquisition focuses on modular program elements that decompose scope, avoid "vendor lock", and create opportunities for competition amongst industry while aligning with Enterprise capabilities. GRIFFON is comprised of three components: Ground Integration & Framework (GIF), SoSI, and Software Applications. GIF involves the development of the Framework and operational environments on Modular Open Systems Approach (MOSA) principles and is capable of on-boarding and hosting external mission applications and services. The SoSI ensures all ESS segments and external entities work together to accomplish the mission. The Software applications suite is the development of mission unique applications to be on-boarded into the software pipeline including In-Band command and control (C2), Strategic Mission Planning, Mission Control, and Test and Evaluation.

End-Cryptographic Unit (ECU): Initiatives for the ESS Cryptographic Segment are focused on the development, integration, and testing of National Security Agency (NSA)-certified End-Cryptographic Units required for secure strategic communications encryption in the ESS payloads, bus, and payload test terminals in accordance with the approved ECU acquisition strategy and schedule.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206855SF *I Evolved Strategic SATCOM (ESS)*

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction and other efforts to develop new or re-purpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver ESS weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF, 1206398SF.

The total cost of the ESS Space Segment Rapid Prototype Middle Tier of Acquisition effort is $1,029.9 million. The ESS Space Segment Rapid Prototype is fully funded across the Future Years Defense Program.

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

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	172.089	565.597	670.659	0.000	670.659
Current President's Budget	166.231	519.047	632.833	0.000	632.833
Total Adjustments	-5.858	-46.550	-37.826	0.000	-37.826
• Congressional General Reductions	0.000	-1.550			
• Congressional Directed Reductions	0.000	-45.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-5.858	0.000			
• Other Adjustments	0.000	0.000	-37.826	0.000	-37.826

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 643725: *Evolved Strategic SATCOM (ESS)*		
Congressional Add: *IT upgrades to NC3 Cybersecurity*	19.319	-
Congressional Add Subtotals for Project: 643725	19.319	-
Congressional Add Totals for all Projects	19.319	-

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206855SF *I Evolved Strategic SATCOM (ESS)*

Change Summary Explanation

FY 2022: -5.858; Small Business Innovation Research
FY 2023: -1.550; Congressional General Reduction
FY 2023: -45.000; Congressional Mark
FY 2024: -36.254M; to fund to Department of the Air Force Non-Advocate Cost Assessment
FY 2024: -4.405M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity
FY2024: +2.833M; inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Segment Prototyping	124.101	310.572	357.666

Description: Invest in technology and demonstrations that enable continued development of a modernized, strategic payload and other key technology prototypes, risk reduction, and space segment design utilizing competitive rapid-prototyping contracts. Enables long-term return on investment through an energized Strategic SATCOM industrial base, increased competition, promotion of innovation by driving diverse designs, and increased resiliency. Actively manage contractors through prototyping, demonstration and requirements/criteria needed for contractors to competitively bid on the ESS space segment Build, Integration and Test (I&T) and Delivery follow-on.

FY 2023 Plans:
Continue execution of two rapid prototyping contracts through critical year of payload technology development. Capitalize on contractors' System Functional Review (SFR) technical baselines and artifacts to perform functional demonstrations of key technical elements within the payload using breadboards as necessary. Demonstrate and validate microelectronic designs, hardware producibility, software coding, and performance to derived system requirements. Assess contractor demonstration performance against preliminary design review (PDR) entrance criteria. Contractor demonstrations are focused on phased arrays, crosslinks, and timing management. Demonstrate that electronics solution can transmit, receive, process and route the ESS waveform and can perform the protocols, modes, and distribution as outlined in the Government-controlled ESS System Specification. Demonstrate ability to produce electronically-steered arrays that can receive and transmit in specific portions of the electromagnetic spectrum. Ensure contractors' sub-array or subset of elements can perform to requirements decomposed from the systems level for power, signal integrity, timing, noise, etc. Validate system performance requirements at the array level. Develop software simulations to verify that design for constellation time management can meet the ESS requirements for autonomous operations. Resolve open system engineering trades and populate outstanding requirements in order to progress to a space segment-level PDR in FY 2024. The Systems Engineers will show full traceability that the design satisfies the CDD and that each requirement has sufficient margin between the expected performance and associated requirement. Expand focus to spacecraft bus design, bus integration, and delivery of bus-to-payload interface control documents. Provide interface control

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206855SF *I Evolved Strategic SATCOM (ESS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
documents for modular open system architecture designs for additional capabilities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2024 Plans:*** Continue execution of two rapid prototyping contracts through payload technology development and demonstrations that best align to the new ESS proliferated and resilient architecture. The existing contracts for the rapid prototyping phase will be funded to perform additional nonrecurring engineering activities to further increase the technology readiness levels (TRL) of various space components prior to the Critical Design Review (CDR), mitigate overarching program schedule risk, and reduce development durations to respond to threats from adversaries. Purchase long lead items identified on the critical path or at high risk due to supply chain shortages to meet the system strategic need date. Build upon the SFR technical baselines and artifacts, complete system engineering trade studies, and finalize requirements traces and allocations to conduct Preliminary Design Reviews (PDR). Continue to demonstrate and validate system capabilities, with a focus on integration of the previously completed efforts leading to end-to-end Capstone demonstrations, which will show the capability for each contractors' ESS payload to execute the strategic satellite communications mission. Ensure payload cybersecurity designs are aligned with ESS program cybersecurity strategy. Execute post-PDR activities and begin preparations for CDR. Additional efforts beyond the existing rapid prototyping firm fixed price contracts may be utilized to maximize the technical capability delivered to the warfighter and support Nuclear Command, Control, and Communication (NC3) modernization efforts. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Other activities may include, but are not limited to program office support, studies, technical analysis, experimentation, and prototyping. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funds increased to support two vendors' ramp up into PDR and to mature critical spacecraft technologies to a CDR-level. Funding is aligned with the subject matter experience needed to burn down risk and support cybersecurity and hosted payload capabilities.			
Title: Ground Resilient Integration & Framework for Operational NC3 (GRIFFON) ***Description:*** The previous thrust entitled "ESS Ground Segment and Space-to-Ground Integration" has changed to "Ground Resilient Integration and Framework for Operational NC3 (GRIFFON)" to recognize program of record establishment. Develop and field the ESS Ground Segment and SoSI. GRIFFON is the Ground Segment solution for ESS. It includes ESS Ground Integration and Framework (GIF), SoSI, and Software Application Development efforts. GRIFFON also includes Mission Planning, Command and Control along with other architecture activities required to support the ESS Space Segment. It also includes interoperability with the existing architectures and interfaces for Enterprise Ground System (EGS) compatibility. Lastly, it provides for space-to-ground (system) and mission integration for the ESS SoS.	13.437	167.133	216.486

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206855SF *I Evolved Strategic SATCOM (ESS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: Competitively Award multiple Ground and SoSI contracts. Fund program office, Federally Funded Research and Development Centers (FFRDC), and University-Affiliated Research Center Laboratories (UARC) support to execute a competition which acquires a secure software development framework/pipeline and ensures ESS alignment with EGS. Build a classified development environment to support a Continuous Integration/Continuous Development (CI/CD) Software Pipeline and work with operational mission partners to acquire Authority-to-Operate (ATO) at multiple sites. Onboard mission partners into end-to-end development environment for production, test, war gaming, and cyber testing. Generate strategic framework for mission planning applications and produce a System Developer Kit. Prepare ESS to procure ground system specific applications for satellite control, mission planning, and satellite integration and test. Develop Request for Proposal (RFP) for mission planning applications. Create software catalogue and functionally decompose software into a delivery roadmap aligned with strategic framework. Develop end user agreements with operational sites outlining deliveries and key milestones. Begin integration work to establish connectivity with Public Key Management Architecture (PKMA) and cryptographic modernization efforts with the NSA. Continue ground segment Command and Control (C2) studies with legacy sustainment team and terminal program office to evolve legacy systems by investigating code reuse with AEHF and Enhanced Polar System (EPS) to capitalize on enterprise NC3 efforts. Assess necessary mechanical and cryptographic improvements to the Family of Advanced Beyond-line-of-sight Terminals (FAB-T) Command Post Terminal to support ESS. Continue development activities in support of the ground segment and system/mission integration schedules. Activities include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. FFRDC, UARC, and technical support will assist with requirements trades, technical approaches, threat assessment and mitigation approaches, and ESS testing assets.			
FY 2024 Plans: Release full-competition RFP for Mission Planning applications and Command and Control applications. Execute multiple GRIFFON prototype demonstration contracts, and down select to one GIF and SoSI contract. Develop and release follow-on RFP for further agile software and modular framework prototype development. Conduct studies and source selection activities to award multiple contracts for command and control, and other software applications. Fund program office, FFRDC, and UARC support to execute a competition which acquires a secure software development framework/pipeline, mission planning applications, and ensures ESS alignment with EGS. Develop a development, security, and operations (DevSecOps) pipeline for software vendors to test their applications on the ground framework mission partners to conduct end-to-end integration testing. Procure ground system specific applications for satellite control, mission planning, and satellite integration and test. Conduct early integration testing with users and legacy systems. Continue software catalogue creation and functionally decompose software into a delivery roadmap aligned with strategic framework. Develop end user agreements with operational sites outlining deliveries and key milestones. Solidify integration testing and connectivity with PKMA and cryptographic modernization efforts with the NSA. Modify legacy terminal programs to ensure entire integrated system functions within modernized cyber architecture. Invest in Command			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206855SF *I Evolved Strategic SATCOM (ESS)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Post Terminal modernization (cryptographic and cybersecurity needs, etc.) necessary to support ESS and meet critical ground segment, space segment, and systems integration need dates. Continue development activities in support of the ground segment and system/mission integration schedules. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, and prototyping. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funds increased to support the award of multiple contracts to begin cyber resilient ground system acquisition and integration for the NC3 enterprise to include an integrated ground framework, modular mission application software, designing and completing classified infrastructure development, SoS engineering, and digital engineering.			
Title: End-Cryptographic Unit (ECU)	9.374	41.342	58.681
Description: Develop and deliver the NSA-certified ECUs required for secure strategic communications encryption in the ESS payloads, bus, and payload test terminals in accordance with the approved ECU acquisition strategy and schedule. Upon development completion, production ECU units will be delivered as government-furnished equipment (GFE) for integration and testing with the ESS payloads and payload test terminals. ***FY 2023 Plans:*** Award the ECU development and production contract through a Cryptologic and Cyber Systems Division (CCSD)-led and ESS Program Office-supported competitive solicitation to transition to the Engineering & Manufacturing Development (EMD) phase. Fund CCSD, UARC, and FFRDC to provide program office support, planning, GFE, studies, technical analyses and information or resources in support of prototyping activities. Support ESS ECU requirements for the payload, bus, and test terminal ECUs. Provide NSA-certified crypto solutions to support tracking, telemetry, and commanding (TT&C), mission data (MD), transmission security (TRANSEC), and communications security (COMSEC); includes all required cyber, resiliency, and security activities required, as well as Government support for contractor management and oversight. FFRDC and UARC studies and technical support will assist with requirements trades, technical approaches, threat assessment and mitigation approaches, and ESS testing assets to include the Strategic Test Terminal (ST2). Continue to coordinate with the NSA on the development and certification of ECU requirements and the delivery of cryptographic keying material to support the development effort. ***FY 2024 Plans:*** Continue to execute ECU contract through the EMD phase. Fund CCSD, UARC, and FFRDC to provide program office support, planning, GFE, studies, technical analyses and information or resources in support of prototyping activities. Support ESS ECU requirements for the payload, bus, and test terminal. Provide NSA-certified crypto solutions to support TT&C, MD, TRANSEC, and COMSEC; includes all required cyber, resiliency, and security activities required, as well as Government support for contractor management and oversight. Studies and technical support will assist with requirements trades, technical approaches, threat assessment and mitigation approaches, and ESS testing assets to include the ST2. Continue to coordinate with the NSA on the			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
development and certification of ECU requirements and the delivery of cryptographic keying material to support the development effort. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funds increased due to ECU developer preparation to mature its payload and test terminal ECUs to PDR-level. This design work will meet ESS requirements for payload and test terminal ECUs, to include Engineering Development Units (EDUs), Production Representative Article (PRA), and Flight ECUs.			
Accomplishments/Planned Programs Subtotals	146.912	519.047	632.833

	FY 2022	FY 2023
Congressional Add: IT upgrades to NC3 Cybersecurity	19.319	-
FY 2022 Accomplishments: The Congressional add supports: Improve NC3 cybersecurity practices by creating secure IT infrastructure to connect the government and industry partners to protect the critical ESS NC3 SATCOM capability for the nation. This secure IT infrastructure will allow for the full and efficient elevation of the overall ESS program's security posture necessary to enable this protection.		
Congressional Adds Subtotals	19.319	-

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The Milestone Decision Authority (MDA) designated the ESS Space Segment as an FY 2016 National Defense Authorization Act MTA (Rapid Prototyping) activity and approved the ESS acquisition strategy on 14 December 2018. A rapid prototyping phase effectively replaces the Technology Maturation and Risk Reduction phase from a traditional acquisition under Department of Defense 5000 series Directives and Instructions. The ESS Program Office used this approach to award three space segment contracts in late FY 2020 and early FY 2021 that focus on reducing space segment risks with the objective of maximizing ESS demonstrated capability for the payload and other key technologies. An ESS Program Office-led RFP and source selection will determine which space prototyping contractor(s) is positioned for the space segment Build, I&T, and Delivery follow-on contract. Two of the most promising space prototyping contractors will be carried through the follow-on contract source selection to continue momentum until the follow-on contract is awarded in FY 2025.

Competition during space prototyping is energizing the industrial base in strategic SATCOM; injecting diverse technical processes and integration approaches; burning down risks early and identifying/correcting issues as early as possible; and decreasing traditional fielding timelines to support a more resilient, responsive architecture against emerging threats. Success during competitive rapid-prototyping determines and informs follow-on Build, I&T, and Delivery.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206855SF *I Evolved Strategic SATCOM (ESS)*

The initial Ground Segment Acquisition Strategy was approved by the Program Executive Officer (PEO) in 4th Quarter FY 2019 to begin early technology readiness studies for ESS Mission Planning in FY 2020. In June 2022, the Space Force Service Acquisition Executive (SAE) approved the use of Department of Defense Instruction (DoDI) 5000.87 Software Acquisition Pathway for the GRIFFON. This pathway will be used to design and develop a software-intensive ground system to promote agile software development, control program timelines, cost, and foster innovation that is needed for resilient NC3 systems. GRIFFON is the ground segment solution for ESS, and it includes ESS GIF, SoSI, and Software Application development efforts. The GIF will scope and provide advisory services on the ground system infrastructure to provide a software architecture and support the corresponding software factory. The GIF contractor will provide continual test and delivery services of the DevSecOps pipeline and software from different development and pre-production environments. It will also ensure EGS and NC3 compliance. The SoS Integrator will ensure all ESS segments operate cohesively in order to deliver the capability. The SoS Integrator will facilitate requirement verification, validation, and sell-off to maintain an authoritative source of truth throughout the system integration process. Mission unique capability will be provided by software applications. The ESS Ground Segment forecasts two competitively awarded prototype contracts in 2nd Quarter FY 2023, for the GIF and SoS Integrator. There will be a down select to one prototype contract in FY 2024. The Strategic Mission Planning Applications will be competitively awarded, with projected contracts beginning in FY 2024 and the remaining applications to be competitively awarded later in the program.

An ECU acquisition strategy was approved by the PEO in FY 2021. The ESS program office is partnering with the Air Force Life Cycle Management Center CCSD for ECU crypto development, both on the space vehicle for payload and bus cryptographic devices and in the test terminal. Using a CCSD-led competitive RFP, a contract for payload and payload test terminal ECU development will be awarded in the 3rd Quarter of FY 2023.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206855SF / *Evolved Strategic SATC OM (ESS)*	**Project (Number/Name)** 643725 / *Evolved Strategic SATCOM (ESS)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Segment Prototyping	SS/FFP	Various : Various	-	101.180	Oct 2021	295.089	Oct 2022	-		-		-	Continuing	Continuing	-
Space Segment Prototyping Northrup Grumman	SS/FFP	Northrup Grumman : Redondo Beach, CA	-	-		-		146.000	Dec 2023	-		146.000	Continuing	Continuing	-
Space Segment Prototyping Boeing	SS/FFP	Boeing : El Segundo, CA	-	-		-		142.340	Dec 2023	-		142.340	Continuing	Continuing	-
Ground Segment and Space-to-Ground Integration	Various	Various : Various	-	6.384	Jan 2022	114.555	Jan 2023	-		-		-	Continuing	Continuing	-
GRIFFON: GIF and SOSI Demo Ctr 1	TBD	TBD : TBD	-	-		-		15.378	Jan 2024	-		15.378	Continuing	Continuing	-
GRIFFON: GIF and SOSI Demo Ctr 2	TBD	TBD : TBD	-	-		-		15.378	Jan 2024	-		15.378	Continuing	Continuing	-
GRIFFON: GIF and SOSI Follow-on	TBD	TBD : TBD	-	-		-		23.600	Jul 2024	-		23.600	Continuing	Continuing	-
GRIFFON: Software Applications MP Demo Ctr 1	TBD	TBD : TBD	-	-		-		23.100	Mar 2024	-		23.100	Continuing	Continuing	-
GRIFFON: Software Applications MP Demo Ctr 2	TBD	TBD : TBD	-	-		-		23.100	Mar 2024	-		23.100	Continuing	Continuing	-
GRIFFON: In-Band Study	TBD	TBD : TBD	-	-		-		13.100	Jun 2024	-		13.100	Continuing	Continuing	-
GRIFFON: Out-of-Band Study	TBD	TBD : TBD	-	-		-		11.100	May 2024	-		11.100	Continuing	Continuing	-
FAB-T Compatibility Study	TBD	TBD : TBD	-	-		-		17.940	Dec 2023	-		17.940	Continuing	Continuing	-
User Terminal ESS Studies	TBD	TBD : TBD	-	-		-		12.040	Apr 2024	-		12.040	Continuing	Continuing	-
Software Independent Framework Tester (SWIFT)	TBD	TBD : TBD	-	-		-		13.040	Mar 2024	-		13.040	Continuing	Continuing	-
IT Upgrades to NC3 cybersecurity Follow-On	TBD	TBD : TBD	-	-		-		7.030	May 2024	-		7.030	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206855SF / *Evolved Strategic SATC OM (ESS)*	**Project (Number/Name)** 643725 / *Evolved Strategic SATCOM (ESS)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test Terminal Development and Support	SS/CPFF	MIT/LL : Lexington, MA	-	-		-		17.490	Nov 2023	-		17.490	Continuing	Continuing	-
IT Upgrades to NC3 cybersecurity	SS/FFP	GDIT : Falls Church, VA	-	19.319	Jan 2023	-		-		-		-	0.000	19.319	-
End-Cryptographic Unit (ECU)	TBD	TBD : TBD	-	4.085	Jan 2022	34.292	Jun 2023	50.415	Jan 2024	-		50.415	Continuing	Continuing	-
Technical Mission Analysis	RO	Various : Various	-	13.569	Nov 2021	13.556	Nov 2022	22.099	Nov 2023	-		22.099	Continuing	Continuing	-
Enterprise SE&I	C/CPIF	Linquest : Los Angeles, CA	-	14.375	Feb 2022	23.548	Feb 2023	19.653	Feb 2024	-		19.653	Continuing	Continuing	-
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		22.149	Mar 2024	-		22.149	0.000	22.149	-
		Subtotal	-	158.912		481.040		594.952		-		594.952	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace : El Segundo, CA	-	1.738	Nov 2021	1.050	Nov 2022	3.766	Nov 2023	-		3.766	Continuing	Continuing	-
A&AS	Various	Various : Various	-	5.381	Nov 2021	36.457	Nov 2022	33.615	Nov 2023	-		33.615	Continuing	Continuing	-
Other Support	Various	Various : Various	-	0.200	Oct 2021	0.500	Oct 2022	0.500	Oct 2023	-		0.500	Continuing	Continuing	-
		Subtotal	-	7.319		38.007		37.881		-		37.881	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	166.231		519.047		632.833		-		632.833	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206855SF / *Evolved Strategic SATC OM (ESS)*	**Project (Number/Name)** 643725 / *Evolved Strategic SATCOM (ESS)*

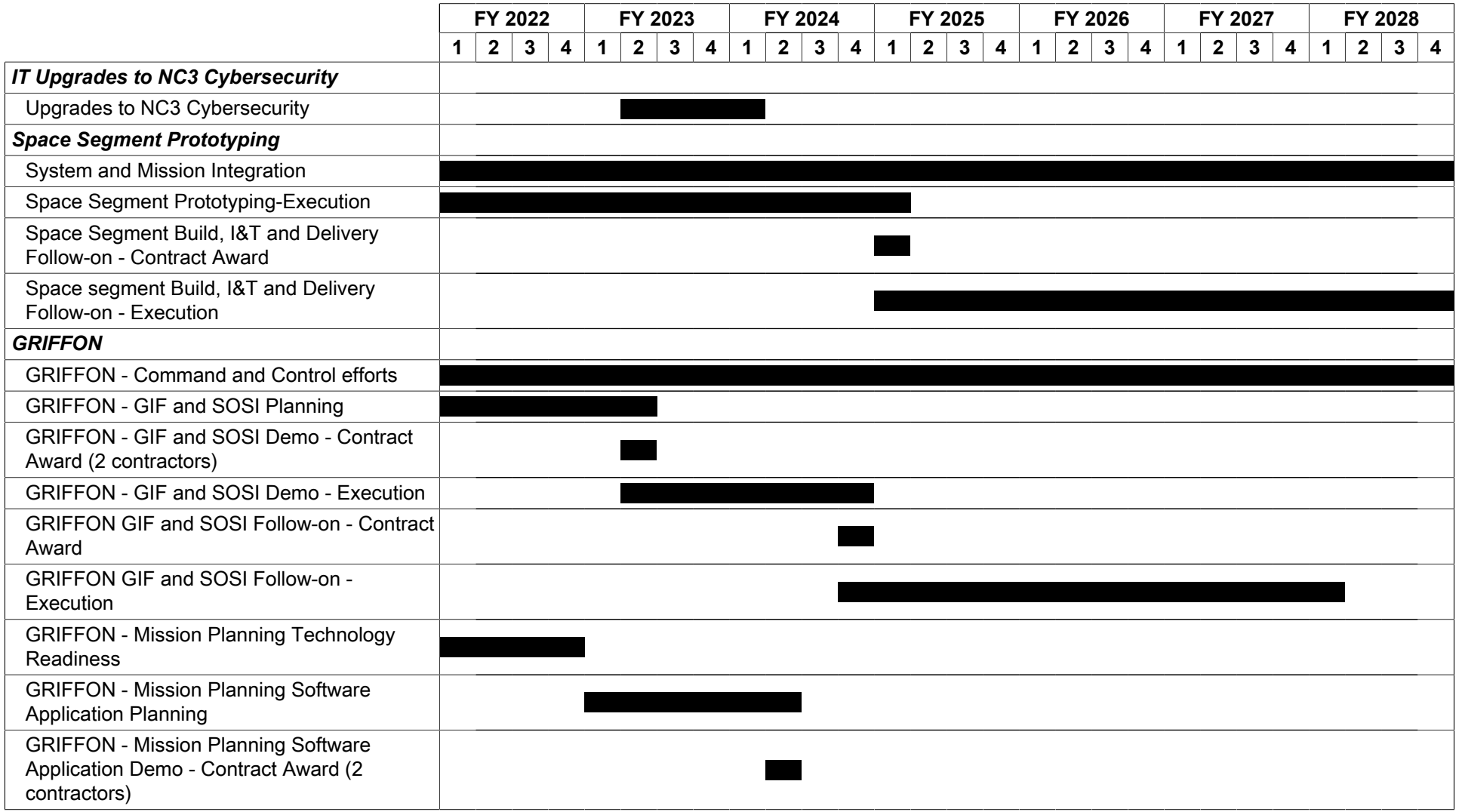

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206855SF / *Evolved Strategic SATC OM (ESS)*	**Project (Number/Name)** 643725 / *Evolved Strategic SATCOM (ESS)*

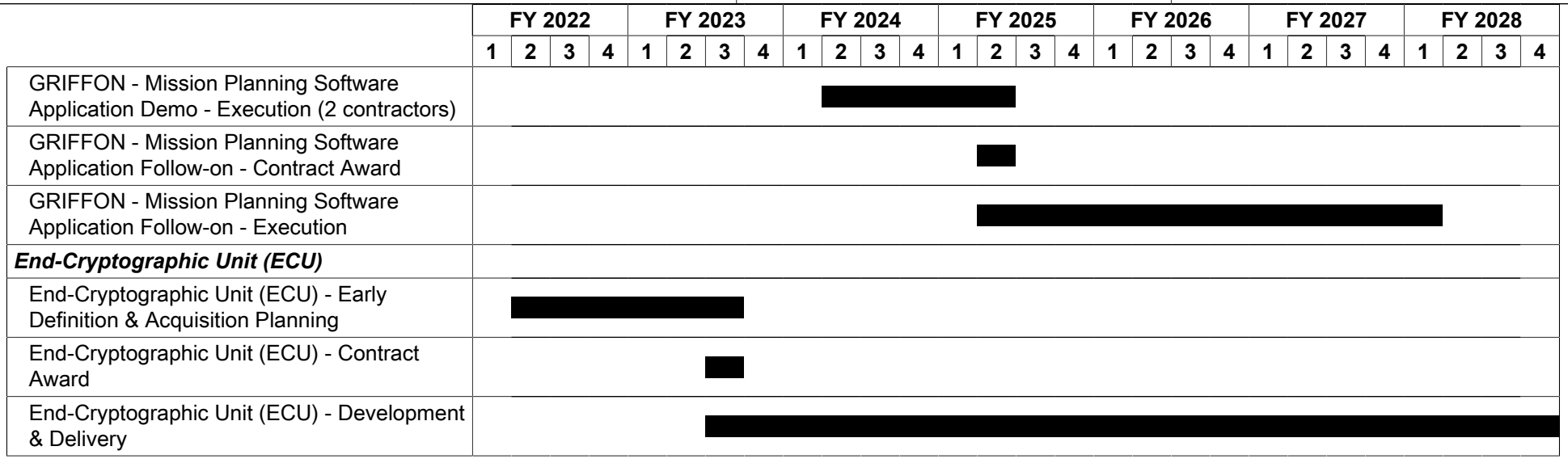

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206855SF / *Evolved Strategic SATCOM (ESS)*	**Project (Number/Name)** 643725 / *Evolved Strategic SATCOM (ESS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
IT Upgrades to NC3 Cybersecurity				
Upgrades to NC3 Cybersecurity	2	2023	1	2024
Space Segment Prototyping				
System and Mission Integration	1	2022	4	2028
Space Segment Prototyping-Execution	1	2022	1	2025
Space Segment Build, I&T and Delivery Follow-on - Contract Award	1	2025	1	2025
Space segment Build, I&T and Delivery Follow-on - Execution	1	2025	4	2028
GRIFFON				
GRIFFON - Command and Control efforts	1	2022	4	2028
GRIFFON - GIF and SOSI Planning	1	2022	2	2023
GRIFFON - GIF and SOSI Demo - Contract Award (2 contractors)	2	2023	2	2023
GRIFFON - GIF and SOSI Demo - Execution	2	2023	4	2024
GRIFFON GIF and SOSI Follow-on - Contract Award	4	2024	4	2024
GRIFFON GIF and SOSI Follow-on - Execution	4	2024	1	2028
GRIFFON - Mission Planning Technology Readiness	1	2022	4	2022
GRIFFON - Mission Planning Software Application Planning	1	2023	2	2024
GRIFFON - Mission Planning Software Application Demo - Contract Award (2 contractors)	2	2024	2	2024
GRIFFON - Mission Planning Software Application Demo - Execution (2 contractors)	2	2024	2	2025
GRIFFON - Mission Planning Software Application Follow-on - Contract Award	2	2025	2	2025
GRIFFON - Mission Planning Software Application Follow-on - Execution	2	2025	1	2028
End-Cryptographic Unit (ECU)				

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206855SF / *Evolved Strategic SATC OM (ESS)*	**Project (Number/Name)** 643725 / *Evolved Strategic SATCOM (ESS)*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
End-Cryptographic Unit (ECU) - Early Definition & Acquisition Planning	2	2022	3	2023
End-Cryptographic Unit (ECU) - Contract Award	3	2023	3	2023
End-Cryptographic Unit (ECU) - Development & Delivery	3	2023	4	2028

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206857SF / *Space Rapid Capabilities Office*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	63.677	54.077	12.036	0.000	12.036	11.340	9.777	9.978	10.338	Continuing	Continuing
64A020: *AF Funded ORSSats*	-	63.677	54.077	12.036	0.000	12.036	11.340	9.777	9.978	10.338	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Rapid Capabilities Office (Space RCO) mission is to expedite the development and fielding of operationally focused capabilities for immediate and near term needs as directed by the Space RCO Board of Directors (BoD). Key operating principles include a short and narrow chain of command, overarching programmatic insight, early and prominent war fighter involvement, and small integrated teams within a single office to rapidly augment existing space capabilities when needed, to expand operational capability, reconstitute/replenish/protect critical space capabilities to reserve "continuity of operations" capability, and exploit space technological or operational innovations to increase U.S. advantage.

The Space RCO is ready to develop, test, train, and equip war fighter needs as they are identified at any time. First, the requirements must be validated by the commander U.S. Space Command; second, the project must be approved by the Space RCO BoD; third, the project will be executed by the Space RCO. If the effort is initiated during execution year, it will be described in the next year's budget exhibit.

Space RCO is supporting the Air Force Research Lab (AFRL) developed Space Solar Power project to collect solar energy and provide uninterrupted, assured, and logistically agile power to expeditionary forces operating in unimproved areas such as forward operating bases. AFRL formulated the Space Solar Power Incremental Demonstrations and Research (SSPIDR) project to rapidly demonstrate this innovative technology via a series of integrated demos and technology development/ maturation efforts.

In addition, Space RCO will conduct studies and analyses for future programs to support the BoD.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space RCO weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857SF / *Space Rapid Capabilities Office*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	73.193	45.427	11.982	0.000	11.982
Current President's Budget	63.677	54.077	12.036	0.000	12.036
Total Adjustments	-9.516	8.650	0.054	0.000	0.054
• Congressional General Reductions	0.000	-0.350			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	9.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	-9.516	0.000	0.054	0.000	0.054

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 64A020: *AF Funded ORSSats*		
Congressional Add: *Space RCO Digital Beamformed Ground-based SATCOM*	7.000	-
Congressional Add: *Hyper Converged Edge Computing*	-	9.000
Congressional Add Subtotals for Project: 64A020	7.000	9.000
Congressional Add Totals for all Projects	7.000	9.000

Change Summary Explanation

FY 2022: -$9.516M for higher priority USSF needs.
FY 2023: +$9.0M for hyper converged edge computing.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Space RCO Board of Directors (BoD) Projects, Studies, and Analysis	8.826	8.872	9.365	0.000	9.365
Description: Execute projects, studies, and analyses under rapid acquisition authorities inherent to the Space RCO, that address emergent capabilities and respond to validated requirements and other BoD approved efforts to meet needs in year of execution. In addition, provide systems engineering, program management support and civilian pay across all the Space RCO activities as well as perform modeling, simulation, analyses, and assess alternative concepts and requirements.					

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857SF *I Space Rapid Capabilities Office*	

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
FY 2023 Plans: Continue to initiate rapid acquisition projects, studies, and analyses that address emergent capabilities requirements and other Space RCO BoD approved efforts. Continue ongoing systems engineering support of future mission development. Additionally, FY 2023 funding will allow the program to rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analyses, experimentation, prototyping, etc. ***FY 2024 Base Plans:*** Continue to initiate rapid acquisition projects, studies, and analyses that address emergent capabilities requirements and other Space RCO BoD approved efforts. Continue ongoing systems engineering support of future mission development. Additionally, FY 2024 funding will allow the program to rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analyses, experimentation, prototyping, etc. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to inflation adjustment.					
Title: Space RCO Solar Power ***Description:*** Space RCO is developing the Solar Power project to collect solar energy and provide uninterrupted, assured, and logistically agile power to expeditionary forces operating in unimproved areas such as forward operating bases. ***FY 2023 Plans:*** Continue developing space-based solar power collection and transmission technology via a series of integrated demos and technology development/maturation efforts: 1) continue space flight demonstration of solar-to-RF panel payload (take delivery of solar-to-RF payload emulator, validate payload for delivery, continue pre-integration of payload-to-bus), 2) deliver thermal integrated demonstration for on-orbit demonstration, 3) initiate structural operational prototype based on results from scaled array payload demonstrations and validated models, 4) update operational prototype concept designs/analysis based on tile, rectenna, thermal and structure	47.851	36.205	2.671	-	2.671

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857SF *I Space Rapid Capabilities Office*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
demonstrations and updated models, and 5) continue functional demonstrations for critical technologies in energy generation, deployable structures, thermal technology, RF transmission, and distributed control. ***FY 2024 Base Plans:*** Continue developing space-based solar power collection and transmission technology via a series of integrated demos and technology development/maturation efforts: 1) continue space flight demonstration of solar-to-RF panel payload (take delivery of solar-to-RF payload emulator, validate payload for delivery, continue pre-integration of payload-to-bus), 2) deliver thermal integrated demonstration for on-orbit demonstration, 3) initiate structural operational prototype based on results from scaled array payload demonstrations and validated models, 4) update operational prototype concept designs/analysis based on tile, rectenna, thermal and structure demonstrations and updated models, and 5) continue functional demonstrations for critical technologies in energy generation, deployable structures, thermal technology, RF transmission, and distributed control. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to funding (with the exception of transition funding in FY24 and FY25) being continued in AFRL PE 1206458SF.					
Accomplishments/Planned Programs Subtotals	56.677	45.077	12.036	0.000	12.036

	FY 2022	FY 2023
Congressional Add: Space RCO Digital Beamformed Ground-based SATCOM ***FY 2022 Accomplishments:*** To provide a proof of concept for the Air Force Satellite Control Network with a high-reliability, interoperable production prototype of a Digital Beamformed Ground-based SATCOM system.	7.000	-
Congressional Add: Hyper Converged Edge Computing ***FY 2023 Plans:*** The Air Force Research Lab will execute the Hyper Converged Edge Computing project as a technology development effort with emphasis on accelerating artificial intelligence and machine learning applications in space.	-	9.000
Congressional Adds Subtotals	7.000	9.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857SF *I Space Rapid Capabilities Office*

E. Acquisition Strategy

Expeditiously award contracts through Space RCO or partner organizations.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206857SF / *Space Rapid Capabilities Office*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space RCO Board of Directors (BoD) Projects, Studies, and Analysis	Various	Various : Various	-	8.826	Mar 2022	4.309	Mar 2023	4.687	Dec 2023	-		4.687	Continuing	Continuing	-
Space RCO Solar Power	SS/CPFF	Northrop Grumman : Linthicum, MD	-	43.401	Nov 2021	36.205	Nov 2022	2.671	Nov 2023	-		2.671	Continuing	Continuing	-
Digital Beamformed Ground-based SATCOM	C/CPAF	BlueHalo : Albuquerque, NM	-	7.000	May 2022	-		-		-		-	Continuing	Continuing	-
Hyper Converged Edge Computing	C/TBD	TBD : TBD	-	-		9.000	Sep 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	59.227		49.514		7.358		-		7.358	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace/Sandia : Various	-	3.750	Dec 2021	3.863	Dec 2022	3.978	Dec 2023	-		3.978	Continuing	Continuing	-
A&AS	Various	Various : Various	-	0.700	Dec 2021	0.700	Dec 2022	0.700	Dec 2023	-		0.700	Continuing	Continuing	-
		Subtotal	-	4.450		4.563		4.678		-		4.678	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	63.677		54.077		12.036		-		12.036	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206857SF / *Space Rapid Capabilities Office*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

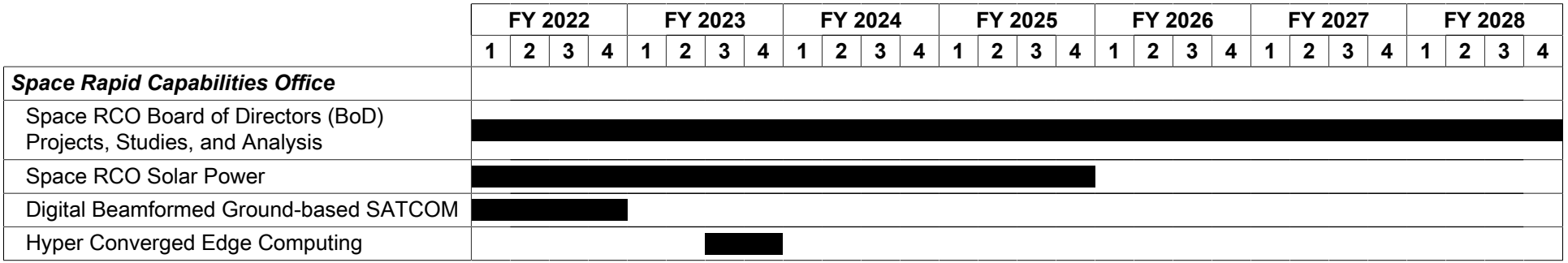

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206857SF / *Space Rapid Capabilities Office*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Rapid Capabilities Office				
Space RCO Board of Directors (BoD) Projects, Studies, and Analysis	1	2022	4	2028
Space RCO Solar Power	1	2022	4	2025
Digital Beamformed Ground-based SATCOM	1	2022	4	2022
Hyper Converged Edge Computing	3	2023	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206862SF / *Tactically Response Space*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	0.000	30.000	0.000	30.000	30.000	0.000	0.000	0.000	0.000	60.000
643835: *Tactically Responsive Space (TacRS)*	-	0.000	0.000	30.000	0.000	30.000	30.000	0.000	0.000	0.000	0.000	60.000
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2024, PE 1206862SF, Tactically Responsive Launch (TacRL), Project 664235, Tactically Responsive Launch is being renamed and changed to Tactically Responsive Space (TacRS), Project 643835, Tactically Responsive Space and moved to Budget Activity 04 to encompass the full range of responsive space. Funding prior to FY24 will remain in Project 664235.

Tactically Responsive Space will fund proof-of concept tactically responsive space demonstrations including launch, satellites, control systems, and concept of operations using emerging and extant commercial launch and satellite providers with the goal to place or replace military capability on-orbit within 24 hours.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) is transforming the organization and implementation of space acquisition to an enterprise approach, to increase 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. SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Tactically Responsive Space weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206862SF / *Tactically Response Space*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	30.000	0.000	30.000
Total Adjustments	0.000	0.000	30.000	0.000	30.000
• 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	30.000	0.000	30.000

Change Summary Explanation

FY 2024: +$30M to continue the TacRS program

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: TacRS Demonstrations	-	0.000	30.000

Description: TacRS is not a new start as it was previously funded in Appropriation, 3620, RDT&E, Space Force, PE 1206862S, Tactically Responsive Launch, Project 664235, Tactically Responsive Launch.

The purpose of this effort is to perform proof of concept demonstrations.

FY 2023 Plans:

N/A.

FY 2024 Plans:

TacRS effort will continue maturing, demonstrating, and stressing end-to-end tactically responsive space solutions based on lessons learned and identified pain points from the VICTUS NOX demonstration. Funding in FY24 accelerates the United State's Space Force's (USSF) ability to deliver operational capabilities in additional mission areas, increase launch site diversity and resilience, continue to decrease response times, and serve as a pathfinder for logistics and sustainment solutions. Activities include concept design and development/acquisition of satellites, control systems, commercial capabilities and operations, technical analysis, international partnerships, launch service acquisition, prototyping, rapid rideshare services, processing, launch

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206862SF *I Tactically Response Space*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
services support, logistics, mission assurance, operations, and tactics, techniques, and procedures, program office support, etc. for demonstration of responsive space and launch missions. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2024 funding increased due to transfer of TacRS efforts from PE 1206862SF, Tactically Responsive Launch.			
Accomplishments/Planned Programs Subtotals	-	0.000	30.000

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• RDTE 06 1206862F: *Tactically Responsive Launch*	50.000	50.000	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

Previous years' funding, FY 2020-FY2023, located in BPAC 664235, PE 1206862SF, Tactically Responsive Launch.

E. Acquisition Strategy

Utilizing new and existing open competitive launch service, space vehicle, and ground operations contracts, Small Business Innovative Research contracts, Other Transaction Authority (OTA) Agreements, and other contract vehicles to take advantage of evolving commercial capabilities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206862SF / *Tactically Response Space*	**Project (Number/Name)** 643835 / *Tactically Responsive Space (TacRS)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TacRS Range Support	Various	Various : Various	-	-		-		1.900	May 2024	-		1.900	Continuing	Continuing	-
TacRS Mission CY25 Launch Service	TBD	TBD : TBD	-	-		-		20.945	May 2024	-		20.945	Continuing	Continuing	-
Tech Advance & Studies	Various	TBD : TBD	-	-		-		1.045	Jun 2024	-		1.045	Continuing	Continuing	-
SBIR/STTR	Allot	Not specified : TBD	-	-		-		1.050	Jan 2024	-		1.050	Continuing	Continuing	-
		Subtotal	-	-		-		24.940		-		24.940	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Transportation of Hardware/Personnel	PO	TMO : El Segundo, CA	-	-		-		0.110	Nov 2023	-		0.110	Continuing	Continuing	-
		Subtotal	-	-		-		0.110		-		0.110	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
TacRS Launch Service Mission Assurance	C/CPIF	ASRC Federal : Albuquerque, NM	-	-		-		0.850	May 2024	-		0.850	Continuing	Continuing	-
LV Support & SV Mission Assurance (FFRDC)	RO	Aerospace : El Segundo, CA	-	-		-		1.500	Oct 2024	-		1.500	Continuing	Continuing	-
TacRS (LV & SV) Technical Services, Program and Financial Support	Various	Various : Various	-	-		-		2.500	Aug 2024	-		2.500	Continuing	Continuing	-
Other Support	Various	Various : El Segundo, CA	-	-		-		0.100	Oct 2023	-		0.100	Continuing	Continuing	-
		Subtotal	-	-		-		4.950		-		4.950	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 4	R-1 Program Element (Number/Name) PE 1206862SF / *Tactically Response Space*	Project (Number/Name) 643835 / *Tactically Responsive Space (TacRS)*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		30.000		-		30.000	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206862SF / *Tactically Response Space*	**Project (Number/Name)** 643835 / *Tactically Responsive Space (TacRS)*

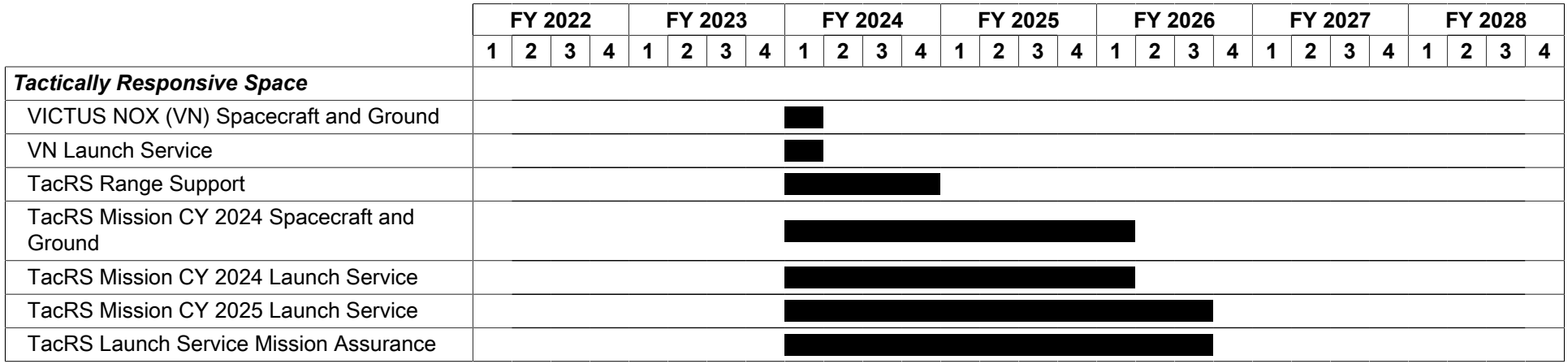

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 4	**R-1 Program Element (Number/Name)** PE 1206862SF / *Tactically Response Space*	**Project (Number/Name)** 643835 / *Tactically Responsive Space (TacRS)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Tactically Responsive Space				
VICTUS NOX (VN) Spacecraft and Ground	1	2024	1	2024
VN Launch Service	1	2024	1	2024
TacRS Range Support	1	2024	4	2024
TacRS Mission CY 2024 Spacecraft and Ground	1	2024	1	2026
TacRS Mission CY 2024 Launch Service	1	2024	1	2026
TacRS Mission CY 2025 Launch Service	1	2024	3	2026
TacRS Launch Service Mission Assurance	1	2024	3	2026

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1203269SF / *GPS III Follow-On (GPS IIIF)*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	275.819	237.947	292.847	308.999	0.000	308.999	254.025	193.634	167.288	70.120	277.486	2,078.165
653170: *GPS IIIF*	275.819	237.947	232.783	247.278	0.000	247.278	190.442	128.163	100.481	0.900	277.486	1,691.299
653171: *GPS Enterprise Integration*	0.000	0.000	60.064	61.721	0.000	61.721	63.583	65.471	66.807	69.220	0.000	386.866
Program MDAP/MAIS Code: 590												

A. Mission Description and Budget Item Justification

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 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.

The system is composed of three segments: User Equipment (funded under Program Element (PE) 1203164F, 1203164SF), Space (funded under PE 1203165F, 1203265F, 1203265SF, 1203269F, and 1203269SF), and a Control Network (funded under PE 1206423F, 1206423SF and 1203165F). The satellites broadcast high accuracy data using precisely synchronized signals that are received and processed by user equipment installed in military and civil 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 (US) 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 (DWMS); Air Mobility; and Space Launch Orbital Support.

GPS III Follow On (GPS IIIF) delivers improved satellites beyond the first ten GPS III Space Vehicles (SVs) being delivered (funded in PE 1203265SF GPS III Space Segment). While GPS IIIF satellites maintain the same capabilities as the GPS III satellites, they deliver significant enhancements to include: potential on-ramping of advanced PNT technology from efforts such as the Navigation Technology Satellite 3 (NTS-3), backward compatibility, Unified S-Band (USB) interface compliance, integration of hosted payloads including a redesigned USNDS payload, Laser Retro-reflector Arrays (LRAs), Search and Rescue/GPS (SAR/GPS), and Regional Military Protection (RMP) capabilities that provide the ability to deliver high-power regional Military Code (M-Code) signals in specific areas of intended effect.

Implementation of RMP into the GPS Enterprise requires integration with the ground and user segments, executed by the GPS Next Generation Operational Control System (OCX), along with the Military GPS User Equipment (MGUE) programs, respectively. The SAR/GPS payload provided by Canada supports Air Combat Command (ACC) and fills a validated National Search and Rescue Committee requirement to provide enduring, space-based distress alerting capability to detect,

locate, and relay distress alerts to fulfill its responsibilities under international agreements for Search and Rescue. LRA, built by the Naval Research Lab (NRL), is a passive reflector that improves accuracy and provides better satellite ephemeris data. National Geospatial-Intelligence Agency (NGA) funds the integration costs of the LRA.

This PE funds the Research, Development, Test, and Evaluation (RDT&E) of GPS IIIF SVs 11-12 (to include Non-Recurring Engineering (NRE) support efforts). This program includes risk-reducing simulators and systems engineering associated with delivering the new capabilities required of GPS IIIF satellites.

Starting in FY 2023, this program also funds the GPS Enterprise Integration (EI) project which includes critical efforts associated with the Government's responsibility to accomplish integration of multiple prime contracts across the three GPS enterprise segments, along with the transition to sustainment and operational communities. GPS EI maintains the current GPS architecture and system definition, controls and validates interfaces, ensures compatibility across current Generation II and III systems, and ongoing developments such as GPS IIIF space systems, OCX control systems, and MGUE Inc 1 and MGUE Inc 2 systems. GPS EI also develops/manages plans for execution and fielding of new capability like the new M-Code for use at the earliest opportunity. 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.

In addition, GPS EI funds the technical evolution, risk reduction, enterprise-level testing and delivery of all PNT Enterprise, capabilities. GPS EI also assists in the analysis and assessment of futures technology to continue the advancement of the PNT enterprise ensuring PNT capabilities continue to be at the forefront. 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.

GPS EI's analyses guide Government decisions to ensure efficient and effective synchronization and execution across all GPS II and III programs. For Enterprise-wide integration to be successful, 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 PNT programs in all acquisition phases. The Government owns the GPS Enterprise system requirements and integration, interfaced specifications, 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.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurposed capabilities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS IIIF)*

This program may include necessary civilian pay expenses required to manage, execute, and deliver GPS IIIF Space Segment weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in PEs 1206392SF and 1206398SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	246.332	325.927	309.651	0.000	309.651
Current President's Budget	237.947	292.847	308.999	0.000	308.999
Total Adjustments	-8.385	-33.080	-0.652	0.000	-0.652
• Congressional General Reductions	0.000	-0.880			
• Congressional Directed Reductions	0.000	-32.200			
• 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	-8.385	0.000			
• Other Adjustments	0.000	0.000	-0.652	0.000	-0.652

Change Summary Explanation

FY 2023: -$32.200M Congressional Directed Mark.
FY 2024: -$2.035M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.
FY 2024: +$1.383M Inflation adjustment

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1203269SF / *GPS III Follow-On (GPS III F)*	Project (Number/Name) 653170 / *GPS IIIF*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
653170: *GPS IIIF*	275.819	237.947	232.783	247.278	0.000	247.278	190.442	128.163	100.481	0.900	277.486	1,691.299
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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 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.

The system is composed of three segments: User Equipment (funded under Program Element (PE) 1203164F, 1203164SF), Space (funded under PE 1203165F, 1203265F, 1203265SF, 1203269F, and 1203269SF), and a Control Network (funded under PE 1206423F, 1206423SF and 1203165F). 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 (US) 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 (DWMS); Air Mobility; and Space Launch Orbital Support.

GPS III Follow On (GPS IIIF) delivers improved satellites beyond the first ten GPS III Space Vehicles (SVs) being delivered (funded in PE 1203265SF GPS III Space Segment). While GPS IIIF satellites maintain the same capabilities as the GPS III satellites, they deliver significant enhancements to include: potential on-ramping of advanced PNT technology from efforts such as the Navigation Technology Satellite 3 (NTS-3), backward compatibility, Unified S-Band (USB) interface compliance, integration of hosted payloads including a redesigned USNDS payload, Laser Retro-reflector Arrays (LRAs), Search and Rescue/GPS (SAR/GPS), and Regional Military Protection (RMP) capabilities that provide the ability to deliver high-power regional Military Code (M-Code) signals in specific areas of intended effect.

Implementation of RMP into the GPS Enterprise requires integration with the ground and user segments, executed by the GPS Next Generation Operational Control System (OCX), along with the Military GPS User Equipment (MGUE) programs, respectively. The SAR/GPS payload provided by Canada fills a validated National Search and Rescue Committee requirement to provide enduring, space-based distress alerting capability to detect, locate, and relay distress alerts to fulfill its responsibilities under international agreements for Search and Rescue. LRA, built by the Naval Research Lab (NRL), is a passive reflector that improves accuracy and provides better ephemeris data. National Geospatial-Intelligence Agency (NGA) funds the integration costs of the LRA.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653170 / *GPS IIIF*

This PE funds the Research, Development, Test, and Evaluation (RDT&E) of GPS IIIF SVs 11-12 (to include Non-Recurring Engineering (NRE) support efforts). This program includes risk-reducing simulators (GPS Software and Simulator (GSS+ 1 & 2), (GPS Non-flight Satellite Test Bed (GNST+)) and systems engineering associated with delivering the new capabilities required of GPS IIIF satellites.

Starting in FY 2023, this program also funds the GPS Enterprise Integration (EI) project which includes critical efforts associated with the Government's responsibility to accomplish integration of multiple prime contracts across the three GPS enterprise segments, along with the transition to sustainment and operational communities. GPS EI maintains the current GPS architecture and system definition, controls and validates interfaces, ensures compatibility across current Generation II and III systems, and ongoing developments such as GPS IIIF space systems, OCX control systems, and MGUE Inc 1 and MGUE Inc 2 systems. GPS EI also develops/ manages plans for execution and fielding of new capability like the new M-Code for use at the earliest opportunity. 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.

In addition, GPS EI funds the technical evolution, risk reduction, enterprise-level testing and delivery of all PNT Enterprise capabilities. GPS EI also assists in the analysis and assessment of futures technology to continue the advancement of the PNT enterprise ensuring PNT capabilities continue to be at the forefront. Examples for Generation II included 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.

GPS EI's analyses guide Government decisions to ensure efficient and effective synchronization and execution across all GPS II and III programs. For Enterprise-wide integration to be successful, 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 PNT programs in all acquisition phases. The Government owns the GPS Enterprise system requirements and integration, and interfaced specifications, and interfaced specifications, 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.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurposed capabilities.

This program may include necessary civilian pay expenses required to manage, execute, and deliver GPS IIIF Space Segment weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in PEs 1206392SF and 1206398SF.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653170 / *GPS IIIF*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: GPS III Follow-On (GPS IIIF) Development	237.947	232.783	247.278
Description: The program utilizes RDT&E funds to develop and deliver space vehicles (SVs) 11-12, conduct the Non-recurring Engineering (NRE) of developing risk-reducing simulators (Global Positioning System (GPS) Software and Simulator (GSS+ 1 & 2), (GPS Non-flight Satellite Test Bed (GNST+)), developing support test equipment, and conducting the systems engineering associated with delivering the new capabilities required of GPS IIIF including backward compatibility, dual band Telemetry, Tracking, and Control, integration of Government Furnished Equipment hosted payloads, and Regional Military Protection (RMP), which delivers high power regional Military-Code (M-Code) signals in specific areas of intended effect. ***FY 2023 Plans:*** Complete build, test, and delivery of GNST+. Continue development, build, and test of GSS+ 1 & 2, SV 11, & SV 12 in support of system integration. Conduct Integration and Testing of satellites and GNST+ pathfinder. Receive and process critical components for SVs 11-12 and initiate system module assembly. Conduct and support capability insertion research, and perform risk reduction activities on the Common Bus approach for SVs 13+. ***FY 2024 Plans:*** Complete integration of GNST+. Complete test and transfer of GSS+ 1. Complete build, test and qualification of GSS+ 2. NTS-3 is scheduled to launch at the end of FY 2023. FY 2024 funds will be dedicated to early on orbit checkout and feed into 1 year of preplanned experiments (scheduled to end FY24). Continue development of SV-11, to include receipt of Mission Data Units, Testing and Core mate, and acoustic testing. Begin development of SV-12, to include initial delivery of System Module Hardware, receipt of Mission Data Units, and Testing and Core mate. Continue support capability insertion research, and perform risk reduction activities on the Common Bus approach for SVs 13+. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase is due to early on orbit checkout and continued development of SV-11, to include receipt of Mission Date Units, Testing and Core mate, and acoustic testing. In addition, increase is due to beginning development of SV-12.			
Accomplishments/Planned Programs Subtotals	237.947	232.783	247.278

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653170 / *GPS IIIF*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 BA01 GPS03C: *GPSIII Follow On*	835.176	616.962	118.916	-	118.916	678.531	708.802	743.060	758.646	2,051.461	6,511.554

Remarks

D. Acquisition Strategy

In December 2017, Principal Deputy Office of the Assistant Secretary of the Air Force Acquisition & Logistics began the GPS IIIF program. Beginning in FY 2019 and, consistent with the Fiscal Year 2016 National Defense Authorization Act, the program was categorized as an Acquisition Category 1B Major Defense Acquisition Program (MDAP) with the Service Acquisition Executive serving as the Milestone Decision Authority (MDA). During this time, the MDA approved the second phase of the two-phased GPS III Follow-On acquisition strategy. Executed using funds in PE 1203265F, GPS III Space Segment, the Phase 1 Production Readiness Feasibility Assessments conducted during FY 2016-2017 provided data and insight into contractors' GPS satellite production designs with emphasis on a mature navigation payload and production-ready designs. Phase 1 results affirmed the viability of a competitive approach for Phase 2. The Phase 2 strategy directed the Air Force to conduct a full-and-open competition for GPS IIIF space vehicles and specified the use of RDT&E funds to deliver SVs 11-12 and conduct associated NRE.

In addition to SVs 11-12, the RDT&E effort is comprised of developing risk-reducing simulators (GPS Software and Simulator (GSS+), (GPS Non-flight Satellite Test Bed (GNST+)), support test equipment, and conducting the systems engineering associated with delivering the new capabilities required of GPS IIIF. The Air Force awarded the contract to Lockheed Martin in September 2018 and began the 1-year Critical Design Review (CDR) campaign in March 2019. Completion of CDR was done in March 2020 and Milestone C production certification completed in July 2020. Procurement of SVs 13 and 14 awarded on October 7, 2020. Procurement of SVs 15-17 awarded on October 22, 2021. GPS IIIF SVs 18, 19, and 20 were awarded on October 27, 2022. The Space Force will continue to procure future GPS IIIF satellites via annual contract options exercised using Space Procurement, Air Force and Procurement, Space Force funds consistent with full-funding policy under an annual buy approach.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653170 / *GPS IIIF*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS IIIF Development	C/FPIF	Lockheed Martin : Littleton, CO	245.955	223.474	Dec 2022	206.765	Nov 2022	206.414	Nov 2024	-		206.414	514.381	1,396.989	1,374.851
NTS-3 Payload and Launch	Various	Various : Various : TBD	19.233	-		3.660	Mar 2023	5.203	Mar 2024	-		5.203	0.884	28.980	-
GPS IIIF SBIR/STTR	Various	Various : Various, CA	0.000	-		0.000		8.616	Mar 2024	-		8.616	2.863	11.479	-
GPS IIIF Technical Mission Analysis	Various	Aerospace : El Segundo, CA	5.325	2.216	Dec 2022	2.531	Dec 2022	6.077	Dec 2024	-		6.077	45.185	61.334	-
GPS IIIF Enterprise SE&I	C/CPAF	SAIC : El Segundo, CA	1.545	2.321	Dec 2022	6.082	Dec 2022	6.443	Dec 2024	-		6.443	26.693	43.084	-
		Subtotal	272.058	228.011		219.038		232.753		-		232.753	590.006	1,541.866	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS IIIF Test and Evaluation	Various	Various : Various	1.000	0.000	Dec 2022	-		-		-		-	0.000	1.000	-
		Subtotal	1.000	0.000		-		-		-		-	0.000	1.000	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS IIIF FFRDC	Various	Aerospace : El Segundo, CA	1.923	2.104	Dec 2022	1.106	Dec 2022	2.840	Dec 2024	-		2.840	35.485	43.458	-
GPS IIIF A&AS	Various	Various : El Segundo, CA	0.355	7.632	Dec 2022	12.339	Dec 2022	11.385	Dec 2024	-		11.385	40.643	72.354	-
GPS IIIF Other Support	Various	Various : El Segundo, CA	0.483	0.200	Oct 2022	0.300	Oct 2022	0.300	Oct 2024	-		0.300	1.200	2.483	-
		Subtotal	2.761	9.936		13.745		14.525		-		14.525	77.328	118.295	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1203269SF / *GPS III Follow-On (GPS III F)*	Project (Number/Name) 653170 / *GPS IIIF*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	275.819	237.947		232.783		247.278		-		247.278	667.334	1,661.161	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653170 / *GPS IIIF*

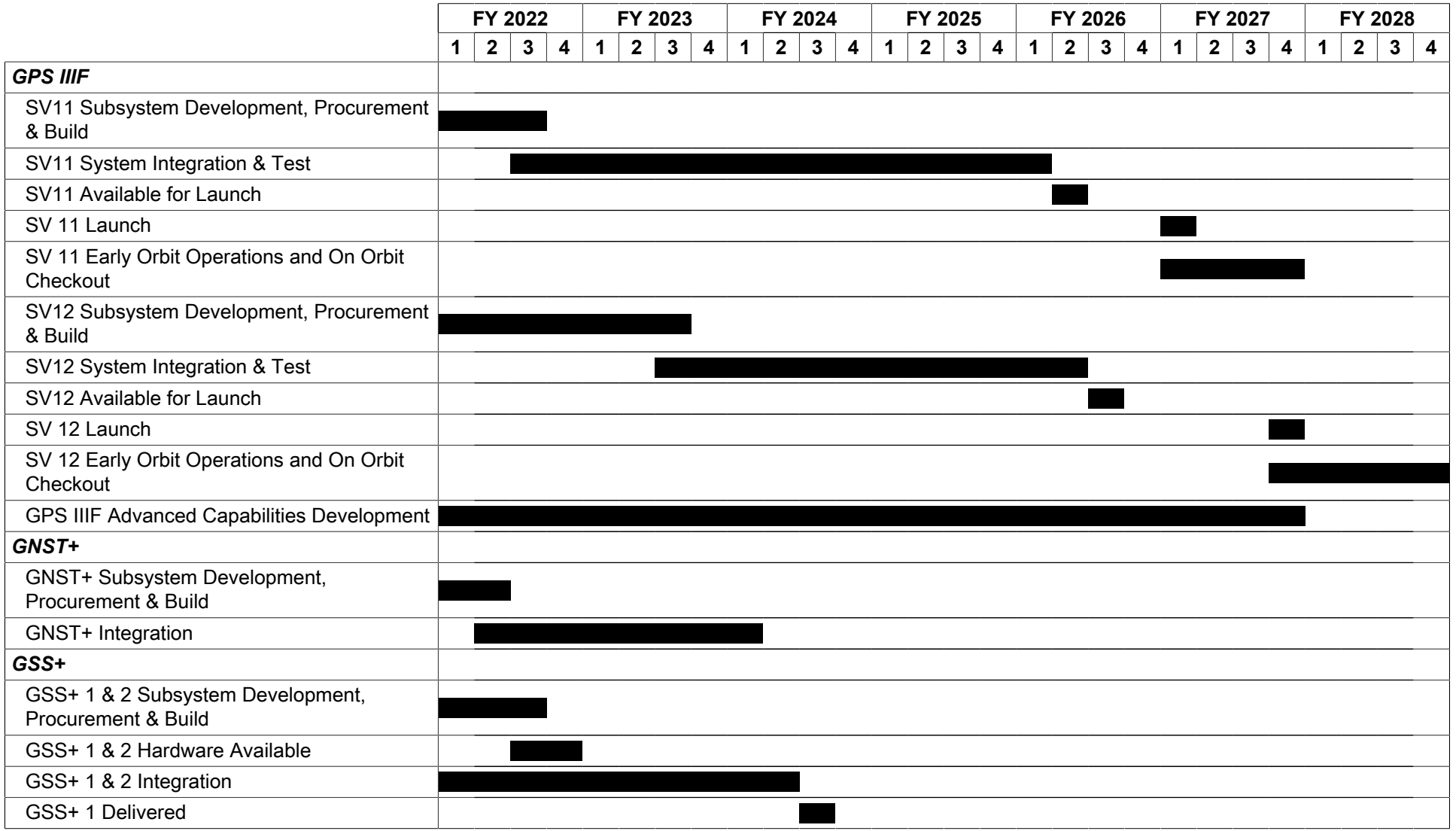

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653170 / *GPS IIIF*

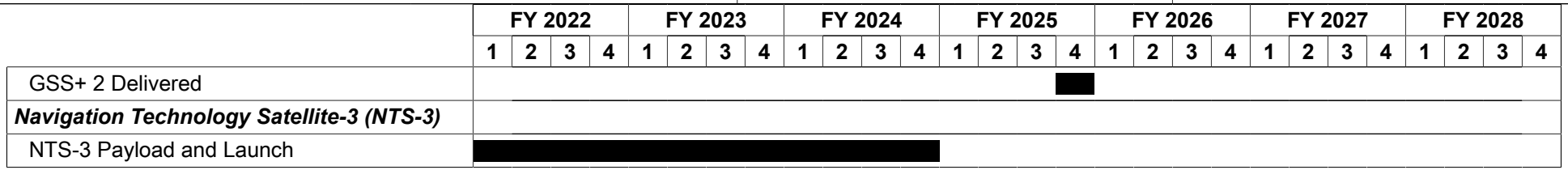

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653170 / *GPS IIIF*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GPS IIIF				
SV11 Subsystem Development, Procurement & Build	1	2022	3	2022
SV11 System Integration & Test	3	2022	1	2026
SV11 Available for Launch	2	2026	2	2026
SV 11 Launch	1	2027	1	2027
SV 11 Early Orbit Operations and On Orbit Checkout	1	2027	4	2027
SV12 Subsystem Development, Procurement & Build	1	2022	3	2023
SV12 System Integration & Test	3	2023	2	2026
SV12 Available for Launch	3	2026	3	2026
SV 12 Launch	4	2027	4	2027
SV 12 Early Orbit Operations and On Orbit Checkout	4	2027	4	2028
GPS IIIF Advanced Capabilities Development	1	2022	4	2027
GNST+				
GNST+ Subsystem Development, Procurement & Build	1	2022	2	2022
GNST+ Integration	2	2022	1	2024
GSS+				
GSS+ 1 & 2 Subsystem Development, Procurement & Build	1	2022	3	2022
GSS+ 1 & 2 Hardware Available	3	2022	4	2022
GSS+ 1 & 2 Integration	1	2022	2	2024
GSS+ 1 Delivered	3	2024	3	2024
GSS+ 2 Delivered	4	2025	4	2025
Navigation Technology Satellite-3 (NTS-3)				

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653170 / *GPS IIIF*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
NTS-3 Payload and Launch	1	2022	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1203269SF / *GPS III Follow-On (GPS III F)*	Project (Number/Name) 653171 / *GPS Enterprise Integration*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
653171: *GPS Enterprise Integration*	0.000	0.000	60.064	61.721	0.000	61.721	63.583	65.471	66.807	69.220	0.000	386.866
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This is not a New Start. In FY 2023, PE 1206423SF, Global Positioning System III - Operational Control Segment, Project 67A025, GPS Enterprise Integrator (EI), R-1 Line #52 efforts were transferred to PE 1203269SF, Global Positioning System IIIF, Project 653171, GPS Enterprise Integration, R-1 Line #17 in order to continue enterprise integration activities to support GPS IIIF Space, Ground and User Segment.

A. Mission Description and Budget Item Justification

The Global Positioning System (GPS) 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 PNT 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 Positioning, Navigation, and Timing (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 equipment).

More specifically, GPS EI is responsible for technical baseline management, integration, synchronizing, testing, and verifying GPS III, GPS III Follow-on (IIIF), Operational Control System (OCS), Next Generation Operational Control System (OCX), Military GPS User Equipment (MGUE) Increment (Inc) 1 and Inc 2, and other PNT investment projects. 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 legacy systems such as GPS Block II satellites, OCS, and legacy user equipment. The GPS EI also manages the process through which the Joint Requirements Oversight Council 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 PNT capabilities, and various other obligations to the international community that provide inter-operable PNT signals.

GPS EI also supports GPS spectrum protection at international forums such as the International Telecommunications Union. Such support consists of providing technical support to the Departments of State and Defense to advocate on behalf of the US Government when negotiating with foreign partners. In addition, GPS EI provides technical expertise to maintain relationships with other US government agencies that include the Federal Aviation Administration, National Geospatial-

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653171 / *GPS Enterprise Integration*

Intelligence Agency (NGA), National Aeronautics and Space Administration, and Departments of State, Transportation, Homeland Security, and Commerce. 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.

GPS EI also manages GPS and other navigation system performance monitoring and publishes performance specifications and reports to ensure anomalies with GPS can be resolved. In addition, GPS EI provides technical expertise for the development for GPS program technical baselines and public specifications to make certain that the DoD fulfills its commitment to the world for civilian GPS Service.

GPS EI also provides the PNT 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 the PNT Enterprise Segments, cybersecurity, and associated test cases necessary to deliver a secure operational system.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Enterprise Integration	-	60.064	61.721
Description: This is not a New Start. Funding supports the integration and technical baseline control of all elements of the Global Positioning System (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.			
FY 2023 Plans: Continue Space Systems Command (SSC)-led integrated test, operational evaluation, and transition to operations of the Next Generation Operational Control System (OCX) Block 1/2 and Military GPS User Equipment (MGUE) Increment (Inc) 1 receivers. Continue integrated, Government-led development and operational testing using operational assets, facilities and resources; efforts will include OCX Site Acceptance Testing, OCX Transition Risk Reduction to Operations, Integrated System Test (IST) 3-1 for OCX, Initial Operational Test and Evaluation (OT&E) for OCX-dependent capabilities, IST 3-3 Phase 4, and integration in the US Air Force B-2 Bomber and Navy Arleigh Burke Class Guided-Missile Destroyer (DDG). Support MGUE Inc 2 Miniature Serial Interface (MSI) with Next Generation Application Specific Integrated Circuit (ASIC) prototyping. Support MGUE Handheld program initiation and requirements review. Continue GPS Enterprise-wide systems engineering, systems integration, and technical baseline management to ensure GPS Programs of Record work effectively together. Support GPS III SV 09-10 delivery, launch planning and integration. Support integration planning for OCX Block 3 Follow-on (OCX 3F) and GPS IIIF Space Vehicles (SVs). Evaluate systems for effectiveness in delivering capabilities of GPS Constellation Management, prepare for GPS Enterprise Military-Code (M-Code) Positioning, Navigation, and Timing (PNT) Determination, GPS L2C signal PNT Determination, and GPS L5 signal PNT Determination. Support operational demonstration of Vanguard			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653171 / *GPS Enterprise Integration*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Navigation Technology Satellite-3 (NTS-3) program acquisition planning for selected technology transition to operational systems. Work with US Civil Partners to develop and assess future GPS opportunities. Provide increased support for PNT cybersecurity including cyber survivability test and evaluation planning and analysis. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2024 Plans:*** Continue integrated, Government-led development and operational testing using operational assets, facilities and resources. Support MGUE Inc 2 MSI with Next Generation ASIC prototyping. Support MGUE Handheld program and requirements review. Continue GPS Enterprise-wide systems engineering, systems integration, and technical baseline management to ensure GPS Programs of Record work effectively together. Support GPS III SV09-10 delivery, launch planning and integration. Support integration planning for OCX 3F and GPS IIIF SVs. Evaluate systems for effectiveness in delivering capabilities of GPS Constellation Management, GPS Enterprise M-Code PNT Determination, GPS L2C signal PNT Determination, and GPS L5 signal PNT Determination. Support operational demonstration of Vanguard NTS-3 program and acquisition planning for selected technology for transition to operational systems. Work with US Civil Partners to develop and assess future GPS opportunities. Provide increased support for PNT cybersecurity including cyber survivability test and evaluation planning and analysis. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but not limited to: program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Program funding increases due to slight ramp up in support to MGUE Inc 2 Handheld and OCX 3F development, and GPS IIIF production.			
Accomplishments/Planned Programs Subtotals	-	60.064	61.721

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653171 / *GPS Enterprise Integration*	

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• RDTE 07 1206423F: *Global Positioning System III - Operational Control Segment*	388.977	277.052	317.309	-	317.309	82.385	22.836	6.616	6.855	0.000	1,102.030
• RDTE 04 1203164F: *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	419.889	381.394	353.807	-	353.807	299.499	133.838	0.000	0.000	0.000	1,588.427
• RDTE 07 1203265F: *GPS III Space Segment*	7.207	1.526	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.733
• RDTE 05 1203269SF: *GPS III Follow-On (GPS IIIF)*	199.947	232.783	247.278	-	247.278	190.442	128.163	100.481	0.900	214.192	1,314.186
• SPSF 01 1203265SF: *GPS III Space Segment*	84.452	103.340	121.770	-	121.770	75.491	50.078	2.809	0.000	0.000	437.940
• SPSF 01 1203269SF: *GPS III Follow-On (GPS IIIF)*	835.176	616.962	118.916	-	118.916	678.531	708.802	743.060	758.646	2,100.419	6,560.512

Remarks

D. Acquisition Strategy

In accordance with a "back to basics" acquisition approach the Space Force is required to exercise complete ownership of the architecture, system definition, technical baseline, and integration of the GPS space, ground, and user segments. This complex inter-segment integration 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. SE&I effort was awarded in April 2022 through a full and open competition, following a sole source SE&I Bridge Contract that began in 1QFY22.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1203269SF / *GPS III Follow-On (GPS III F)*	Project (Number/Name) 653171 / *GPS Enterprise Integration*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS EI Enterprise SE&I	RO	SAIC : El Segundo, CA	0.000	-		29.587	Nov 2022	27.294	Nov 2023	-		27.294	Continuing	Continuing	-
GPS EI Technical Mission Analysis 1	RO	Aerospace : El Segundo, CA	0.000	-		5.559	Oct 2022	5.605	Oct 2023	-		5.605	Continuing	Continuing	-
GPS EI Technical Mission Analysis 2	Various	Mitre : Various	0.000	-		11.635	Oct 2022	13.684	Oct 2023	-		13.684	Continuing	Continuing	-
GPS EI SBIR/STTR	Various	Various : Washington, DC	0.000	-		0.000		2.151	Mar 2024	-		2.151	Continuing	Continuing	-
GPS EI Additional Product Development	Various	Various : Various	0.000	-		6.990	Oct 2022	1.486	Oct 2023	-		1.486	Continuing	Continuing	-
		Subtotal	0.000	-		53.771		50.220		-		50.220	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS EI Integrated System Test	Various	Various : TBD	0.000	-		4.400	Dec 2023	4.400	Dec 2023	-		4.400	0.000	8.800	-
GPS EI GPS Test Asset Program (GTAP)	C/CPAF	Draper Labs : Cambridge, MA	0.000	-		-		5.637	Dec 2023	-		5.637	Continuing	Continuing	-
		Subtotal	0.000	-		4.400		10.037		-		10.037	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS EI A&AS	Various	Various : El Segundo, CA	0.000	-		1.493	Oct 2022	1.064	Oct 2023	-		1.064	Continuing	Continuing	-
GPS EI Other Support	Various	Various : Various	0.000	-		0.400	Oct 2022	0.400	Oct 2023	-		0.400	Continuing	Continuing	-
		Subtotal	0.000	-		1.893		1.464		-		1.464	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1203269SF / *GPS III Follow-On (GPS III F)*	Project (Number/Name) 653171 / *GPS Enterprise Integration*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-		60.064		61.721		-		61.721	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653171 / *GPS Enterprise Integration*

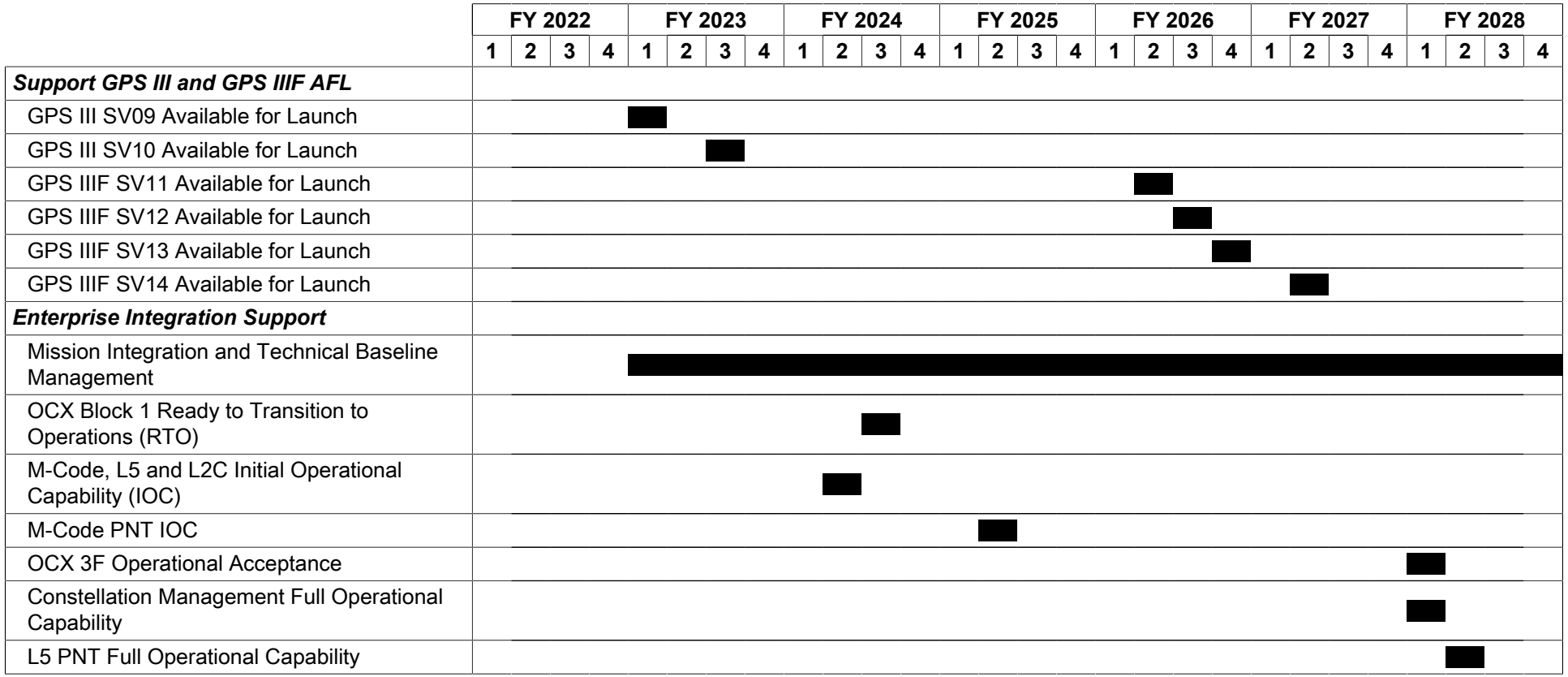

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203269SF / *GPS III Follow-On (GPS III F)*	**Project (Number/Name)** 653171 / *GPS Enterprise Integration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Support GPS III and GPS IIIF AFL				
GPS III SV09 Available for Launch	1	2023	1	2023
GPS III SV10 Available for Launch	3	2023	3	2023
GPS IIIF SV11 Available for Launch	2	2026	2	2026
GPS IIIF SV12 Available for Launch	3	2026	3	2026
GPS IIIF SV13 Available for Launch	4	2026	4	2026
GPS IIIF SV14 Available for Launch	2	2027	2	2027
Enterprise Integration Support				
Mission Integration and Technical Baseline Management	1	2023	4	2028
OCX Block 1 Ready to Transition to Operations (RTO)	3	2024	3	2024
M-Code, L5 and L2C Initial Operational Capability (IOC)	2	2024	2	2024
M-Code PNT IOC	2	2025	2	2025
OCX 3F Operational Acceptance	1	2028	1	2028
Constellation Management Full Operational Capability	1	2028	1	2028
L5 PNT Full Operational Capability	2	2028	2	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1203940SF *I Space Situation Awareness Operations*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	40.731	57.478	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.209
65A037: *Ground Based Optical Sensor*	-	40.731	57.478	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.209
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2024, PE 1203940SF, Space Situation Awareness Operations, Project 65A037, Ground Based Optical Sensor efforts were transferred to PE 1264250SF, Space Situation Awareness Systems, Project 65A037, Ground Based Optical Sensor in order to align it with other developmental Space Domain Awareness (SDA) programs.

A. Mission Description and Budget Item Justification

Space Domain Awareness (SDA) is one of five core competencies of the Space Force and is the effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain that could affect space operations and thereby impact the security, safety, economy, or environment of our nation. As the foundation for space control, SDA encompasses surveillance of all space objects and activities; detailed surveillance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering indications and warning on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities.

This program element fields, upgrades, operationalizes, operates and maintains Space Force sensors and information integration capabilities within the SDA network while companion program element 1206425SF, Space Situational Awareness Systems, develops new network sensors and improved information integration capabilities across the network. Activities funded in this program element (1203940SF) focus on surveillance of objects in earth orbit to aid tasks including satellite tracking; space object identification; tracking and cataloging; satellite attack warning; notification of satellite flyovers to U.S. forces; space treaty monitoring; and technical intelligence gathering.

The Ground-Based Optical Sensor System (GBOSS) Program is an upgrade to the Ground-based Electro-Optical Deep Space Surveillance (GEODSS) system that enables GEODSS to monitor small, closely-spaced, and advanced threats in low, mid, high, and geostationary orbits. The upgraded system will discover currently un-detectable space threats, reduce an adversary's tactical surprise and deliver the data required to support accurate, timely, actionable SDA. This facilitates decision-making within the compressed timelines dictated by the realities of the congested, contested, competitive space domain. The program delivers a combination of performance upgrades to existing GEODSS sites, including advanced data exploitation and rapid data dissemination, and will incorporate coalition data, commercial data and/or new GEODSS sites to provide a global capability to positively ID an adversary committing an orbital attack. The program includes updates to the GEODSS image processing and optical subsystems that will enhance the sensitivity and search rate, and fields new multi-spectral advanced technology sensors supporting extended operations, high-fidelity characterization, enhanced indications and warnings (I&W), and attribution.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver GBOSS capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	42.008	49.628	21.972	0.000	21.972
Current President's Budget	40.731	57.478	0.000	0.000	0.000
Total Adjustments	-1.277	7.850	-21.972	0.000	-21.972
• Congressional General Reductions	0.000	-0.150			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	8.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.277	0.000			
• Other Adjustments	0.000	0.000	-21.972	0.000	-21.972

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 65A037: *Ground Based Optical Sensor*		
Congressional Add: *Artificial Intelligence and Autonomy for Data Analytics and Sensor Systems*	-	8.000
Congressional Add Subtotals for Project: 65A037	-	8.000
Congressional Add Totals for all Projects	-	8.000

Change Summary Explanation

FY 2024: -0.144M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: -21.828M transfer of funding to PE 1206425SF, Space Situation Awareness Systems in order to align it with other developmental SDA programs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203940SF *I Space Situation Awareness Operations*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Ground Based Optical Sensor System (GBOSS)	40.731	49.478	0.000
Description: GBOSS provides a global, ground-based, optical sensor capability for Space Domain Awareness (SDA). The program implements advanced capabilities that may leverage coalition data, commercial data, and sophisticated exploitation algorithms to enhance system response and resiliency to operate in the contested space domain based on aggressive threats by our pacing-competitors, China and Russia. GBOSS improves sensitivity, search rate, tracking of non-cooperative launches, precise tagging of clustered objects, detection of closely spaced dim objects, attribution of orbital attackers and delivers foundational technology to support data exploitation for advanced indications and warnings. This effort includes upgrading existing sensors, dissemination of all data to DoD and IC stakeholders via the Unified Data Library (UDL), and may field GBOSS-enhanced GEODSS capabilities to new locations in accordance with USSF Leadership direction. The program will also acquire new advanced technology sensors to improve persistence and advanced multi-spectral data collection, enabling high-fidelity characterization and rapid attribution. The program will collaborate with Combined Space Operations Center (CSpOC), National Space Defense Center (NSDC), and National Air and Space Intelligence Center (NASIC) efforts to ensure enterprise data fusion and dissemination supporting Enterprise Space Battle Management Command, and Control (ESBMC2). ***FY 2023 Plans:*** Complete the installation and testing of the GET upgrade at the Maui GEODSS site. Incorporate coalition data, commercial data, and/or initiate facility construction of a European GEODSS site to close the Atlantic Optical Gap and support Initial Operational Capability (IOC) in FY 2024. Incorporate coalition data, commercial data and/or initiate facility construction of an Indo-Pacific GEODSS site to provide full global coverage by FY 2026 and Full Operational Capability (FOC) in FY 2027. FY 2023 funding will allow the program office to continue developing and fielding a resilient system necessary to operate in the contested space domain. Activities may include, but are not limited to: integration and test of command and control (C2) and mission partner interfaces, implementation of advanced data exploitation algorithms that may include pattern of life (PoL), advanced indications and warnings (I&W), enhanced defensive cyber operations resiliency measures, space test/combat range events, studies, technical analysis, risk reduction experiments, prototyping and program office support, etc. ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to transfer of GBOSS to PE 1206425SF, Space Situation Awareness Systems.			
Accomplishments/Planned Programs Subtotals	40.731	49.478	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1203940SF *I Space Situation Awareness Operations*

	FY 2022	FY 2023
Congressional Add: Artificial Intelligence and Autonomy for Data Analytics and Sensor Systems	-	8.000
FY 2023 Plans: This effort will develop and demonstrate a prototype of a distributed Artificial Intelligence-driven autonomous SDA sensor management system and associated modular hosting system.		
Congressional Adds Subtotals	-	8.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

This program began in FY 2018 to address ground-based optical SDA gaps and shortfalls. The acquisition strategy, approved in March 2018, accelerates the development and fielding of the solution, minimizing the time to address the requirements in light of current and emerging threats. Initial TMRR activities were executed using existing defense, intelligence, and lab contracts. EMD activities are being executed on the Maintenance of Space Situational Awareness Integrated Capabilities (MOSSAIC) contract awarded through full and open competition.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBOSS design, development and life extension	Various	L3Harris : Colorado Springs, CO	-	32.492	Nov 2021	33.123	Nov 2022	0.000		-		0.000	0.000	65.615	-
GBOSS Test and Training, Materials Development	C/CPIF	Various : Various	-	-		7.029	Nov 2022	0.000		-		0.000	0.000	7.029	-
GBOSS Technical Mission Analysis	RO	Various : Various	-	2.819	Nov 2021	4.401	Nov 2022	0.000		-		0.000	0.000	7.220	-
GBOSS AI and Autonomy for Data Analytics and Sensor Systems	Various	Various : Various	-	-		8.000	Apr 2023	-		-		-	0.000	8.000	-
		Subtotal	-	35.311		52.553		0.000		-		0.000	0.000	87.864	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	2.560	Nov 2021	2.800	Nov 2022	0.000		0.000		0.000	0.000	5.360	-
FFRDC	Various	Various : Various	-	2.080	Nov 2021	2.000	Nov 2022	0.000		0.000		0.000	0.000	4.080	-
Other Support	C/CPAF	Various : Various	-	0.780	Nov 2021	0.125	Nov 2022	0.000		0.000		0.000	0.000	0.905	-
		Subtotal	-	5.420		4.925		0.000		0.000		0.000	0.000	10.345	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	40.731		57.478		0.000		0.000		0.000	0.000	98.209	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor*

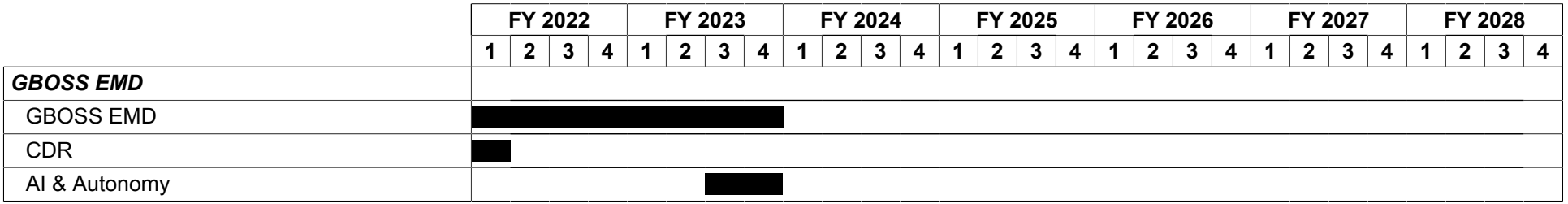

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GBOSS EMD				
GBOSS EMD	1	2022	4	2023
CDR	1	2022	1	2022
AI & Autonomy	3	2023	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206421SF / *Counterspace Systems*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	46.872	31.544	36.537	0.000	36.537	37.014	37.322	38.084	39.460	0.000	266.833
65A001: *Counter Satellite Communications System*	-	29.991	19.527	34.382	0.000	34.382	34.816	35.072	35.788	37.081	0.000	226.657
65A005: *Offensive Counterspace (OCS) C2*	-	2.464	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.464
65A013: *BOUNTY HUNTER*	-	14.417	12.017	2.155	0.000	2.155	2.198	2.250	2.296	2.379	0.000	37.712

Note

This program, BA 5, PE 1206421SF, project 65A001, Counter Communications System CCS Emerging Threat Integration Program (CETIP), is a new start.

A. Mission Description and Budget Item Justification

Acquisition Decision Memorandum (ADM) April 24th 2009, directed all capabilities identified in the October 4th 2006, Counter Communications System (CCS) Block 20, Joint Requirements Oversight Council (JROC) approved Capability Development Document (CDD) shall be accomplished as Pre-planned Product Improvement Program (P3I) upgrades to the CCS Block 10. On April 11th 2016, Air Force Space Command (AFSPC) updated ADM adding additional responsibility for CCS Block 10.3 Meadowlands.

CCS provides expeditionary, deployable, reversible offensive space control (OCS) effects applicable across the full spectrum of conflict. It prevents adversary Satellite Communications (SATCOM) in Area of Responsibility (AOR) including Command & Control (C2), Early Warning and Propaganda, and hosts Rapid Reaction Capabilities in response to Urgent Needs. This program effort includes architecture engineering and studies, system hardware design and development, software design and integration, and testing and demonstration of capabilities to provide disruption of satellite communications signals.

Space acquisition must respond with speed and agility to emerging adversary threats. The Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver CCS weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

Bounty Hunter (BH) is a ground-based, deployable, tactical space Electronic Warfare Support system (ES) that provides SATCOM geolocation and interference detection capabilities that support the Defensive Space Control of US systems in a specific AOR. BH provides the capability to monitor, detect, characterize and

geolocate friendly and unfriendly electro-magnetic interference (EMI) across multiple radio frequency bands in support of Command, Control, Communications, Computers, and Intelligence (C4I) systems by US Joint forces. Continuing annual agile development is needed to meet new user needs in an ever changing threat environment.

This program element may include civilian pay expenses required to manage, execute, and deliver Bounty Hunter capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605829S.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	48.063	21.848	36.600	0.000	36.600
Current President's Budget	46.872	31.544	36.537	0.000	36.537
Total Adjustments	-1.191	9.696	-0.063	0.000	-0.063
• Congressional General Reductions	0.000	-0.304			
• 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	-1.191	0.000			
• Other Adjustments	0.000	0.000	-0.063	0.000	-0.063

Change Summary Explanation

FY 2024: -0.227M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +0.164M inflation increase for non-pay and non-fuel purchases.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206421SF / *Counterspace Systems*	Project (Number/Name) 65A001 / *Counter Satellite Communications System*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
65A001: *Counter Satellite Communications System*	-	29.991	19.527	34.382	0.000	34.382	34.816	35.072	35.788	37.081	0.000	226.657
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 1206421SF, project 65A001, Counter Communications System CCS Emerging Threat Integration Program (CETIP), is a new start.

A. Mission Description and Budget Item Justification

Acquisition Decision Memorandum ADM April 24th 2009, directed all capabilities identified in the Oct 4th 2006 CCS Block 20, Joint Requirements Oversight Council JROC approved Capability Development Document CDD shall be accomplished as Pre-planned Product Improvement Program P3I upgrades to the Counter Communications System CCS Block 10. On April 11th 2016, Air Force Space Command AFSPC signed and updated ADM adding additional responsibility for CCS Block 10.3 Meadowlands.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Counter Communications System CCS Pre-planned Product Improvement P3I Program	29.991	19.527	4.000
Description: Develop, integrate, test and field the CCS P3I program. This is an incremental approach to deliver Block 20 CCS capabilities. ***FY 2023 Plans:*** Continue P3I development, integration and testing of the Block 10 P3I Meadowlands program. Include additional CCS Block 20 capabilities in CCS Block 10.3 Meadowlands, design forward garrison systems, mission specific emulators, training environment and multi-range integration. Continue development of new mission techniques to meet advancing threat and integrate techniques into the CCS program of record. Continue Agile development approach for development of weapon system software and mission techniques. Prepare for concentrated stand-alone testing of CCS warfighting techniques and integration of the next counter Electronic Warfare EW system. Further, FY 2023 funding will further the program's development to rapidly respond and implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of command and control C2, resiliency measures and mission partner interfaces, space test/combat range events, and office support etc. Rapidly respond and implement system resiliency and situational awareness necessary to operate in the contested space domain. ***FY 2024 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Complete P3I testing and system delivery of the Block 10 P3I Meadowlands program. Integrate CCS Block 10.3 Meadowlands into architecture, including forward garrison systems, mission specific emulators, training environment and multi-range integration. Funding will allow the program to 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 office support, studies, technical analysis, experimentation, prototyping, architectural development, systems engineering demonstrations, testing, command and control integration andmission partner integration. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 due to the completion of the Block 10 P3I Meadowlands program.			
Title: Counter Communications System CCS Emerging Threat Integration Program (CETIP) ***Description:*** Define, test and integrate new software capabilities and minor hardware solutions to ensure the Counter Communications System is able to maintain effectiveness against emerging threats and adversary capabilities. This major thrust was broken out from Counter Communications System CCS Pre-planned Product Improvement P3I Program Major Thrust for transparency. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** Award contract for agile development of new CETIP software applications and algorithms and integrate software-based techniques into the CCS program of record to meet emergent threats. Begin concentrated stand-alone testing of CCS capabilities to refine space warfighting techniques and prepare for integration into counter-Electronic Warfare EW architecture. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2024 increased due to the break out of CETIP mission technique activities.	-	0.000	30.382
Accomplishments/Planned Programs Subtotals	29.991	19.527	34.382

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPAF 01 CTRSPC: *Counterspace Systems*	58.130	54.954	50.565	-	50.565	4.241	2.040	2.090	2.132	0.000	174.152

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*

D. Acquisition Strategy

All contracts in this program element will be awarded using competitive procedures to the maximum extent possible, to upgrade existing capabilities as well as to acquire next generation capabilities through incremental acquisitions.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Block 10 P3I Development	Various	Various : El Segundo, CA	-	20.219	Feb 2022	12.140	Feb 2023	4.000	Feb 2024	-		4.000	Continuing	Continuing	-
CETIP Development	C/CPIF	TBD : TBD	-	-		-		18.775	Feb 2024	-		18.775	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA	-	1.186	Oct 2021	0.300	Oct 2022	0.750	Oct 2023	-		0.750	Continuing	Continuing	-
Enterprise Systems Engineering and Integration	C/FFP	Various : Various, CA	-	1.072	May 2022	0.394	May 2023	0.400	May 2024	-		0.400	Continuing	Continuing	-
Counterspace Architecture Development	C/CPFF	NGMS : Redondo Beach, CA	-	0.908	Jan 2022	0.927	Jan 2023	0.937	Jan 2024	-		0.937	Continuing	Continuing	-
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		1.198	Oct 2023	-		1.198	Continuing	Continuing	-
		Subtotal	-	23.385		13.761		26.060		-		26.060	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Security	C/CPAF	Mantech : El Segundo, CA	-	2.304	Nov 2021	2.307	Nov 2022	2.349	Nov 2023	-		2.349	Continuing	Continuing	-
		Subtotal	-	2.304		2.307		2.349		-		2.349	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp : El Segundo, CA	-	1.163	Oct 2021	0.268	Oct 2022	0.950	Oct 2023	-		0.950	Continuing	Continuing	-
A&AS	Various	Various : El Segundo, CA	-	3.056	May 2022	3.094	May 2023	4.922	May 2024	-		4.922	Continuing	Continuing	-
Other Support	Various	Various : El Segundo, CA	-	0.083	Oct 2021	0.097	Oct 2022	0.101	Oct 2023	-		0.101	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	4.302		3.459		5.973		-		5.973	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	29.991		19.527		34.382		-		34.382	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*

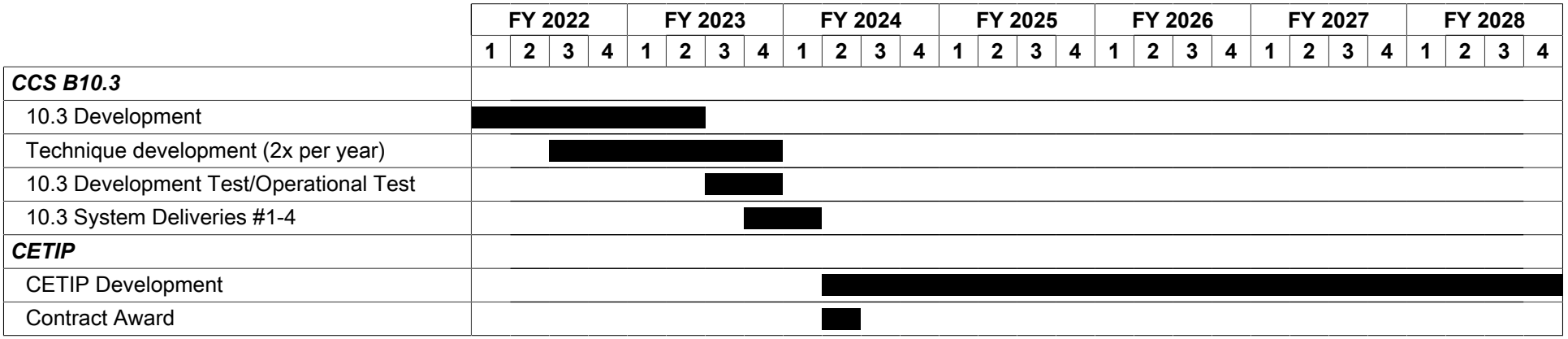

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A001 / *Counter Satellite Communications System*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
CCS B10.3				
10.3 Development	1	2022	2	2023
Technique development (2x per year)	3	2022	4	2023
10.3 Development Test/Operational Test	3	2023	4	2023
10.3 System Deliveries #1-4	4	2023	1	2024
CETIP				
CETIP Development	2	2024	4	2028
Contract Award	2	2024	2	2024

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206421SF / *Counterspace Systems*	Project (Number/Name) 65A005 / *Offensive Counterspace (OCS) C2*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
65A005: *Offensive Counterspace (OCS) C2*	-	2.464	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.464
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This effort supports the evolution of command and control (C2) and mission planning capabilities in support of the fielding and employment of Counterspace Systems. It provides for the integration and upgrade of collaborative tools to link deployable counterspace systems with Joint Warfighting C2 systems and to enable integrated planning and execution of the counterspace mission. Upgraded capabilities will be integrated into current and future command and control systems. This program will leverage the Joint Execution and Tasking System for Space (JETSS) effort in C2 for future space control and counterspace mission capabilities. Requirements for this program are derived from Space Force Headquarters prioritized requirements, in accordance with AFSPC 63-104.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Joint Execution and Tasking System for Space (JETSS)	2.464	0.000	0.000
Description: Evolve with upgrades the counterspace mission planning and C2 capability to support counterspace systems space control warfighter activities. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	2.464	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

All contracts will be awarded using competitive procedures to the maximum extent possible to acquire next generation capabilities through incremental acquisitions. The Offensive Counterspace (OCS) C2 project will complete by end of FY 2022, and any future efforts will be considered for inclusion as an incremental delivery of the Space C2 program.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206421SF / *Counterspace Systems*	Project (Number/Name) 65A005 / *Offensive Counterspace (OCS) C2*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Develop Counterspace Planning and C2 System (JETSS)	C/CPIF	L3Harris : Colorado Springs, CO	-	1.895	Dec 2021	-		-		-		-	0.000	1.895	-
		Subtotal	-	1.895		-		-		-		-	0.000	1.895	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	C/CPFF	Various : Various	-	0.534	May 2022	-		-		-		-	0.000	0.534	-
Other Support	C/Various	Various : Various	-	0.035	Oct 2021	-		-		-		-	0.000	0.035	-
		Subtotal	-	0.569		-		-		-		-	0.000	0.569	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	2.464		-		-		-		-	0.000	2.464	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A005 / *Offensive Counterspace (OCS) C2*

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
JETSS																												
C2 Product Line Development	[redacted]																											

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A005 / *Offensive Counterspace (OCS) C2*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
JETSS				
C2 Product Line Development	1	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206421SF / *Counterspace Systems*	Project (Number/Name) 65A013 / *BOUNTY HUNTER*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
65A013: *BOUNTY HUNTER*	-	14.417	12.017	2.155	0.000	2.155	2.198	2.250	2.296	2.379	0.000	37.712
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Bounty Hunter (BH) is a ground-based, deployable, tactical space Electronic Warfare Support system (ES) that provides SATCOM geolocation and interference detection capabilities that support the Defensive Space Control of US systems in a specific AOR. BH provides the capability to monitor, detect, characterize and geolocate friendly and unfriendly electro-magnetic interference (EMI) across multiple radio frequency bands in support of Command, Control, Communications, Computers, and Intelligence (C4I) systems by US Joint forces. Continuing annual agile development is needed to meet new user needs in an ever changing threat environment.

This program element may include necessary emergent or unanticipated civilian pay expenses required to manage, execute, and deliver Bounty Hunter for emergent or unanticipated weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605829F. In PY 2022 $0.152M was expended for civilian pay expenses in this program element, and in CY 2023 $0.144M was expended for civilian pay expenses in this program element.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Bounty Hunter	14.417	12.017	2.155

Description: Develop new capabilities for the Bounty Hunter program to meet and maintain pace with the operational threat environment. Specific accomplishments are classified.

FY 2023 Plans:

Continue to resolve any new technical obsolescence HW and SW challenges with new system developmental research to facilitate component purchases for new system delivery as directed by the U.S. Space Force. Finalize execution of the program RDT&E plan for system upgrade to BH 3.0 and beyond to allow for system component consolidation and completion of remote operations in specific Combatant Command (CCMD) Areas of Responsibility (AOR's). Reach and maintain pace with the threat environment and 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. Further, FY 2023 development will focus on automation of BH capabilities in an effort to reduce the operational manning of the deployed systems.

FY 2024 Plans:

Finalize execution of the program RDT&E plan for system upgrade to BH 3.x and beyond to allow for system component consolidation and focus on completion of remote operations across all BH systems within the fleet. Development activities/efforts may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. Further,

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A013 / *BOUNTY HUNTER*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 development will focus on further automation of BH capabilities in an effort to reduce the operational manning of the deployed systems, as well as, allow for a hub and spoke operational concept to expand over the horizon capacities; within each AOR that a BH system has been operationally employed. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** RDT&E decreased from FY2023 to FY2024 because of FY2023 $10M Congressional Add for Machine Learning efforts and an additional $2.411M for the UON. FY2024 returns to baseline RDT&E to finalize execution plan for system upgrade to BH 3.x and beyond.			
Accomplishments/Planned Programs Subtotals	14.417	12.017	2.155

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPAF 01 CTRSPC: *Counterspace Systems*	5.011	5.287	2.100	-	2.100	-	-	-	-	0.000	12.398

Remarks

BH was established in FY16 as a JCTD project in response to a JUON in 2010. BH was established as a Program of Record (PoR) in March 2019.

D. Acquisition Strategy

Contracts funded for development efforts supporting the BH PMO shall be awarded to the COLSA Corporation.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206421SF / *Counterspace Systems*	Project (Number/Name) 65A013 / *BOUNTY HUNTER*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Bounty Hunter Equipment	MIPR	Navy Research Laboratory : TBD	-	-		0.924	Nov 2022	-		-		-	Continuing	Continuing	-
Bounty Hunter Developmental Test Support	PO	AFLCMC/HNCP : TBD	-	0.162		0.298		0.416		-		0.416	Continuing	Continuing	-
Bounty Hunter Agile Development	SS/CPAF	MITRE : Colorado Springs, CO	-	0.263	Oct 2021	-		-		-		-	0.000	0.263	-
Bounty Hunter Development	SS/CPFF	COLSA : Huntsville, AL	-	1.429	Mar 2022	0.651	Mar 2023	1.590	Mar 2024	-		1.590	Continuing	Continuing	-
Bounty Hunter UON	C/CPFF	COLSA : Huntsville, AL	-	12.411	May 2022	10.000	Jun 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	14.265		11.873		2.006		-		2.006	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Bounty Hunter Civilian Pay DCA	TBD	USAF : Hanscom AFB, MA	-	0.152	Oct 2021	0.144	Oct 2022	0.149	Oct 2023	-		0.149	Continuing	Continuing	-
		Subtotal	-	0.152		0.144		0.149		-		0.149	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	14.417		12.017		2.155		-		2.155	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A013 / *BOUNTY HUNTER*

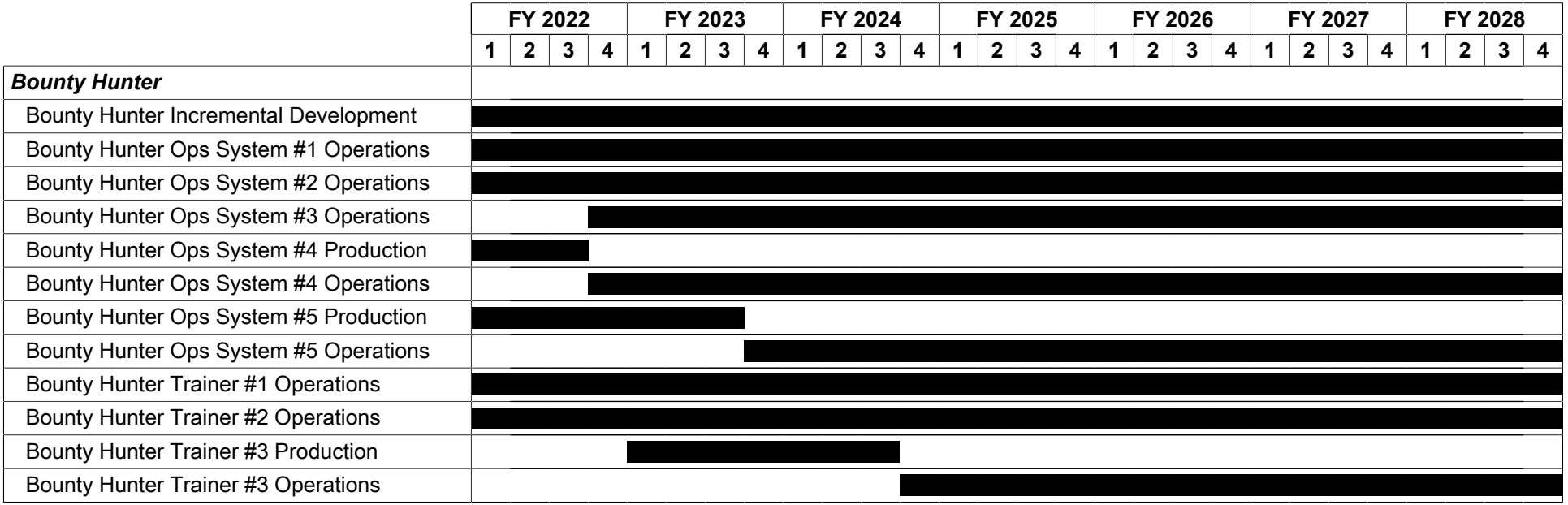

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206421SF / *Counterspace Systems*	**Project (Number/Name)** 65A013 / *BOUNTY HUNTER*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Bounty Hunter				
Bounty Hunter Incremental Development	1	2022	4	2028
Bounty Hunter Ops System #1 Operations	1	2022	4	2028
Bounty Hunter Ops System #2 Operations	1	2022	4	2028
Bounty Hunter Ops System #3 Operations	4	2022	4	2028
Bounty Hunter Ops System #4 Production	1	2022	3	2022
Bounty Hunter Ops System #4 Operations	4	2022	4	2028
Bounty Hunter Ops System #5 Production	1	2022	3	2023
Bounty Hunter Ops System #5 Operations	4	2023	4	2028
Bounty Hunter Trainer #1 Operations	1	2022	4	2028
Bounty Hunter Trainer #2 Operations	1	2022	4	2028
Bounty Hunter Trainer #3 Production	1	2023	3	2024
Bounty Hunter Trainer #3 Operations	4	2024	4	2028

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206422SF / *Weather System Follow-on*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	1.368	48.720	79.727	0.000	79.727	50.884	37.748	33.553	27.902	0.000	279.902
65A038: *SSA Environmental Monitoring*	-	1.368	1.438	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.806
65A039: *WSF-M*	-	0.000	47.282	79.727	0.000	79.727	50.884	37.748	33.553	27.902	0.000	277.096

A. Mission Description and Budget Item Justification

In FY 2023, PE 1206422SF, Weather System Follow-On, Project 644289, Weather Satellite Follow-On, R-1 Line #8 efforts were transferred to PE 1206422SF, Weather System Follow-On, Project 65A039, Weather System Follow-on - Microwave (WSF-M), R-1 Line #20 reflecting the successful completion of Milestone B on 15 May 2020. Residual budget in FY 2024 - FY 2025 funds has transferred from BA 4 to BA 5 in this budget cycle.

Weather System Follow-on program 1206422SF consists of Space Situational Awareness Environmental Monitoring (SSAEM) Project 65A038 and WSF-M Project 65A039.

SSAEM Project 65A038 is a non-ACAT, Class D technology demonstration project to support the international Constellation Observing System for Meteorology, Ionosphere and Climate 2 (COSMIC-2) mission. The SSAEM program provides the acquisition, development and launch/on-orbit support of 18 space/terrestrial weather sensors to COSMIC-2 partnership in coordination with National Oceanic and Atmospheric Administration (NOAA) and Taiwan's National Space Organization (NSPO). COSMIC-2 launched six satellites in an equatorial, Low Earth Orbit (LEO) with 3 SSAEM sensors in each spacecraft in FY 2019. The sensor types are Tri-Global Navigation Satellite System (Tri-GNSS) Radio occultation System (TGRS), Ion Velocity Meter (IVM) and Radio Frequency Beacon (RFB). The SSAEM sensors will address three distinct Joint Requirement Oversight Committee (JROC)-approved Category A weather capability gaps, specifically Gap #4 (Ionospheric Density), Gap #7 (Equatorial Ionospheric Scintillation) and Gap #12 (Electric Field), to provide additional space meteorological data to improve forecast capabilities and improve warfighter navigation/communication capabilities.

The Weather Satellite Follow-on - Microwave (WSF-M) Project 65A039 includes funds for the WSF-M system, the Compact Ocean Wind Vector Radiometer (COWVR) technology demonstration, and the Energetic Charged Particle (ECP) sensor development.

Weather System Follow-on (WSF) is a Low-Earth Orbit (LEO) microwave imaging system developed and delivered by the United States Space Force's Space Systems Command (SSC). WSF is the next generation of space-based passive microwave sensing technology. It will provide U.S. and Allied warfighters with essential weather data, including the measurement of ocean surface wind speed and direction, ice thickness, snow depth, soil moisture, and local spacecraft energetic charged particle environment. The ocean surface wind speed measurement enables tropical cyclone intensity determination by the Joint Typhoon Warning Center. The data gathered by WSF will be provided to meteorologists in support of the generation of a wide variety of weather products necessary to conduct mission planning and operations globally.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206422SF *I Weather System Follow-on*

WSF is an Acquisition Category IB program comprised of two Space Vehicles (SV) and their associated command, control, and data dissemination network. Global environmental monitoring data is gathered, stored, and down-linked through the Satellite Control Network (SCN) and disseminated to Air Force and Navy weather centers. Additionally, data is broadcast real time by the satellite for utilization by heritage Direct Readout Terminals that use the data for local weather forecasting.

WSF is a Major Defense Acquisition Program (MDAP) with the Space Force as the lead component. Founded on the Space-Based Environmental Monitoring (SBEM) Analysis of Alternatives (AoA) results, the WSF will be to enable:

1) Timely weather collection over broad oceans in support of maneuvering forces;
2) Space weather capabilities to characterize operational orbits, space situational awareness, and the ionosphere.

Secondary investments may be supported to address weather gaps identified in the SBEM AoA and validated by the JROC.

COWVR is an on-orbit demonstration project of the new COWVR technology to deliver Weather Gap #3, Ocean Surface Vector Winds (OSVW) and Gap #8, Tropical Cyclone Intensity (TCI).

ECP supports the SBEM Weather Gap #11, Low Earth Orbit Energetic Charged Particle Characterization. To support this requirement, the ECP sensor will be integrated on the WSF-M satellites.

Space acquisition must respond with speed and agility to emerging adversary threats. SSC has transformed 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, SSC 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 WSF for weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206422SF *I Weather System Follow-on*	

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	1.438	48.870	69.333	0.000	69.333
Current President's Budget	1.368	48.720	79.727	0.000	79.727
Total Adjustments	-0.070	-0.150	10.394	0.000	10.394
• Congressional General Reductions	-0.049	-0.150			
• 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	-0.021	0.000	10.394	0.000	10.394

Change Summary Explanation

FY 2022: -$0.0212M realign funding to APPN3620, PE 99999S, for cancelled year bill.

FY 2022: -$0.049M for Congressional General Reduction

FY 2023: -$0.150M for Congressional General Reduction

FY 2024: +$10.562M; transferred from PE 1206422SF, Weather System Follow-On, Project 644289, Weather Satellite Follow-On, Budget Activity, BA 4, to PE 1206442SF, Weather System Follow-On, Project 65A039, WSF-M, BA 5 to capture residual budget.

FY 2024: -$0.5M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +$0.4M; inflation rates for Non-Pay and Non-Fuel purchases.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206422SF / *Weather System Follow-on*	Project (Number/Name) 65A038 / *SSA Environmental Monitoring*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
65A038: *SSA Environmental Monitoring*	-	1.368	1.438	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.806
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Situational Awareness Environmental Monitoring (SSAEM) program is a non-ACAT, Class D technology demonstration project to support the international Constellation Observing System for Meteorology, Ionosphere and Climate 2 (COSMIC-2) mission. The SSAEM program provides the acquisition, development and launch/on-orbit support of 18 space/terrestrial weather sensors to COSMIC-2 partnership in coordination with National Oceanic and Atmospheric Administration (NOAA) and Taiwan's National Space Organization (NSPO). COSMIC-2 launched six satellites in an equatorial, Low Earth Orbit (LEO) with 3 SSAEM sensors in each spacecraft in FY 2019. The sensor types are Tri-Global Navigation Satellite System (Tri-GNSS) Radio occultation System (TGRS), Ion Velocity Meter (IVM) and Radio Frequency Beacon (RFB). The SSAEM sensors will address three distinct Joint Requirement Oversight Committee (JROC)-approved Category A weather gaps, specifically Gap #4 (Ionospheric Density), Gap #7 (Equatorial Ionospheric Scintillation) and Gap #12 (Electric Field), to provide additional space meteorological data to improve forecast capabilities and improve warfighter navigation/communication capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SSAEM for weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

The RFB ground station equipment will be transferred to AFRL to continue development and potential fielding options for future ops capability. Operational fixes for TGRS begin 1QFY23 and IVM validation finalizes later in FY 2023. Design life has extended through FY 2028 due to system performance exceeding expectations.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Situational Awareness Environment Monitoring (SSAEM)	1.368	1.438	0.000
Description: The SSAEM program provides the acquisition, development and launch/on-orbit support of 18 space/terrestrial weather sensors to COSMIC-2 partnership in coordination with National Oceanic and Atmospheric Administration (NOAA) and Taiwan's National Space Organization (NSPO). ***FY 2023 Plans:*** Continue development and improvement of operationalized products for USSF/Navy models. Adapt existing data readings based on emerging user needs. Improve terrestrial and space weather data capture in terms of quality and latency in cooperation with National Oceanic and Atmospheric Administration (NOAA) and Taiwan's National Space Organization (NSPO) Taiwan. Complete fielding and transition of RFB to AFRL. Evaluate and adapt to emerging solar maximum environment to ensure constellation health and longevity as the program is transitioned to sustainment after FY 2024. Rapidly respond to implement system resiliency and			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 65A038 / *SSA Environmental Monitoring*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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 2024 Plans:*** N/A. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A.			
Accomplishments/Planned Programs Subtotals	1.368	1.438	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

SSAEM post-launch and cal/val support contract is the sole-source contract to University Corporation Atmospheric Research due to their expertise in radio occultation and space weather monitoring for SSAEM sensors. The Justification & Approval (J&A) was approved in June 2018 and the Request for Proposal was released on August 1st, 2018. The contract was awarded in July 2019 for 5-years of post-launch cal/val and on-orbit support.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206422SF / *Weather System Follow-on*	Project (Number/Name) 65A038 / *SSA Environmental Monitoring*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
UCAR Sensor R&D	SS/CPFF	UCAR : TBD	-	0.550	Nov 2021	0.625	Nov 2022	-		-		-	Continuing	Continuing	-
On-Orbit Support (UCAR/ JPL)	MIPR	UCAR/JPL : Boulder, CO	-	0.178	Nov 2021	0.395	Nov 2022	-		-		-	Continuing	Continuing	-
Ground Support	Various	Various : TBD	-	0.278	Nov 2021	0.072	Nov 2022	-		-		-	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA	-	0.150	Nov 2021	0.104	Nov 2022	-		-		-	Continuing	Continuing	-
SBIR/STTR	Various	TBD : TBD	-	-		-		-		-		-	Continuing	Continuing	-
		Subtotal	-	1.156		1.196		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp : El Segundo, CA	-	0.212	Nov 2021	0.242	Nov 2022	-		-		-	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		0.000	May 2023	-		-		-	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		0.000	Nov 2022	-		-		-	Continuing	Continuing	-
		Subtotal	-	0.212		0.242		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.368		1.438		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 65A038 / *SSA Environmental Monitoring*

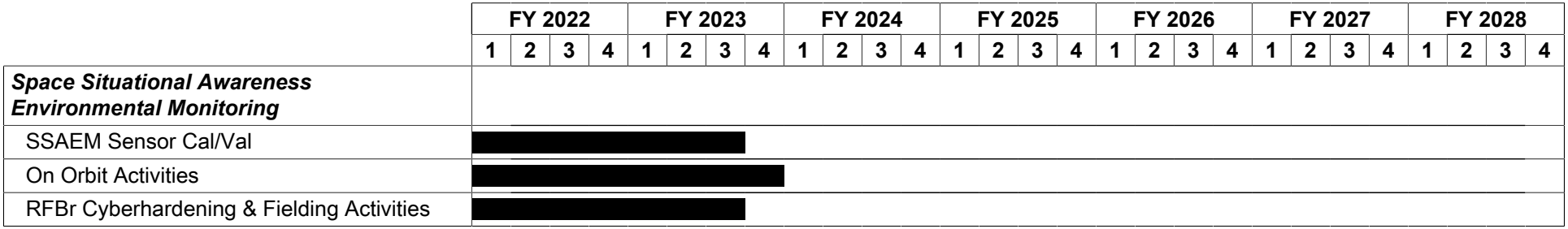

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 65A038 / *SSA Environmental Monitoring*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Situational Awareness Environmental Monitoring				
SSAEM Sensor Cal/Val	1	2022	3	2023
On Orbit Activities	1	2022	4	2023
RFBr Cyberhardening & Fielding Activities	1	2022	3	2023

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206422SF / *Weather System Follow-on*	Project (Number/Name) 65A039 / *WSF-M*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
65A039: *WSF-M*	-	0.000	47.282	79.727	0.000	79.727	50.884	37.748	33.553	27.902	0.000	277.096
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2023, PE 1206422SF, Weather System Follow-On, Project 644289, Weather Satellite Follow-On, R-1 Line #8 efforts were transferred to PE 1206422SF, Weather System Follow-On, Project 65A039, Weather System Follow-on - Microwave (WSF-M), R-1 Line #20 reflecting the successful completion of Milestone B on 15 May 2020. Residual budget in FY 2024 - FY 2025 has transferred from BA 4 to BA 5 in this budget cycle.

The Weather Satellite Follow-on - Microwave (WSF-M) Project 65A039 includes funds for the WSF-M system, the Compact Ocean Wind Vector Radiometer (COWVR) technology demonstration, and the Energetic Charged Particle (ECP) sensor development.

Weather System Follow-on (WSF) is a Low-Earth Orbit (LEO) microwave imaging system developed and delivered by the United States Space Force's Space Systems Command (SSC). WSF is the next generation of space-based passive microwave sensing technology. It will provide U.S. and Allied warfighters with essential weather data, including the measurement of ocean surface wind speed and direction, ice thickness, snow depth, soil moisture, and local spacecraft energetic charged particle environment. The ocean surface wind speed measurement enables tropical cyclone intensity determination by the Joint Typhoon Warning Center. The data gathered by WSF will be provided to meteorologists in support of the generation of a wide variety of weather products necessary to conduct mission planning and operations globally.

WSF is an Acquisition Category IB program comprised of two Space Vehicles (SV) and their associated command, control, and data dissemination network. Global environmental monitoring data is gathered, stored, and down-linked through the Satellite Control Network (SCN) and disseminated to Air Force and Navy weather centers. Additionally, data is broadcast real time by the satellite for utilization by heritage Direct Readout Terminals that use the data for local weather forecasting.

WSF is a Major Defense Acquisition Program (MDAP) with the Space Force as the lead component. Founded on the Space-Based Environmental Monitoring (SBEM) Analysis of Alternatives (AoA) results, the WSF will be to enable:

1) Timely weather collection over broad oceans in support of maneuvering forces;
2) Space weather capabilities to characterize operational orbits, space situational awareness, and the ionosphere.

Secondary investments may be supported to address weather gaps identified in the SBEM AoA and validated by the JROC.

COWVR is an on-orbit demonstration project of the new COWVR technology to deliver Weather Gap #3, Ocean Surface Vector Winds (OSVW) and Gap #8, Tropical Cyclone Intensity (TCI).

ECP supports the SBEM Weather Gap #11, Low Earth Orbit Energetic Charged Particle Characterization. To support this requirement, the ECP sensor will be integrated on the WSF-M satellites.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 65A039 / *WSF-M*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: WSF Microwave Satellite (SV1-2)	0.000	45.377	76.981
Description: Develop, build, integrate, and test the WSF Microwave (WSF-M) satellites, including bus, payloads, and ground upgrades to satisfy JROC-directed SBEM Capability gaps. ***FY 2023 Plans:*** Complete WSF-M Ground Segment Integration & Test. Complete SV-1 I&T, to include, but not limited to Day-In-The-Life testing. Conduct SV-1 pre-ship review ahead of shipment of SV-1 to payload processing facility for launch processing. Execute pre-priced contract to manufacture and build of SV-2 to include payload and spacecraft unit and subsystems production, integration and test. 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 2024 Plans:*** Launch, early orbit, checkout, calibration and validation and Initial Operational Capability of WSF-M SV-1. Continue manufacturing and build of SV-2 to include payload and spacecraft unit and subsystems production. Begin SV-2 spacecraft and payload I&T. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding increased due to parallel SV-1 early orbit and operational testing in addition to continuation of SV-2 production and subsystem I&T.			
Title: COWVR Tech Demo	0.000	1.600	1.640
Description: The Compact Ocean Wind Vector Radiometer (COWVR) launch objective supports Category A Weather Requirements, as codified in JROC Memo 092-014, providing on-orbit technology demonstration of the new COWVR technology to deliver Weather Gap #3, Ocean Surface Vector Winds (OSVW) and Gap #8, Tropical Cyclone Intensity (TCI). This is a cooperative mission with NASA for integrating the sensor onto the International Space Station (ISS) as a weather technology demonstration project. The mission designation for the COWVR is Space Test Program Houston Mission #8 (STP-H8). Demonstrating COWVR technology in the space environment remains an important milestone for the microwave data weather mission in lieu of the ORS-6 cancellation. Unlike ORS-6, COVWR flying on the ISS and the residual operational capability is guaranteed by NASA through December 2024. ***FY 2023 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 65A039 / *WSF-M*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Complete the COWVR sensor calibration and validation onboard the ISS. Continue operating the sensor and gathering data for potential inclusion into current weather models. This funding includes but is not limited to payload commanding, data interpretation and dissemination, and other ground operational support. ***FY 2024 Plans:*** Continue operating the sensor and gathering data for potential inclusion into current weather models. This funding includes but is not limited to payload commanding, data interpretation and dissemination, and other ground operational support. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increase due to operational life has been extended through FY based on ISS availability.			
Title: ECP ***Description:*** Energetic Charged Particles (ECP) will support the SBEM Weather Gap 11 and address the Secretary of the Air Force (SECAF) policy which directed each Space Force Satellite Office to plan for ECP sensors on all pre-Milestone B satellite acquisitions. To support this requirement, the ECP sensor will be integrated on the WSF-M satellites. ***FY 2023 Plans:*** Continue support for system integration activities. Complete WSF-M ECP sensor data processing software and pre-launch efforts. ***FY 2024 Plans:*** Begin integration and test of ECP payload for SV-2. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding decreased due to completion of ECP integration and test with WSF-M SV-1 in FY23.	0.000	0.305	1.106
Accomplishments/Planned Programs Subtotals	0.000	47.282	79.727

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

E. Acquisition Strategy

The acquisition strategy for WSF is based on validated SBEM AoA results from FY 2014 and subsequent acquisition strategy development activities that were conducted in FY 2015. The WSF acquisition strategy focuses on streamlined acquisition processes for providing materiel solutions to OSVW, TCI & LEO ECP, as validated by the JROC; deliver microwave sensing solution to address DoD needs for OSVW and TCI capabilities and deliver space environment sensing solution to address LEO ECP capabilities for on-orbit attributions and support of anomaly resolutions.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 65A039 / *WSF-M*

The Space Force is conducting a technology demonstration of the Compact Ocean Wind Vector Radiometer (COWVR) sensor on the International Space Station (ISS), utilizing its unique technology demonstration capabilities for on-orbit demonstration of COWVR technology. The Space Systems Command (SSC) Space Test Program Office is the lead Space Force organization spearheading the NASA partnership, with the SSC Space Sensing (SN) Directorate responsible for the COWVR sensor and providing programmatic support to enable COWVR sensor to ISS integration/technology demonstration.

The program awarded a contract for WSF-M with up to two satellites through a full and open competition. The WSF-M first satellite (SV-1) Initial Launch Capability is 1st quarter FY 2024. The pre-priced WSF-M SV-2 option was exercised in Nov 2022. WSF-M SV-2 ILC is 3rd quarter FY 2027. The WSF SV-2 will be functionally equivalent to SV-1. The Naval Research Lab Blossom Point Tracking Facility (BPTF) will be the Satellite Operations Center (SOC) for WSF-M.

The WSF ECP sensor is developed by AFRL and will be integrated onto the WSF-M satellites.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206422SF / *Weather System Follow-on*	Project (Number/Name) 65A039 / *WSF-M*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
WSF COWVR Technology Demonstration	Various	Various : TBD	-	-		2.384	Apr 2023	1.640	Apr 2024	-		1.640	0.000	4.024	-
WSF Microwave System (SV1-2)	C/CPFF	Ball Aerospace, : Boulder, CO	-	-		26.629	Nov 2022	53.625	Nov 2023	-		53.625	0.000	80.254	505.466
WSF ECP	C/Various	Various : Various	-	-		0.305	Jan 2023	1.106	Jan 2024	-		1.106	0.000	1.411	-
WSF Enterprise Systems Engineering & Integration	C/CPAF	Engility Corp : Andover, MA	-	-		2.106	Nov 2022	2.325	Nov 2023	-		2.325	0.000	4.431	-
WSF Technical Mission Analysis	RO	Aerospace Corp. : El Segundo, CA	-	-		5.645	Nov 2022	7.102	Nov 2023	-		7.102	0.000	12.747	-
WSF Blossom Point Naval Research Laboratory	MIPR	NRL : Welcome, MD	-	-		3.246	Dec 2022	4.017	Dec 2023	-		4.017	0.000	7.263	-
SBIR/STTR	Various	Not specified. : TBD	-	-		1.563		2.790		-		2.790	0.000	4.353	-
		Subtotal	-	-		41.878		72.605		-		72.605	0.000	114.483	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
WSF FFRDC	RO	Aerospace Corp : El Segundo, CA	-	-		2.419	Nov 2022	3.342	Nov 2023	-		3.342	0.000	5.761	-
WSF A&AS	Various	Various : El Segundo, CA	-	-		2.777	Feb 2023	3.572	Feb 2024	-		3.572	0.000	6.349	-
WSF Other Support	Various	Various : El Segundo, CA	-	-		0.208	Nov 2022	0.208	Nov 2023	-		0.208	0.000	0.416	-
		Subtotal	-	-		5.404		7.122		-		7.122	0.000	12.526	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		47.282		79.727		-		79.727	0.000	127.009	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 65A039 / *WSF-M*

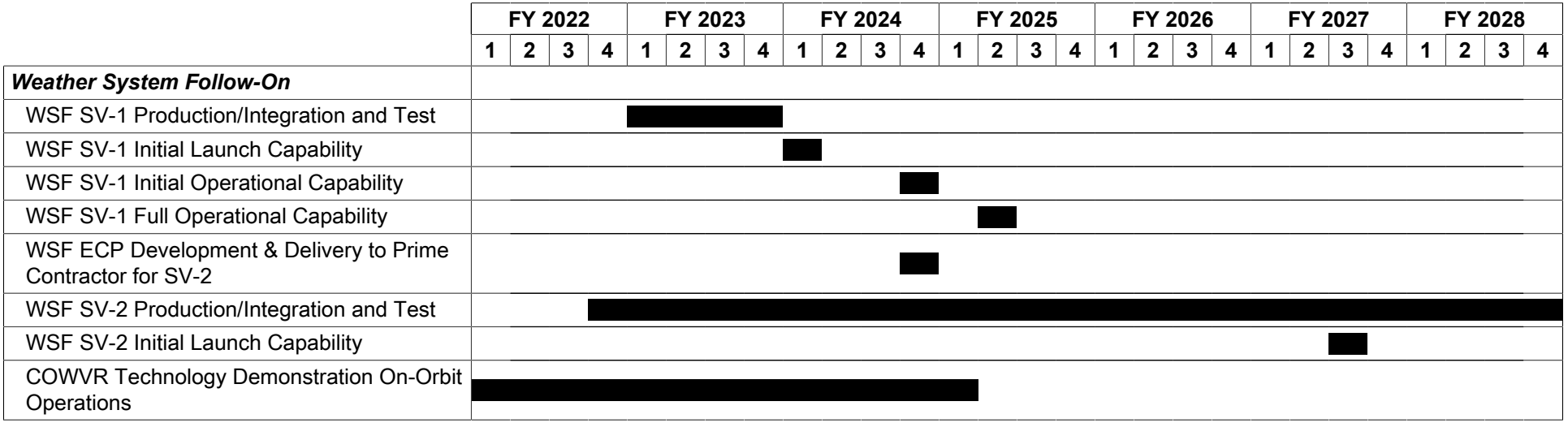

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206422SF / *Weather System Follow-on*	**Project (Number/Name)** 65A039 / *WSF-M*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Weather System Follow-On				
WSF SV-1 Production/Integration and Test	1	2023	4	2023
WSF SV-1 Initial Launch Capability	1	2024	1	2024
WSF SV-1 Initial Operational Capability	4	2024	4	2024
WSF SV-1 Full Operational Capability	2	2025	2	2025
WSF ECP Development & Delivery to Prime Contractor for SV-2	4	2024	4	2024
WSF SV-2 Production/Integration and Test	4	2022	4	2028
WSF SV-2 Initial Launch Capability	3	2027	3	2027
COWVR Technology Demonstration On-Orbit Operations	1	2022	1	2025

Note

FY 2021 and FY 2022 scheduled activities are captured within the budget justification exhibit for program 1206422SF, Weather System Follow-On, Project 644289, Weather Satellite Follow-On, R-1 Line #6.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206425SF / *Space Situation Awareness Systems*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	123.074	96.940	372.827	0.000	372.827	470.054	456.360	465.691	482.513	Continuing	Continuing
656565: *Ground Based SDA*	-	0.000	0.000	214.739	0.000	214.739	254.116	287.802	293.689	304.298	0.000	1,354.644
65A006: *Space Based SDA*	-	123.074	96.940	115.636	0.000	115.636	165.084	156.205	159.395	165.154	0.000	981.488
65A037: *Ground Based Optical Sensor*	-	0.000	0.000	42.452	0.000	42.452	50.854	12.353	12.607	13.061	Continuing	Continuing

Note

In FY 2024, Project 656565, Deep Space Advanced Radar Concept efforts were transferred from PE 1206425SF, Space Situation Awareness Systems, Project 640290, Deep Space Advanced Radar Concept in order to properly align the budget activity to current efforts.

In FY 2024, Project 65A037, Ground Based Optical Sensor System efforts were transferred from PE 1203940SF, Space Situation Awareness Operations, Project 65A037, Ground Based Optical Sensor System in order to properly align the budget activity to current efforts.

A. Mission Description and Budget Item Justification

Space Domain Awareness (SDA) is one of five core competencies of the Space Force and is the effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain that could affect space operations and thereby impact the security, safety, economy, or environment of our nation. As the foundation for space control, SDA encompasses surveillance of all space objects and activities; detailed surveillance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering indications and warning on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities.

This program element develops new network sensors and improved information integration capabilities across the space surveillance network (SSN) while companion program element 1203940SF fields, upgrades, operationalizes, operates, and maintains Space Force sensors and information integration capabilities within the SSN. Activities funded in this program element (1206425SF) also support efforts such as engineering studies and analyses, architectural engineering studies, trade studies, technology needs forecasting, modernization initiatives, systems engineering, system development, and test & evaluation, and may include prototyping and technology demonstration.

Deep Space Advanced Radar Capability (DARC) is a ground-based, SDA radar system to detect, track, and maintain custody of deep space objects 24/7, through the solar exclusion gap. DARC will augment the SSN as an additional sensor with increased capacity and capability for deep space object custody, providing full global coverage.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awareness Systems*

The total cost of the DARC Site 1 Middle Tier of Acquisition effort is 844.62M, including RDT&E and procurement of prototype units. DARC Site 1 is not fully funded across the Future Years Defense Program. The Department of the Air Force is assessing all options to address the funding shortfalls for MTA programs including additional funding in a future budget request, performance trades based on technical maturity, or transition to alternative pathways.

The Space-Based Space Surveillance (SBSS) Block 10 satellite was launched September 2010 with a design life through 2017 and an extended operational capability now expected through 2030. The SBSS Follow-On (SBSS FO) program will develop and deliver a system to continue providing space object surveillance from space beyond SBSS Block 10 End-of-Life. The United States Space Force (USSF) and National Reconnaissance Office (NRO) have signed a Memorandum of Agreement partnering SBSS FO with an NRO program based on overlapping requirements. The new partner program is called Space Based SDA. Space Based SDA will develop and deliver a system to continue providing space object surveillance from space. The United States Space Force (USSF) and National Reconnaissance Office (NRO) have partnered on the Space Based SDA program to meet overlapping requirements. Space Based SDA enables timely detection and custody of on orbit threats in order to protect US High Value Assets in space in support of the National Defense Strategy.

Space Based SDA requirements are based on a Statement of Capabilities and upon the current Space Domain Awareness (SDA) Initial Capabilities Document architectural requirements focused on protecting High Value Assets. Space Based SDA will provide the capability to search, detect, and track objects from a space-based sensor for timely custody and event detection. Surveillance from space augments and overcomes existing ground sensor limitations with timely 24-hour above-the-weather collection of satellite metric data only possible with a space-based sensor. This data is communicated to operators at the Combined Space Operations Center (CSpOC), National Space Defense Center (NSDC), and other classified users. This program element includes efforts related to Space Based SDA, its integration into the broader space superiority architecture, and analysis and experimentation to ensure space-based space surveillance capabilities against the evolving threat.

Ground Based Optical Sensor System (GBOSS) includes an upgrade to the Ground-based Electro-Optical Deep Space Surveillance (GEODSS) system that enables GEODSS to monitor small, closely-spaced, and advanced threats in low, mid, high, and geostationary orbits. The upgraded system will discover currently undetectable space threats, reduce an adversary's tactical surprise and deliver the data required to support accurate, timely, actionable SDA. This facilitates decision-making within the compressed timelines dictated by the realities of the congested, contested, competitive space domain. The program delivers a combination of performance upgrades to existing GEODSS sites, including advanced data exploitation and rapid data dissemination, and will incorporate coalition data, commercial data and/or new GEODSS sites to provide a global capability to positively ID an adversary committing an orbital attack. The program includes updates to the GEODSS image processing and optical subsystems that will enhance the sensitivity and search rate, and fields new multi-spectral advanced technology sensors supporting extended operations, high-fidelity characterization, enhanced indications and warnings (I&W), and attribution.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space and Ground Based SDA and Ground Based Optical system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF. For Space Based SDA in PY 0.220M was expended for civilian pay expenses in this program element, and in CY 0.225M is forecasted for civilian pay expenses in this program element.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force					Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*			R-1 Program Element (Number/Name) PE 1206425SF / *Space Situation Awareness Systems*		
B. Program Change Summary ($ in Millions)	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**
Previous President's Budget	127.026	105.140	115.879	0.000	115.879
Current President's Budget	123.074	96.940	372.827	0.000	372.827
Total Adjustments	-3.952	-8.200	256.948	0.000	256.948
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-7.900			
• 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	-3.952	0.000			
• Other Adjustments	0.000	-0.300	256.948	0.000	256.948

Change Summary Explanation

FY 2023: -0.300M FFRDC reduction for Project 65A006, Space Based SDA.

FY 2024: +215.192M transferred from PE 1206425SF, Space Situation Awareness Systems, Project 640290, Deep Space Advanced Radar Concept, BA 04 efforts, in order to align the budget activity to current efforts, continue Site 1 design and development activities, purchases, construction and integration, and begin efforts for Sites 2 and 3.

FY 2024: +20.578M increase for Project 65A037, Ground Based Optical Sensor to fund program cybersecurity and Engineering and Manufacturing Design requirements.

FY 2024: +21.828M transferred from PE 1203940SF, Space Situation Awareness Operations, Project 65A037, Ground Based Optical Sensor, BA 05 efforts, in order to properly align the budget activity to current efforts, install the GEODSS Enhanced Tower upgrade at White Sands Missile Range (WSMR) and Maui and incorporate coalition and commercial data to mitigate optical sensor coverage gaps.

FY 2024: -2.319M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +1.669M inflation increase for non-pay and non-fuel purchases.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206425SF / *Space Situation Awarenes s Systems*	Project (Number/Name) 656565 / *Ground Based SDA*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
656565: *Ground Based SDA*	-	0.000	0.000	214.739	0.000	214.739	254.116	287.802	293.689	304.298	0.000	1,354.644
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2024, Project 656565, Deep Space Advanced Radar Concept efforts were transferred from PE 1206425SF, Space Situation Awareness Systems, Project 640290, Deep Space Advanced Radar Concept in order to properly align the budget activity to current efforts.

A. Mission Description and Budget Item Justification

Space Domain Awareness (SDA) is one of five core competencies of the Space Force and is the effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain that could affect space operations and thereby impact the security, safety, economy, or environment of our nation. As the foundation for space control, SDA encompasses surveillance of all space objects and activities; detailed surveillance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering indications and warning on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities.

This program element develops new network sensors and improved information integration capabilities across the space surveillance network (SSN) while companion program element 1203940SF fields, upgrades, operationalizes, operates, and maintains Space Force sensors and information integration capabilities within the SSN. Activities funded in this program element (1206425SF) also support efforts such as engineering studies and analyses, architectural engineering studies, trade studies, technology needs forecasting, modernization initiatives, systems engineering, system development, and test & evaluation, and may include prototyping and technology demonstration.

Deep Space Advanced Radar Capability (DARC) is a ground-based, SDA radar system to detect, track, and maintain custody of deep space objects 24/7, through the solar exclusion gap. DARC will augment the SSN as an additional sensor with increased capacity and capability for deep space object custody, providing full global coverage.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver DARC weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 656565 / *Ground Based SDA*

The total cost of the DARC Rapid Prototype Middle Tier of Acquisition (MTA) effort is 844.6M. DARC Site 1 is not fully funded across the Future Years Defense Program. The Department of the Air Force is assessing all options to address the funding shortfalls for MTA programs including additional funding in a future budget request, performance trades based on technical maturity, or transition to alternative pathways.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: DARC Site 1 Operational Capability	-	0.000	174.239
Description: The DARC MTA activity will develop, test, and deliver one DARC site with a current estimated completion date of CY 2025. It will also provide a foundation for up to two more future sites located strategically around the world to provide global deep space radar capability to support SDA. The system will be responsive to regularly scheduled and un-scheduled tasks to locate, identify, characterize deep space objects and report the results to Battle Management Command and Control locations and SSN. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** Continue Site 1 design and development activities including design reviews, hardware purchases, software development and integration, and construction. Continue construction of Site 1 including roads, buildings, utilities, foundation, and installation of all antenna structures. Perform additional site development efforts such as the construction of facility-support and site infrastructure to include backup generator buildings, fuel storage (tank farms), electrical substations for power site distribution, wastewater treatment/septic & leach, non-potable water storage/fire protection distribution (site & buildings), water treatment (potable) and physical security equipment to meet protection level 3 (PL3) requirements. Finalize plans for and begin implementing physical security for Site 1, to include any required equipment such as site perimeter fencing, and standalone fencing for both antenna arrays and site main power station to meet site safety requirements. Begin preparation for and install of fiber optics (COMM) as well as connection to existing and/or new infrastructure such as power grid, backup generators, and main water line. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to transfer of DARC effort to Budget Activity 05.			
Title: DARC Sites 2 and 3 Operational Capability	-	0.000	40.500
Description: The program will develop, test, and deliver DARC sites 2 and 3 with a current estimated completion date of CY 2027. The system will be responsive to regularly scheduled and un-scheduled tasks to locate, identify, characterize deep space objects and report the results to Battle Management Command and Control locations and SSN. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 656565 / *Ground Based SDA*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Begin Site 2 design and development activities including design reviews (Preliminary Design Review/Critical Design Review), hardware purchases, software development and integration, and construction. Initiate various pre-construction activities in preparation for full site construction. Finalize plans for and begin implementing physical security for Site 2, to include any required equipment such as site perimeter fencing, and standalone fencing for both antenna arrays and site main power station to meet site safety requirements. Begin preparation for and install of fiber optics (COMM) as well as connection to existing and/or new infrastructure such as power grid, backup generators, and main water line. Complete purchases for all long-lead facility equipment for Site 2 as rapidly as possible in order to minimize schedule, these will have been initiated in parallel with completing required Environmental Analysis. Begin Site 3, Environmental Impact Assessment (EIA), Federal Aviation Agency (FAA) airspace negotiations and the security posture evaluation. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to start of Sites 2 and 3 activities.			
Accomplishments/Planned Programs Subtotals	-	0.000	214.739

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Project utilizes existing DoD engineering and study contracts and activities to conduct science and technology development and data analysis activities. Preliminary/ critical design effort for the technology maturation and prototype commenced in FY 2017. A Broad Agency Announcement (BAA) was used to award seven Integrated System Engineering Team (ISET) contracts which allow for organizations to participate, advise the government, and gain insight into the prototype design and build. In May of 2019, DARC was designated as an MTA under Section 804 of the 2016 National Defense Authorization Act (NDAA). In 2020, DARC was directed to pursue a Rapid Prototyping Middle Tier Acquisition program for Site 1. The DARC Site effort will be executed through two separate contract elements: The Prime System Integrator (PSI) was awarded to Northrop Grumman Inc. via a single, competitive award through the Space Enterprise Consortium (SpEC) Other Transaction Authority (OTA) agreement and third-party software development through multiple SpEC OTA agreements. The Space Force intends to develop and field two additional DARC sites to culminate in a final operational system of three global sites to ensure SDA coverage. A follow-on MTA pathway strategy based on the success of the Site 1 rapid prototype and an MTA transition plan are being developed for Sites 2 and 3 in accordance with DoDI 5000.80.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206425SF / *Space Situation Awarenes s Systems*	Project (Number/Name) 656565 / *Ground Based SDA*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DARC System Development Site 1	C/CPIF	Northrop Grumman : Colorado Springs, CO	-	-		-		147.642	Nov 2023	-		147.642	Continuing	Continuing	-
DARC System Development Site 2/3	C/TBD	TBD : TBD	-	-		-		40.500	Feb 2024	-		40.500	Continuing	Continuing	-
DARC Technical Mission Analysis	Various	Various : Various	-	-		-		6.381	Jan 2024	-		6.381	Continuing	Continuing	-
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		7.482	Oct 2023	-		7.482	Continuing	Continuing	-
		Subtotal	-	-		-		202.005		-		202.005	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DARC Test Support	Various	Various : Various	-	-		-		1.932	Feb 2024	-		1.932	Continuing	Continuing	-
		Subtotal	-	-		-		1.932		-		1.932	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	-		-		8.347	Nov 2023	-		8.347	Continuing	Continuing	-
FFRDC	RO	MITRE Corp : Colorado Springs, CO	-	-		-		2.355	Nov 2023	-		2.355	Continuing	Continuing	-
Other Support	Various	Various : Colorado Springs, CO	-	-		-		0.100	Oct 2023	-		0.100	Continuing	Continuing	-
		Subtotal	-	-		-		10.802		-		10.802	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206425SF / *Space Situation Awarenes s Systems*	Project (Number/Name) 656565 / *Ground Based SDA*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		214.739		-		214.739	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 656565 / *Ground Based SDA*

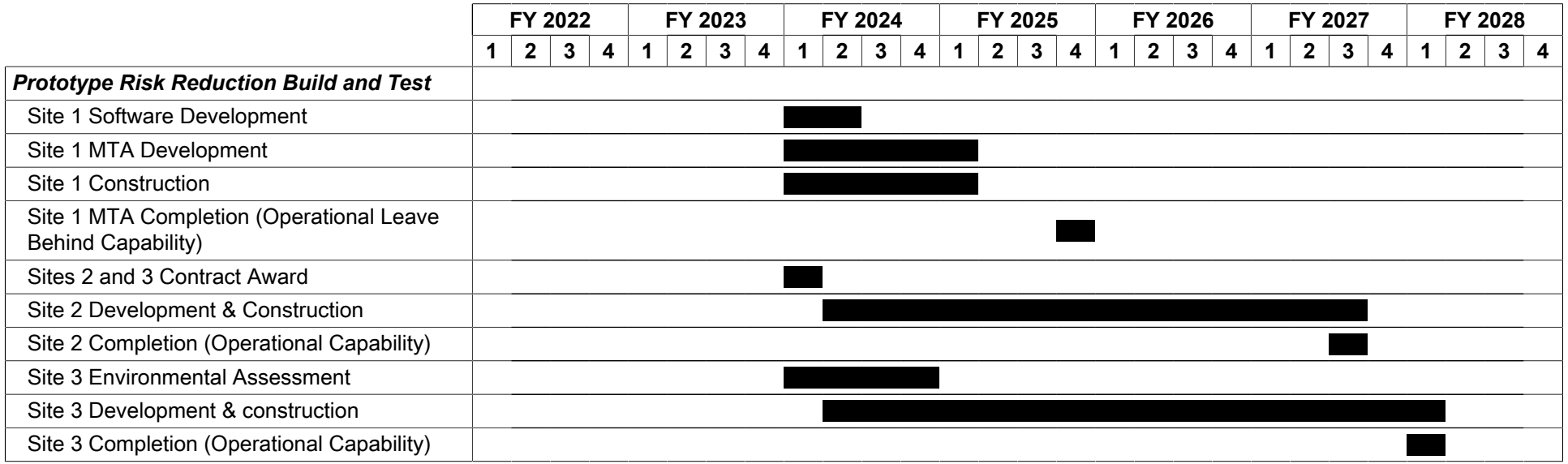

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 656565 / *Ground Based SDA*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Prototype Risk Reduction Build and Test				
Site 1 Software Development	1	2024	2	2024
Site 1 MTA Development	1	2024	1	2025
Site 1 Construction	1	2024	1	2025
Site 1 MTA Completion (Operational Leave Behind Capability)	4	2025	4	2025
Sites 2 and 3 Contract Award	1	2024	1	2024
Site 2 Development & Construction	2	2024	3	2027
Site 2 Completion (Operational Capability)	3	2027	3	2027
Site 3 Environmental Assessment	1	2024	4	2024
Site 3 Development & construction	2	2024	1	2028
Site 3 Completion (Operational Capability)	1	2028	1	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206425SF / *Space Situation Awarenes s Systems*	Project (Number/Name) 65A006 / *Space Based SDA*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
65A006: *Space Based SDA*	-	123.074	96.940	115.636	0.000	115.636	165.084	156.205	159.395	165.154	0.000	981.488
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Space Domain Awareness (SDA) is one of five core competencies of the Space Force and is the effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain that could affect space operations and thereby impact the security, safety, economy, or environment of our nation. As the foundation for space control, SDA encompasses surveillance of all space objects and activities; detailed surveillance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering indications and warning on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities.

This program element develops new network sensors and improved information integration capabilities across the space surveillance network (SSN) while companion program element 1203940SF fields, upgrades, operationalizes, operates, and maintains Space Force sensors and information integration capabilities within the SSN. Activities funded in this program element (1206425SF) also support efforts such as engineering studies and analyses, architectural engineering studies, trade studies, technology needs forecasting, modernization initiatives, systems engineering, system development, and test & evaluation, and may include prototyping and technology demonstration.

Space Based SDA will develop and deliver a system to continue providing space object surveillance from space. The United States Space Force (USSF) and National Reconnaissance Office (NRO) have partnered on the Space Based SDA program to meet overlapping requirements. Space Based SDA enables timely detection and custody of on orbit threats in order to protect US High Value Assets in space in support of the National Defense Strategy.

Space Based SDA requirements are based on a Statement of Capabilities and upon the current Initial Capabilities Document architectural requirements focused on protecting High Value Assets. Space Based SDA will provide the capability to search, detect, and track objects from a space-based sensor for timely custody and event detection. Surveillance from space augments and overcomes existing ground sensor limitations with timely 24-hour above-the-weather collection of satellite metric data only possible with a space-based sensor. This data is communicated to operators at the Combined Space Operations Center (CSpOC), National Space Defense Center (NSDC), and other classified users. This project includes efforts related to Space Based SDA, its integration into the broader space superiority architecture, and analysis and experimentation to ensure space-based space surveillance capabilities against the evolving threat.

This project also evaluates affordable Space-Based SDA replenishment options to provide system resiliency and situational awareness necessary to operate in the contested space domain studies through technical analysis, risk reduction experiments, affordable prototyping, and partnership with Air Force Research Laboratory (AFRL). In addition, this program leverages opportunities for space-based commercial, international partnerships, and hosted payloads to support the SDA mission.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase innovation and resiliency, leveraging international, commercial, and mission partnerships,

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 65A006 / *Space Based SDA*

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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space Based SDA weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF. For Space Based SDA in PY 0.220M was expended for civilian pay expenses in this program element, and in CY 0.225M is forecasted for civilian pay expenses in this program element.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space-Based Space Domain Awareness (SDA)	123.074	96.940	115.636
Description: SDA includes effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain. Performs space-based SDA analysis, research, and development for the SILENTBARKER system in partnership with the NRO. ***FY 2023 Plans:*** Conduct Pre-Ship Review (PSR) in preparation for launch of the first increment. SILENTBARKER launch of the first increment in addition to on-orbit support to prepare for Initial Operational Capability (IOC). Continue development of SILENTBARKER expansion assets to increase coverage for deep-space SDA. Conduct Critical Design Review (CDR) for expansion effort. Continue implementation and operationalize ground mission data processing and data dissemination efforts in support of Space-Based SDA ground requirements. Continue technology enhancements to ensure space-based space surveillance capabilities against the evolving threat for future upgrades, extensions, and augmentations through analysis, prototyping, and experimentation. Additionally, FY 2023 funding will continue planning for Space-Based SDA hosted payloads and affordable replenishment activities and allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. In addition will leverage future low-cost replenishment opportunities for SDA space-based commercial, international partnerships, and AFRL partnerships to include cislunar. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and affordable prototyping, integration and test of command and control (C2), resiliency measures and mission partner interfaces, space test/ combat range events, and office support, etc. ***FY 2024 Plans:*** Provide on-orbit support for SILENTBARKER Baseline in order to meet Initial Operational Capability (IOC). Continue development of SILENTBARKER Expansion increment to meet Full Operational Capability (FOC) for deep-space SDA. Continue implementation of mission data processing and data dissemination efforts supporting SILENTBARKER and other SDA prototyping efforts.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 65A006 / *Space Based SDA*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue technology enhancements and prototyping efforts for space-based space domain surveillance against evolving threats, to include: future upgrades, extension and augmentations through analysis, demonstration, and experimentation. Prepare and conduct SDA hosted payload integration on a commercial host for launch in FY 2025. Additionally, FY 2024 funding will continue prototype efforts for SDA Hosted Payload (HP) efforts for a second prototype payload and expanded payload characterization tests. FY 2024 funding supports the launch and experiment operations for the AFRL and SSC partnership prototype programs such as the Oracle-M Defense Deep Space Sentinel (D2S2) satellites, enabling critical low-cost space based experimentation, expanding USSF SDA operations in Cislunar to counteract evolving threat activity. FY 2024 will continue activities for implementation of system resiliency and situational awareness necessary to operate in the contested space domain environment. In addition, FY 2024 will leverage opportunities for SDA space-based commercial, international partnerships, and AFRL partnerships. Activities may include, but are not limited to: studies, technical analysis, risk reduction, pre-acquisition activities, affordable prototyping, integration and test of command and control (C2), resiliency measures, mission partner interfaces, space test/combat range events and office support, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding increased because the annually allocated amounts fluctuate per the 50/50 cost sharing USSF-NRO Interagency Agreement.			
Accomplishments/Planned Programs Subtotals	123.074	96.940	115.636

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Acquisition Strategy was approved to minimize the space-based SDA gap post-SBSS Block 10. SILENTBARKER anticipates Initial Launch Capability in FY 2023. The SBSS FO Materiel Development Decision was approved by the Milestone Decision Authority (MDA) on April 5, 2016. The Acquisition Strategy Panel was completed with the MDA on August 29, 2016. To satisfy the SDA architecture needs, the SBSS FO program requirements combined with an NRO program and were updated in the December 2017 SILENTBARKER Statement of Capabilities. The Space Force is partnered with the NRO on SILENTBARKER space segment and telemetry, tracking, and commanding (TT&C) program segments in order to further National Security Space objectives. Mutual investment for the non-recurring engineering (NRE) cost enables the potential for a larger initial constellation buy and lower unit costs. SILENTBARKER expansion contract was awarded Jun 2021 to extend capabilities past IOC.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 65A006 / *Space Based SDA*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Based SDA Development	MIPR	Various : Various	-	100.761	Dec 2021	80.982	Dec 2022	94.073	Dec 2023	-		94.073	Continuing	Continuing	-
Space Based SDA Technical Mission Analysis	Various	Various : Various	-	0.900	Nov 2021	0.831	Nov 2022	1.500	Nov 2023	-		1.500	Continuing	Continuing	-
Space Based SDA Enterprise SE&I	Various	Various : Various	-	1.600	Nov 2021	0.900	Nov 2022	1.450	Nov 2023	-		1.450	Continuing	Continuing	-
Space Based SDA SBIR/ STTR	Allot	TBD : TBD	-	-		-		4.029	Oct 2023	-		4.029	Continuing	Continuing	-
		Subtotal	-	103.261		82.713		101.052		-		101.052	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Based SDA Civilian Reimbursable Budget Authority	RO	SSC : El Segundo, CA	-	0.220	Dec 2021	0.225	Dec 2022	0.225	Dec 2023	-		0.225	Continuing	Continuing	-
		Subtotal	-	0.220		0.225		0.225		-		0.225	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Based SDA FFRDC	RO	Aerospace Corp : Los Angeles, CA	-	0.900	Nov 2021	0.831	Nov 2022	0.900	Nov 2023	-		0.900	Continuing	Continuing	-
Space Based SDA A&AS	Various	Various : Various	-	18.373	Jan 2022	12.831	Jan 2023	13.119	Jan 2024	-		13.119	Continuing	Continuing	-
Space Based SDA Other Support	Various	Various : Various	-	0.320	Mar 2022	0.340	Mar 2023	0.340	Mar 2024	-		0.340	Continuing	Continuing	-
		Subtotal	-	19.593		14.002		14.359		-		14.359	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206425SF / *Space Situation Awarenes s Systems*	Project (Number/Name) 65A006 / *Space Based SDA*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	123.074		96.940		115.636		-		115.636	Continuing	Continuing	N/A

Remarks

The Space Based SDA SILENTBARKER project has very minimal organic Space Force resources. The FY 2024 Management Services includes support to parallel efforts for both the SILENTBARKER Baseline and Expansion, including Space Force contributions for prepare for SILENTBARKER launch, check out, and on-orbit support as well as design reviews for SILENTBARKER Expansion. Additionally, non-recurring engineering investments require increased assistance and advisory services to enable integration of data products between intelligence community and Space Force infrastructure until integration is mature and stable.

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 65A006 / *Space Based SDA*

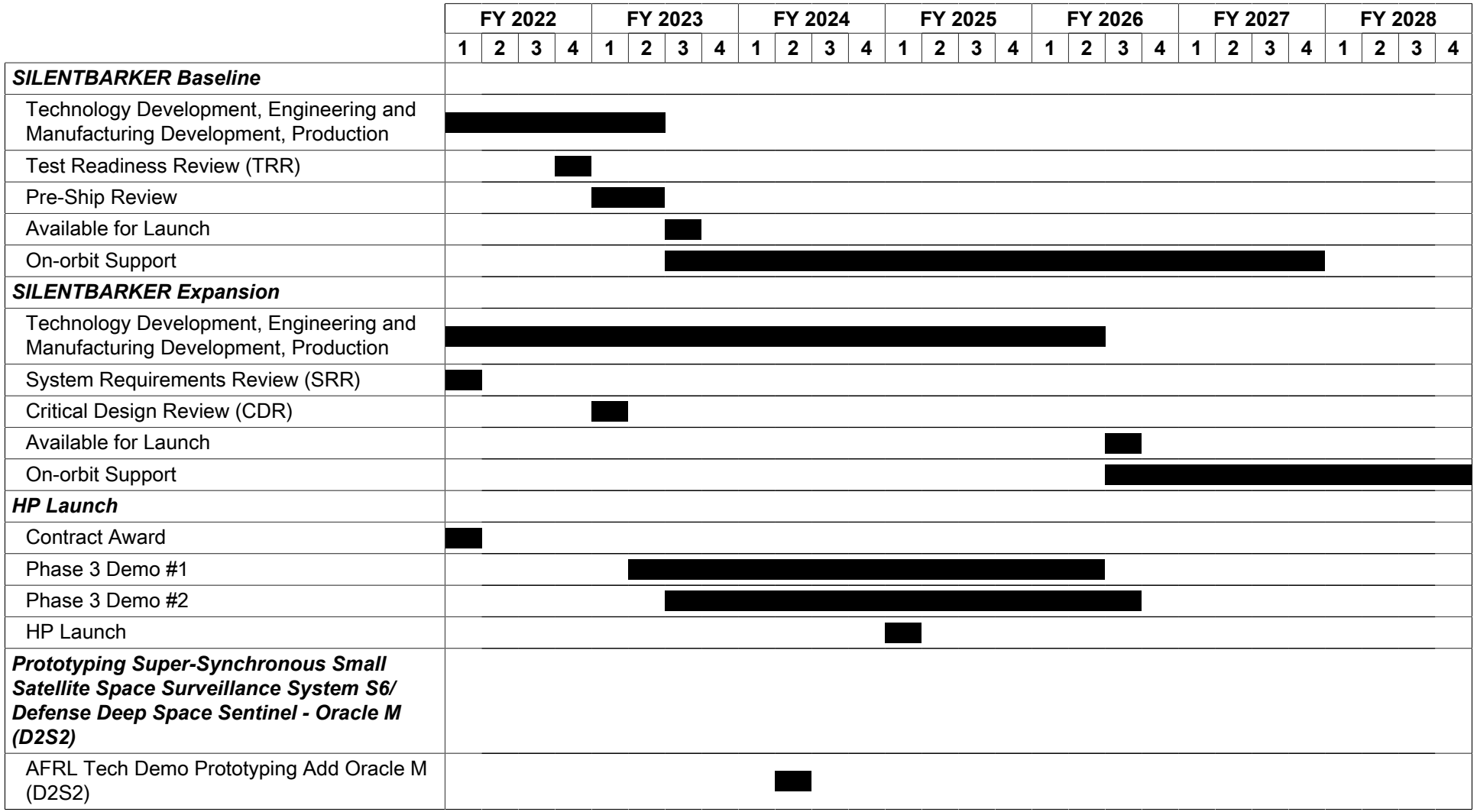

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 65A006 / *Space Based SDA*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SILENTBARKER Baseline				
Technology Development, Engineering and Manufacturing Development, Production	1	2022	2	2023
Test Readiness Review (TRR)	4	2022	4	2022
Pre-Ship Review	1	2023	2	2023
Available for Launch	3	2023	3	2023
On-orbit Support	3	2023	4	2027
SILENTBARKER Expansion				
Technology Development, Engineering and Manufacturing Development, Production	1	2022	2	2026
System Requirements Review (SRR)	1	2022	1	2022
Critical Design Review (CDR)	1	2023	1	2023
Available for Launch	3	2026	3	2026
On-orbit Support	3	2026	4	2028
HP Launch				
Contract Award	1	2022	1	2022
Phase 3 Demo #1	2	2023	2	2026
Phase 3 Demo #2	3	2023	3	2026
HP Launch	1	2025	1	2025
Prototyping Super-Synchronous Small Satellite Space Surveillance System S6/ Defense Deep Space Sentinel - Oracle M (D2S2)				
AFRL Tech Demo Prototyping Add Oracle M (D2S2)	2	2024	2	2024

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206425SF / *Space Situation Awarenes s Systems*	Project (Number/Name) 65A037 / *Ground Based Optical Sensor*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
65A037: *Ground Based Optical Sensor*	-	0.000	0.000	42.452	0.000	42.452	50.854	12.353	12.607	13.061	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2024, Project 65A037, Ground Based Optical Sensor System efforts were transferred from PE 1203940SF, Space Situation Awareness Operations, Project 65A037, Ground Based Optical Sensor System in order to properly align the budget activity to current efforts.

A. Mission Description and Budget Item Justification

Space Domain Awareness (SDA) is one of five core competencies of the Space Force and is the effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain that could affect space operations and thereby impact the security, safety, economy, or environment of our nation. As the foundation for space control, SDA encompasses surveillance of all space objects and activities; detailed surveillance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering indications and warning on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities.

This program element develops new network sensors and improved information integration capabilities across the space surveillance network (SSN) while companion program element 1203940SF fields, upgrades, operationalizes, operates, and maintains Space Force sensors and information integration capabilities within the SSN. Activities funded in this program element (1206425SF) also support efforts such as engineering studies and analyses, architectural engineering studies, trade studies, technology needs forecasting, modernization initiatives, systems engineering, system development, and test & evaluation, and may include prototyping and technology demonstration.

Ground Based Optical Sensor System (GBOSS) includes an upgrade to the Ground-based Electro-Optical Deep Space Surveillance (GEODSS) system which monitors small, closely-spaced, and advanced threats in low, mid, high, and geostationary orbits. The upgraded system will discover currently undetectable space threats, reduce an adversary's tactical surprise and deliver the data required to support accurate, timely, actionable SDA. This facilitates decision-making within the compressed timelines dictated by the realities of the congested, contested, competitive space domain. The program delivers a combination of performance upgrades to existing GEODSS sites, including advanced data exploitation and rapid data dissemination, and will incorporate coalition data, commercial data and/or new GEODSS sites to provide a global capability to positively ID an adversary committing an orbital attack. The program includes updates to the GEODSS image processing and optical subsystems that will enhance the sensitivity and search rate, and fields new multi-spectral advanced technology sensors supporting extended operations, high-fidelity characterization, enhanced indications and warnings (I&W), and attribution.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor*

authorities and contract mechanisms to deliver capability sooner, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose existing capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Ground Based Optical Sensor System (GBOSS)	-	0.000	42.452

Description: GBOSS provides a global, ground-based, optical sensor capability for Space Domain Awareness (SDA). The program implements advanced capabilities that may leverage coalition data, commercial data, and sophisticated exploitation algorithms to enhance system response and resiliency to operate in the contested space domain based on aggressive threats by our pacing-competitors, China and Russia. Ground Based Optical Sensor improves sensitivity, search rate, tracking of non-cooperative launches, precise tagging of clustered objects, detection of closely spaced dim objects, attribution of orbital attackers and delivers foundational technology to support data exploitation for advanced indications and warnings. This effort includes upgrading existing sensors, dissemination of all data to DoD and IC stakeholders via the Unified Data Library (UDL), and may field Ground Based Optical Sensor-enhanced GEODSS capabilities to new locations in accordance with USSF Leadership direction. The program will also acquire new advanced technology sensors to improve persistence and advanced multi-spectral data collection, enabling high-fidelity characterization and rapid attribution. The program will collaborate with Combined Space Operations Center (CSpOC), National Space Defense Center (NSDC), and National Air and Space Intelligence Center (NASIC) efforts to ensure enterprise data fusion and dissemination supporting Enterprise Space Battle Management Command, and Control (ESBMC2).

FY 2023 Plans:
N/A

FY 2024 Plans:
Complete the installation, contractor verification testing, and developmental testing of the GEODSS Enhanced Tower (GET) upgrade at the WSMR GEODSS site. Prepare for deployment of GET materials needed to upgrade the Maui GEODSS site. Incorporate coalition and commercial data to mitigate the Atlantic Optical Gap. Incorporate commercial data to help mitigate optical sensor coverage gaps over the Atlantic and Indo-Pacific regions.

FY 2024 funding will allow the program office to continue developing and fielding a resilient system necessary to operate in the contested space domain. Activities may include, but are not limited to: integration and test of command and control (C2) and mission partner interfaces, implementation of advanced data exploitation algorithms that may include pattern of life (PoL), advanced indications and warnings (I&W), enhanced defensive cyber operations resiliency measures, space test/combat range events, studies, technical analysis, risk reduction experiments, prototyping and program office support, etc.

FY 2023 to FY 2024 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 increased due to transfer of GBOSS effort from PE 1203940SF, Space Situation Awareness Operations.			
Accomplishments/Planned Programs Subtotals	-	0.000	42.452

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

This program began in FY 2018 to address ground-based optical SDA gaps and shortfalls. The acquisition strategy, approved in March 2018, accelerates the development and fielding of the solution, minimizing the time to address the requirements in light of current and emerging threats. Initial Technology Maturation & Risk Reduction (TMRR) activities were executed using existing defense, intelligence, and lab contracts. Engineering & Manufacturing Development (EMD) activities are being executed on the Maintenance of Space Situational Awareness Integrated Capabilities (MOSSAIC) contract awarded through full and open competition.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBOSS Design, development and life extension	C/CPIF	L3 Harris : Colorado Springs, CO	-	-		-		32.768	Nov 2023	-		32.768	Continuing	Continuing	-
GBOSS Test and Training Materials Development	Various	Various : Various	-	-		-		1.000	Nov 2023	-		1.000	Continuing	Continuing	-
GBOSS Technical Mission Analysis	RO	Various : Various	-	-		-		2.630	Nov 2023	-		2.630	Continuing	Continuing	-
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		1.479	Oct 2023	-		1.479	Continuing	Continuing	-
		Subtotal	-	-		-		37.877		-		37.877	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	-		-		2.200	Nov 2023	-		2.200	Continuing	Continuing	-
FFRDC	RO	Various : Various	-	-		-		2.300	Nov 2023	-		2.300	Continuing	Continuing	-
Other Support	C/CPAF	Various : Various	-	-		-		0.075	Nov 2023	-		0.075	Continuing	Continuing	-
		Subtotal	-	-		-		4.575		-		4.575	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		42.452		-		42.452	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor*

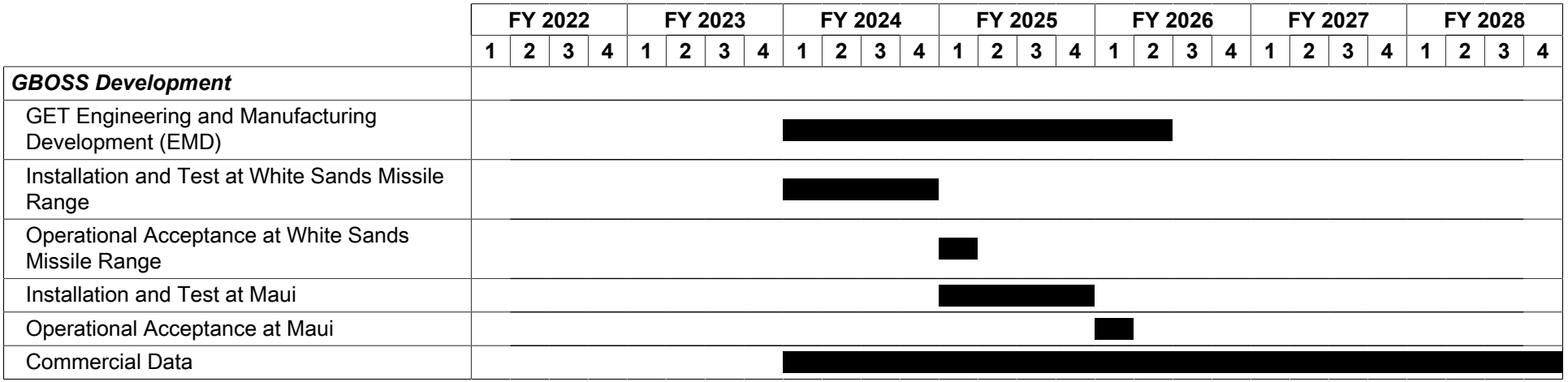

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206425SF / *Space Situation Awarenes s Systems*	**Project (Number/Name)** 65A037 / *Ground Based Optical Sensor*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GBOSS Development				
GET Engineering and Manufacturing Development (EMD)	1	2024	2	2026
Installation and Test at White Sands Missile Range	1	2024	4	2024
Operational Acceptance at White Sands Missile Range	1	2025	1	2025
Installation and Test at Maui	1	2025	4	2025
Operational Acceptance at Maui	1	2026	1	2026
Commercial Data	1	2024	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206431SF / *Advanced EHF MILSATCOM (SPACE)*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	39.217	11.651	4.068	0.000	4.068	1.018	1.021	1.042	1.080	Continuing	Continuing
657104: *MILSATCOM Space Modernization Initiative (SMI)*	-	39.217	11.651	4.068	0.000	4.068	1.018	1.021	1.042	1.080	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Modernization Initiative (SMI) evolves current and future SATCOM systems to develop a more affordable and resilient integrated enterprise capable of meeting near-term and emerging requirements. Under this construct, SMI includes the Capabilities Insertion Program (CIP) to enhance the current Advanced Extremely High Frequency (AEHF) constellation and protected communications performance to improve system operational resiliency. Additionally, SMI will demonstrate technologies and Concepts of Operations (CONOPS) supporting the Protected Anti-jam Tactical SATCOM (PATS) family-of-systems capability that provides tactical-level military SATCOM (MILSATCOM) users protected, anti-jam SATCOM while operating in a contested environment. PATS is an integrated approach that includes the Protected Tactical Satellite Communications (PTS) and Protected Tactical Enterprise Service (PTES) programs to mitigate adversarial jamming effects by using the Protected Tactical Waveform (PTW). For this effort, SMI includes the Air Force - Army Anti-Jam Modem (A3M) to develop PTW-capable modems, providing high throughput and enhanced anti-jam capability in benign and contested environments. Finally, Global Broadcast Service (GBS) functionality will be added to the PATS modems. GBS implements a worldwide high-capacity satellite broadcast information system to provide a continuous, one-way, high-speed, high-volume flow of classified and unclassified intelligence products (full motion video, imagery, data) to garrisoned, deployed or moving forces. FY 2022 was the final year of funding for CIP and A3M. FY 2024 funding continues the GBS effort.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver AEHF and SMI capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206431SF *I Advanced EHF MILSATCOM (SPACE)*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	26.942	11.701	4.077	0.000	4.077
Current President's Budget	39.217	11.651	4.068	0.000	4.068
Total Adjustments	12.275	-0.050	-0.009	0.000	-0.009
• Congressional General Reductions	0.000	-0.050			
• 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	13.202	0.000			
• SBIR/STTR Transfer	-0.927	0.000			
• Other Adjustments	0.000	0.000	-0.009	0.000	-0.009

Change Summary Explanation

FY 2022: 13.202; program increase to complete A3M development.
FY 2023: -0.050M Congressional General Reduction
FY 2024: -0.027M; to realign funding to APPN 3410, PE 1207804SF, for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity
FY 2024: +0.018M; Inflation

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Capabilities Insertion Program (CIP)	11.846	0.000	0.000

Description: Develop software that will increase the current AEHF constellation and Protected Communications capabilities, broaden overall user base, and accommodate a larger user population through improved resource utilization efficiencies. Develop modifications that will improve the Protected mission operational resiliency. Develop software to increase current AEHF terminal data rates with adaptive coding algorithms. Invest in technology demonstrations that improve the operational mission resiliency and effectiveness for all protected capabilities, which include, but are not limited to, W/V Frequency utility assessments and demonstrations, Operational Resiliency Phase 2 (OR 2/2B), Mission Planning Element (MPE) 8.4, and Cyber Defense-in-depth.

FY 2023 Plans:
NA

FY 2024 Plans:
NA

FY 2023 to FY 2024 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206431SF *I Advanced EHF MILSATCOM (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
N/A. FY 2022 was the final year of funding for W/V frequency utilization demonstration to determine the utility of W and V frequency bands to support future MILSATCOM requirements.			
Title: Air Force - Army Anti-Jam Modem (A3M) ***Description:*** The A3M will develop PTW modems that meet all environmental, integration, and mission requirements for the Satellite Transportable Terminal (STT), Ground Multi-band Terminal (GMT), and other Combat Communications tactical users. A3M development includes integration and testing of production evaluation (pre-production) modems, development of operator training materials, fielding, and sustainment planning. A3M is dependent on the Protected Tactical Enterprise Service (PTES) development and delivery of a production representative ground hub to connect to and perform an Operational Assessment (OA) of the pre-production modems to inform the Milestone C production decision. A3M pre-production modems are 100% production-ready and support PTES Minimum Viable Product (MVP) goals. A3M OA testing reduces risk for the PTES Multi-service Operational Test and Evaluation (MOT&E) for initial operating capability (IOC). ***FY 2023 Plans:*** NA ***FY 2024 Plans:*** NA ***FY 2023 to FY 2024 Increase/Decrease Statement:*** NA. FY 2022 is the final year of funding.	27.371	0.000	0.000
Title: Global Broadcast Service (GBS) ***Description:*** GBS continues A3M efforts towards meeting integration and mission requirements for Combat Communications users. This includes completing A3M software/firmware updates and integrating the modem into the GBS receive suites, which will allow the modem to be compatible with the GBS legacy broadcast. This ensures the 2,000+ worldwide GBS users continue to have access to continuous, one-way, high-speed, high-volume flow of classified and unclassified intelligence products (full motion video, imagery, data, weather, etc.) during the 5-year fielding timeline. Upon fielding completion, GBS users will transition to a PATS broadcast. This will fulfill the GBS TRANSEC requirement in the GBS JORD-III (2005) and Committee on National Security Systems (CNSS) Policy No. 12/CNSS Instruction No.1200. This solution also supports the Chief Space Operations' SATCOM Vision for improved resiliency and agility. ***FY 2023 Plans:*** Begin A3M software/firmware updates through one of the current A3M Block I Development vendors to add GBS legacy broadcast compatibility. Funding will also integrate A3M with GBS receive suites (physical integration, technical order updates, training package updates, software updates, etc.). Start Satellite Broadcast Manager (SBM) architecture updates for PATS compatibility.	0.000	11.651	4.068

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206431SF *I Advanced EHF MILSATCOM (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Perform initial test activities to include planning and acquisition of test assets. Rapidly respond to implement system resiliency necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2024 Plans:*** Continue A3M software/firmware updates through one of the current A3M Block I Development vendors to add GBS legacy broadcast compatibility. Funding will also integrate A3M with GBS receive suites (physical integration, technical order updates, training package updates, software updates, etc.). Continue SBM architecture updates for PATS compatibility. Continue initial test activities to include planning and acquisition of test assets. Rapidly respond to implement system resiliency necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funds decreased to transition the efforts from development to integration of the A3M modem providing PTW capability with GBS receive suites.			
Accomplishments/Planned Programs Subtotals	39.217	11.651	4.068

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 MILSAT: *MILSATCOM*	13.927	17.338	23.703	-	23.703	22.165	4.640	4.762	-	0.000	86.535

Remarks

The MILSATCOM Procurement Space Force (PSF) funds the production costs of the A3M for GBS.

The above costs reflect the GBS and PTW Modem line item totals (omitting the AFWET line item costs) of the 3022F: Procurement, Space Force MILSAT / MILSATCOM document.

E. Acquisition Strategy

A3M is an ACAT III program and is a joint effort between SSC and the Program Manager (PM) Tactical Networks (TN), Aberdeen Proving Ground (APG), to develop a common modem for the United States Air Force Global Multi-band Terminal (GMT) and United States Army Satellite Transportable Terminal (STT).

The Space Force will utilize existing contracts for all updates necessary. Those contracts are: A3M Block I Development contracts for software/firmware updates; GBS receive suite contracts for terminal integration; GBS architecture sustaining engineering contract for SBM updates; and an existing service level agreement with the 520th Software Engineering Squadron (SWES) for receive suite and SBM software updates. Within the CIP effort, the W/V-band Satellite Communication Experiment

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206431SF *I Advanced EHF MILSATCOM (SPACE)*

Transponder (WSCE-T) program's W/V frequency utilization demonstration was a cost-shared venture between the Program Office and the Air Force Research Laboratory (AFRL).

Leveraging similar mission and environmental requirements enables selection of the high water mark requirements to meet both mission parameters with greater efficiency while reducing risk and lifecycle cost. A3M leverages the PTS Field Demonstration technology maturation resulting in a low-risk development effort delivering pre-production modems with 100% production-ready components. This will include certified End Cryptographic Units (ECUs) for full-scope operational and cyber testing, operator and maintainer training materials, and all required intellectual property rights and provisioning documentation to enable swift terminal modification for operational use and sustainment. The development phase will deliver pre-production PTW-capable modems ready for "build-to-print" production. Blended developmental and operational testing is expected to include full environmental, blue, and red team testing prior to the production decision.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206431SF / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CIP - W/V Frequency Utilization Demonstration	MIPR	AFRL : Various	-	8.554	Jan 2022	-		-		-		-	0.000	8.554	-
A3M PTW Modem Development	C/CPAF	Various : Various	-	26.964	Nov 2021	-		-		-		-	0.000	26.964	-
GBS-A3M Software/ Firmware Design Changes	C/CPFF	Various : Various	-	0.000		8.701	May 2023	1.500	Nov 2023	-		1.500	Continuing	Continuing	-
GBS Receive Suite Integration	C/Various	Various : Various	-	0.000		0.673	May 2023	2.355	Oct 2023	-		2.355	Continuing	Continuing	-
SBIR/STTR	Various	Various : Various	-	-		-		0.142	Mar 2024	-		0.142	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	2.627	Nov 2021	-		-		-		-	0.000	2.627	-
Enterprise SE&I	C/CPAF	Linquest : Los Angeles, CA	-	0.650	Nov 2021	0.600	May 2023	-		-		-	0.000	1.250	-
		Subtotal	-	38.795		9.974		3.997		-		3.997	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GBS DT/IT/OT Resources	Various	Peterson / Schriever SFB : CO Springs, CO	-	-		1.500	Jun 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	-		1.500		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	0.299	Oct 2021	0.177	Apr 2023	0.053	Jan 2024	-		0.053	Continuing	Continuing	-
Other Support	Various	Various : Various	-	0.123	Oct 2021	-		0.018		-		0.018	Continuing	Continuing	-
		Subtotal	-	0.422		0.177		0.071		-		0.071	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206431SF / *Advanced EHF MILSATCOM (SPACE)*	Project (Number/Name) 657104 / *MILSATCOM Space Modernization Initiative (SMI)*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	39.217		11.651		4.068		-		4.068	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206431SF / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

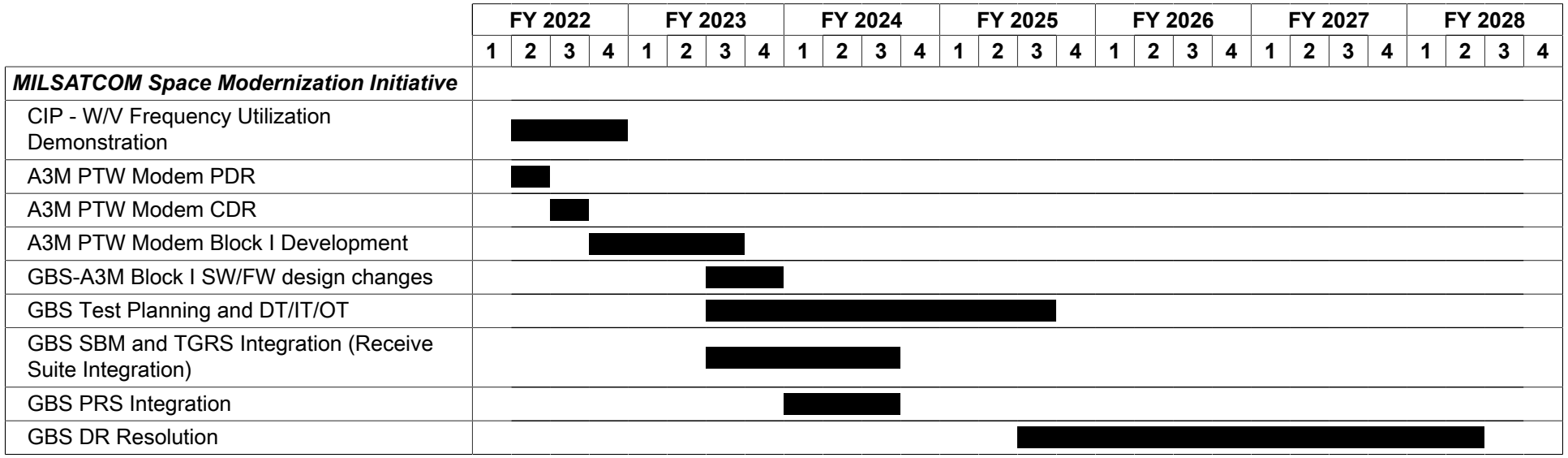

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206431SF / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MILSATCOM Space Modernization Initiative				
CIP - W/V Frequency Utilization Demonstration	2	2022	4	2022
A3M PTW Modem PDR	2	2022	2	2022
A3M PTW Modem CDR	3	2022	3	2022
A3M PTW Modem Block I Development	4	2022	3	2023
GBS-A3M Block I SW/FW design changes	3	2023	4	2023
GBS Test Planning and DT/IT/OT	3	2023	3	2025
GBS SBM and TGRS Integration (Receive Suite Integration)	3	2023	3	2024
GBS PRS Integration	1	2024	3	2024
GBS DR Resolution	3	2025	2	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206432SF *I Polar MILSATCOM (SPACE)*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	123.519	79.557	67.215	73.757	0.000	73.757	0.000	0.000	0.000	0.000	0.000	344.048
654215: *EPS Recap*	123.519	79.557	67.215	73.757	0.000	73.757	0.000	0.000	0.000	0.000	0.000	344.048
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Program MDAP/MAIS Code: 121												

Note

In FY 2024, PE 1206432SF (Polar MILSATCOM Space)/Project 654215 EPS Recap was completed.

A. Mission Description and Budget Item Justification

This program element acquires the Polar Military Satellite Communications (MILSATCOM) system that provides protected communications (anti-jam and low probability of intercept and detection) for users in the North Polar Region.

In FY 2006, the Department of Defense (DoD) began funding Enhanced Polar System (EPS). The host spacecraft and the polar communications packages took advantage of the Advanced Extremely High Frequency (AEHF) technology including the extended Data Rate (XDR) waveform. The EPS Capability Development Document (CDD), approved by the Joint Requirements Oversight Council in September 2006, is based on a two-package, hosted XDR program with operational availability in CY 2015 and CY 2017. EPS is comprised of four segments: Payload, Ground Control, Gateway, and Terminal (acquired by each Service's Terminal Program Office). Milestone B review was completed April 2, 2014.

In FY 2019, the United States Air Force (USAF) and Norwegian Ministry of Defense signed the Arctic Memorandum of Agreement (MOA), which enforces the international collaboration with Norway to host two EPS-Recapitalization (EPS-R) payloads on Space Norway-procured spacecraft. EPS-R continues to develop and acquire two Extremely High Frequency (EHF) payloads hosted on Space Norway-procured spacecraft and continues to upgrade/modify the existing EPS Ground Control and Gateway.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC 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 Polar MILSATCOM weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206432SF *I Polar MILSATCOM (SPACE)*

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	112.170	67.465	26.522	0.000	26.522
Current President's Budget	79.557	67.215	73.757	0.000	73.757
Total Adjustments	-32.613	-0.250	47.235	0.000	47.235
• Congressional General Reductions	0.000	-0.250			
• 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	-3.613	0.000			
• Other Adjustments	-29.000	0.000	47.235	0.000	47.235

Change Summary Explanation

FY 2022: -29.000M; reduction for execution
FY 2033: -3.613M; Small Business Innovation Research
FY 2023: -0.250M Congressional General Reduction
FY 2024: +47.000M; to address Host vehicle launch delay.
FY 2024: -0.175M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.
FY 2024: +0.410M; inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Segment	54.413	20.706	22.366
Description: Develop and acquire two EHF payloads, using AEHF's XDR waveform, for integration on host spacecraft. ***FY 2023 Plans:*** Continue testing of both EPS-R payloads that were initiated in FY 2018 to include on-orbit testing starting in FY 2023. Fund FY 2023 DAF share of Arctic MOA collaboration costs for hosting of the EPS-R payloads. Facilitate coordination between Space Norway, space vehicle vendor, and payload contractor. Provide representation, technical expertise, and assistance as necessary at Space Norway and space vehicle vendor facilities to support activities including payload integration, testing, and deficiency			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206432SF *I Polar MILSATCOM (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
resolution as needed. Support segment and system level testing. Continue cyber certification efforts. Support development and integration for the EPS-R system strategic requirements. ***FY 2024 Plans:*** Finalize coordination between Space Norway, space vehicle vendor, and payload contractor. Provide representation, technical expertise, and assistance as necessary at space vehicle vendor facilities to support activities including payload integration, testing, and deficiency resolution as needed. Support segment and system level testing. Lead launch activities including launch base processing, rehearsals, initialization, calibrations, testing and activation of the EPS-R payloads. Complete cyber certification and evaluation efforts. Manage readiness of the Engineering Model Test Bed, Hosted Payload Interface Unit, XDR Processing Unit test beds, flight software and databases. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding decreased because program completes launch, launch checkout, and on-orbit testing.			
Title: Ground Updates	19.862	39.667	45.549
Description: Modify and upgrade the existing EPS Control and Planning Segment (CAPS) to provide command and control and XDR mission planning capability for the two new payloads. ***FY 2023 Plans:*** Continue testing EPS CAPS to include on-orbit testing starting in FY 2023. Continue efforts with Defense Information Systems Agency (DISA) on ground nodes to provide out-of-band connectivity to the EPS-R payload as well as in-band connectivity between EPS-R ground nodes. Provide representation, technical expertise, and assistance as necessary at Space Norway and/or space vehicle vendor facilities to support activities including payload integration and ground to payload testing. Support segment and system level testing. Continue cyber certification and Authority To Operate (ATO) efforts. Provide updates, fixes, and retests to ground software deficiencies found in Factory Acceptance Testing, Site Acceptance Testing, and On-orbit Testing. Support development and integration for the EPS-R system strategic requirements. 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 2024 Plans:*** Complete on-orbit testing with EPS CAPS. Complete efforts with DISA on ground nodes to provide out-of-band connectivity to the EPS-R payload as well as in-band connectivity between EPS-R ground nodes. Provide representation, technical expertise, and assistance as necessary at Space Norway and/or space vehicle vendor facilities to support activities including payload integration and ground to payload testing. Support segment and system level testing. Complete cyber certification and evaluation efforts. Provide updates, fixes, and retests to ground software deficiencies found in Site Acceptance Testing and On-orbit Testing. Complete CAPS integration activities with the Family of Advanced Beyond Line-of-Sight Terminals (FAB-Ts). Rapidly respond			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding increased due to host satellite launch delay, resulting in delay in on-orbit testing with CAPS and the start of Interim Contractor Support (ICS).			
Title: Gateway Updates ***Description:*** Modify and upgrade the existing EPS Gateway to support the two new payloads. ***FY 2023 Plans:*** Continue EPS Gateway upgrades, segment, and system integration testing. Complete terminals installation efforts and continue testing for a second telemetry and control terminal as well as a fourth Navy Multiband Terminal to support dual EPS/EPS-R operations to the extent EPS legacy remains operational. Prepare for two FAB-Ts to replace two aging Telemetry & Control Terminals (T&C-T). Continue to support risk reduction, development upgrades, and integration for the EPS-R system strategic requirements to include any modification required for the FAB-Ts' software as needed. ***FY 2024 Plans:*** Complete EPS Gateway upgrades, segment, and system integration testing. Complete terminal support as required by System-level or Integration tests. Complete software modifications for FAB-Ts and install the two FAB-T terminals and towers/shelters to augment the two aging T&C-T at Clear Space Force Station. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding decreased due to primary focus shifting to FAB-T modifications and installation.	5.282	6.842	5.842
Accomplishments/Planned Programs Subtotals	79.557	67.215	73.757

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Awarded payloads contract to Northrop Grumman Aerospace Systems (NGAS) and initiated fabrication of two EPS functional-equivalent payloads in FY 2018. In FY 2019, the USAF and Norwegian Ministry of Defence signed the Arctic Memorandum of Agreement, which enforces the international collaboration with Norway to host the two EPS-R payloads on the Space Norway-procured spacecraft. Conducted market research to identify industry capabilities and acquisition concepts. Awarded CAPS contract for EPS ground upgrade. Gateway updates will be accomplished by Naval Information Warfare Center Pacific, the EPS Gateway Segment developer.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
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The program office initiates the procurement of a replacement terminal for the Telemetry and Command Terminal. This acquisition strategy updates the EPS Ground Segment to accommodate the EPS functional equivalent payloads and extend operations and sustainment beyond CY 2028. The U.S. Government will retain the system integrator role, as it was for EPS program of record.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206432SF / *Polar MILSATCOM (SPACE)*	**Project (Number/Name)** 654215 / *EPS Recap*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EPS-R Tactical Payloads	SS/CPIF	NGAS : Redondo Beach, CA	50.268	40.069	Nov 2021	16.878	Nov 2022	19.335	Nov 2023	-		19.335	0.000	126.550	505.355
Control and Planning Segment Upgrades	SS/CPIF	NGMS : Redondo Beach, CA	31.783	14.626	Nov 2021	32.335	Nov 2022	36.792	Nov 2023	-		36.792	0.000	115.536	95.379
Gateway Upgrades	Various	Various : Various, CA	14.643	3.890	Nov 2021	5.577	Nov 2022	5.050	Nov 2023	-		5.050	0.000	29.160	68.895
SBIR/STTR	TBD	Various : Various, CA	0.000	-		-		2.581		-		2.581	0.000	2.581	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	5.880	5.105	Nov 2021	1.780	Nov 2022	1.835	Nov 2023	-		1.835	0.000	14.600	-
Enterprise SE&I	C/CPAF	LinQuest : Los Angeles, CA	18.027	12.551	Nov 2021	8.050	Nov 2022	5.000	Nov 2023	-		5.000	0.000	43.628	-
		Subtotal	120.601	76.241		64.620		70.593		-		70.593	0.000	332.055	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace : El Segundo, CA	0.755	0.789	Oct 2021	-		-		-		-	0.000	1.544	-
A&AS	Various	Various : Various	2.070	2.377	Oct 2021	2.445	Oct 2022	3.014	Oct 2023	-		3.014	0.000	9.906	-
Other Support	Various	Various : Various	0.093	0.150	Oct 2021	0.150	Oct 2022	0.150	Oct 2023	-		0.150	0.000	0.543	-
		Subtotal	2.918	3.316		2.595		3.164		-		3.164	0.000	11.993	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	123.519	79.557		67.215		73.757		-		73.757	0.000	344.048	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206432SF / *Polar MILSATCOM (SPACE)*	**Project (Number/Name)** 654215 / *EPS Recap*

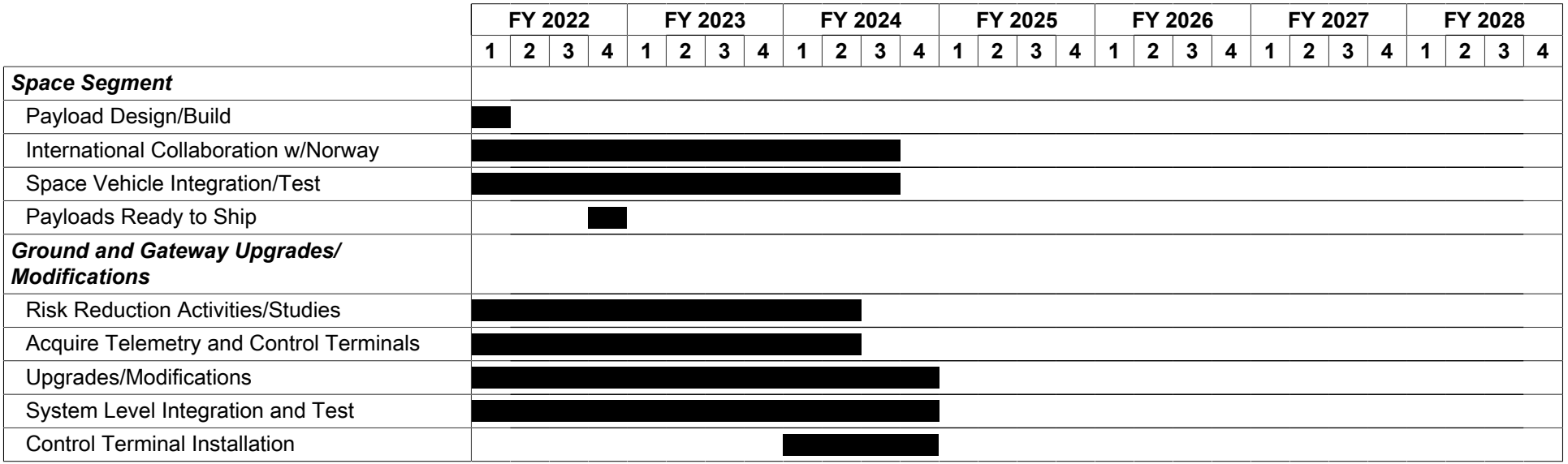

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206432SF / *Polar MILSATCOM (SPACE)*	**Project (Number/Name)** 654215 / *EPS Recap*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Segment				
Payload Design/Build	1	2022	1	2022
International Collaboration w/Norway	1	2022	3	2024
Space Vehicle Integration/Test	1	2022	3	2024
Payloads Ready to Ship	4	2022	4	2022
Ground and Gateway Upgrades/Modifications				
Risk Reduction Activities/Studies	1	2022	2	2024
Acquire Telemetry and Control Terminals	1	2022	2	2024
Upgrades/Modifications	1	2022	4	2024
System Level Integration and Test	1	2022	4	2024
Control Terminal Installation	1	2024	4	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206433SF / *Wideband Global SATCOM (SPACE)*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	48.288	49.445	0.000	49.445	0.000	0.000	0.000	0.000	Continuing	Continuing
657107: *WGS Space Systems Resiliency Upgrade*	-	0.000	48.288	49.445	0.000	49.445	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Wideband Global SATCOM (WGS) System provides the Department of Defense (DoD) with high data rate military satellite communication (MILSATCOM) services in accordance with the Joint Space Management Board-approved MILSATCOM architecture (August 1996), the Joint Requirements Oversight Council (JROC)-approved MILSATCOM Capstone Requirements Document (October 1997), and JROC-approved WGS Operational Requirements Document (May 2000). Dual-frequency WGS satellites augment, then replace the DoD's Defense Satellite Communications System X-band service and augment one-way Global Broadcast Service Ka-band capabilities. In addition, WGS provides a high capacity two- way Ka-band Service. This program was originally conceived to augment the near-term "bandwidth gap" in warfighter communications needs but it remains to be the DoD's primary wideband system. WGS has 10 operational legacy satellites and WGS-11 and WGS-12 (WGS-11 & 12) are in development as the first modern digital payloads using commercial technologies providing more coverage beams than their existing WGS predecessors combined and delivering twice the operational capacity than previous WGS analog satellites. Funding for this effort supports the advanced capabilities for WGS-11 & 12 under development for launch in FY 2025 and FY 2027, respectively. Project 657107, WGS Space Systems Resiliency Upgrade, is for WGS Beam Optimization & Operational Management (WGS-BOOM) enhancements to maximize efficiency/warfighter use of the additional number of beams provided by WGS-11 & 12 by improving the functionality of the legacy WGS ground systems to rapidly change the planned coverage scheme.

The 10 operational legacy WGS satellites on-orbit were each developed by building on heritage WGS capabilities. Continually improving WGS capability and leveraging advances in Boeing commercial technology, in FY 2018 the DoD has procured a more advanced single WGS-11 satellite (previously referenced as WGS-11+ to designate meeting the Congressional intent of two satellites, herein referenced as WGS-11 with the new Congressional add of WGS-12) enhancing support to the US military, DoD, and allied nations with more flexibility and mission capability to support dispersed users than previous WGS spacecraft. The new capabilities allow operators to create unique coverage anywhere within the satellite's field of view and custom designed for the mission at hand. In FY 2023, the DoD will procure a WGS-12, an expected clone of the WGS-11 spacecraft with the Protected Tactical SATCOM (PTS) as a hosted payload, is a planned addition to the WGS Block II Follow On (B2FO) contract and would be supported by current work on WGS-BOOM enhancements. The advanced beam management capabilities of WGS-11 & 12 payloads under development to produce more coverage beams (over 1500) than the entire existing WGS constellation and deliver twice the mission capability than WGS-10 can operationally increase the availability of military-grade communications.

The objective of the WGS-BOOM effort is for the development, integration, and test of advanced beam management to enhance WGS-11 & 12 baseline beam management tools in support of rapid planning and control. This effort will develop and deploy capabilities across the WGS enterprise to provide WGS-11 & 12 management and control (M&C) ground enhancements with responsive end-to-end mission planning, protection, and terminal synchronized capabilities. WGS BOOM development includes upgrades to the WGS-11 & 12 payload control system, Global SATCOM Configuration Control Element (GSCCE), to decrease operational

timelines to be able to better track and support airborne ISR missions as they move through the theater. Additionally, a Power Control Management Subsystem (PCMS) will be developed to provide superior situational awareness of user resource usage as well as automated configuration capability to restore users. Finally, a classified version of the WGS planning system, Common Network Planning Software (CNPS), will be developed to act as an automated source of truth for classified missions, which would reduce resource planning timelines. Funding the engineering and development for enhanced element M&C will provide greater routing complexity and mission planning flexibility to support 80 times more X and Ka-band spot beams on WGS-11 & 12 than on WGS 1-10 spacecraft. This funding will be used to develop and integrate WGS-11 & 12 advanced beam management capabilities & power control capabilities facilitating contested and mobile operations on tactically relevant timescales. Updated WGS-11 & 12 M&C interfaces will improve planning data responsiveness through access to automated equipment configuration registries and enable WGS-11/12 integration into the broader DoD SATCOM Enterprise. External WGS-11 & 12 interfaces may be leveraged to support planning, situational awareness, power control, and real time equipment orchestration.

WGS Block I consists of satellites 1-3, Block II consists of satellites 4-6 and B2FO currently includes satellites 7-10 and plans to add WGS 11 & 12 in FY 2023. WGS satellites 1-10 have been funded, procured and launched in previous budget cycles. With the operation of WGS-5, the constellation provided global coverage and Full Operational Capability (FOC) was declared on 12 May 2014.

In the Consolidated Appropriations Act, FY 2018, Congress added 600M Space Force Procurement in FY 2018 for "full funding for WGS-11 and WGS-12." A sole source Request for Proposal was released to Boeing in June 2018. A final decision was made to procure a single satellite (once designated as WGS-11+ but will herein forward be referenced as WGS-11) with twice the operational capacity of WGS-10 as the best approach to delivering the directed additional WGS capacity in a cost-effective manner. WGS-11 will host a PTS payload providing robust anti-jam capability to tactical warfighters, funded by the PTS program in PE 1206761SF.

In the Consolidated Defense Appropriations Act, FY 2023, Congress added 442M Space Force Procurement in FY 2023 for "Protected Wideband Satellite" to procure a protected wideband satellite providing resilient, jam resistant tactical communications to support warfighter needs. The United States Space Force (USSF) has interpreted the Congressional add is intended to procure a WGS-12 satellite equipped with the tactical anti-jam capabilities delivered with WGS-11 with the PTS hosted payload. The funding is expected to cover costs for a WGS-12 spacecraft clone of the WGS-11 to include a PTS hosted payload. The current B2FO Acquisition Program Baseline (APB) allows for procurement of a WGS-12 and the acquisition is planned to be a Firm Fixed Price effort with integration of PTS in FY 2026 and launch in FY 2027. The Congressional add does not include funding for ground, launch and operation/maintenance activities. USSF is pursuing a mix of USSF and International Partner (IP) sources to cover additional funding required by FY 2025 for launch vehicle, ground and other Government costs.

IPs receive constellation-wide WGS resources commensurate with their financial contributions to the WGS system. Investment from IPs to cooperatively enhance the system started in November 2007 through a bilateral Memorandum of Understanding (MOU) with Australia to fund WGS space vehicle (SV)-6, launch and launch services. Five countries (Canada, Denmark, Netherlands, Luxembourg, New Zealand) signed a new multilateral WGS MOU in CY 2012 and funded the procurement of WGS SV-9. In CY 2017, Amendment One to the WGS MOU leveraged additional funding for resiliency enhancements from two new IPs (Czech Republic and Norway). There is an International Agreement via the State Department regarding IP collaboration with WGS-11. In May 2022, nine countries signed Amendment Two to the multilateral MOU (adds Belgium and United Kingdom) to cover necessary ground upgrades and launch costs for WGS-11 was not covered by the FY 2018 Congressional add, and extends the duration of the WGS MOU, as amended, through September 2039. Space Systems Command (SSC) provides program

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management, integration, and engineering expertise through FY 2026. Discussions for potential future partnerships regarding the WGS program continue in support of National Space Policy and improved operational efficiency.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. The SSC has transformed 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, SSC 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 WGS-11 & 12 for weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	48.438	49.549	0.000	49.549
Current President's Budget	0.000	48.288	49.445	0.000	49.445
Total Adjustments	0.000	-0.150	-0.104	0.000	-0.104
• Congressional General Reductions	0.000	-0.150			
• 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	-0.104	0.000	-0.104

Change Summary Explanation

FY 2023: -$0.150M; Congressional General Reduction

FY 2024: -$0.325M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity

FY 2024: +$0.221; inflation adjustment

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: WGS Beam Optimization & Operational Management (BOOM) Planning Development, Systems Integration, and Test	0.000	48.288	7.240

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024

Description: Starting in FY 2024, the previously titled WGS-11+ BOOM Major Thrust has been renamed, and the efforts have been segregated into four distinct thrust efforts. This Major Thrust, renamed to WGS-BOOM Planning Development, Systems Integration, and Test, continues efforts previously included in the FY 2023 WGS-11+ BOOM Major Trust for the overall planning, overarching systems integration, and testing effort. The remaining key WGS-BOOM beam planning development activities included are broken out into separate thrusts for GSSCE, CNPS, and PCMS.

Develop and integrate WGS-11 & 12 advanced beam management capabilities driving improved warfighter ability to rapidly re-plan WGS-11 & 12 expanded coverage. Mature technical baseline and interface requirements for BOOM. Perform as the Government systems integrator through acquiring, designing, testing, and integrating the three key BOOM development segments and external interfaces with WGS. Support, configure, and conduct integrated testing of GSCCE, CNPS, and PCMS BOOM development efforts. Manage the MILSATCOM system architecture, refine interface requirements, and validate concept of operations through integrated system performance demonstrations. Leverage external WGS-11 & 12 interfaces to test and support planning, situational awareness, power control, and real time equipment orchestration.

FY 2023 Plans:
In FY 2023, WGS-11+ BOOM is a New Start. FY 2023 funding commences development and initial integration of advanced beam management facilitating contested and mobile operations in tactically relevant timelines, updates to architecture models, and identifies software functions required to update WGS-11+ ground and terminal components. Mission planning and development focus is on defining and implementing software specifications to program the configuration of shaped beams supporting MILSATCOM service topologies. Integration focus will be on the publication and deployment of equipment configuration data elements into a Unified Data Library for access by planners and the integration and test of planning beam management products within the DoD SATCOM Enterprise. Efforts will also include using external platforms for integration and test. Activities may include, but are not limited to: program office support, studies, technical analysis, experimentation, prototyping, etc.

FY 2024 Plans:
Continue plans to support the mission planning, integration and test of the three key BOOM development efforts (GSCCE, CNPS, and PCMS) and beam management products within the DoD SATCOM Enterprise, to including software specifications to program shaped beams supporting MILSATCOM service topologies. Provide GSCCE & PCMS support in preparation for a parallel on-orbit checkout during WGS-11 on-orbit checkout in FY 2025. Manage interface requirements to externally managed enhancements, such as Enterprise Management & Configuration (EM&C) and SATCOM Ordering, Management, and Situational Awareness Tools (SOMSAT). Activities may include, but are not limited to: program office support, studies, technical analysis, experimentation, prototyping, etc.

FY 2023 to FY 2024 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206433SF *I Wideband Global SATCOM (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 decreased due to the separation of activity previously included in FY 2023 WGS-11+ BOOM Major Thrust into other thrusts for three key WGS-BOOM development efforts: GSSCE, CNPS, and PCMS.			
Title: WGS-BOOM Development - Global SATCOM Configuration Control Element (GSCCE) ***Description:*** This is not a New Start as this activity for GSCCE was previously included in the FY 2023 WGS-11+ BOOM Major Thrust. WGS-BOOM-GSCCE is one of three BOOM development efforts to best improve the beam management panning ability for WGS-11 & 12 missions. GSCCE is an existing ground system with Boeing that performs payload commanding at all five of the Wideband SATCOM Operations Centers (WSOCs). WGS-BOOM-GSCCE development upgrade will reduce commanding/commit time due to increased commanding pace as a result of additional users/beams on WGS-11 & 12. This will result in the ability to rapidly plan WGS-11 & 12 missions. ***FY 2023 Plans:*** FY 2023 plans for WGS-11+ BOOM-GSSCE development are included under the WGS-11+ BOOM Major Thrust. ***FY 2024 Plans:*** Continue efforts to provide automation functions for payload planning/control in support of WGS-11 & 12. Continue to leverage existing GSSCE contract that commands and establishes WGS payload for operations, for development upgrades. Continue the design and development phase with the focus on advanced beam management and ensuring mobile operations with tactically relevant timelines. Refactor GSCCE payload plan commit time, improve WSOC handover times, and improve other GSCCE functionality for faster commanding of beam repoints supporting user movement in theater. Prepare for parallel verification testing during WGS-11 on-orbit checkout in FY 2025. Implement risk mitigations, such as modifying legacy code or introducing new code and processes into a legacy system and ensure compatibility. Procure GSCCE licenses and infrastructure to address the WGS-11 baseline obsolescence gap during the WGS-11 transition period. Ensure interfaces like CNPS and WSTARS are compatible with new GSCCE capability. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to separating out the WGS-BOOM-GSSCE development effort previously included in the FY 2023 WGS-11+ BOOM Major Thrust.	-	0.000	0.000
Title: WGS-BOOM Development - Consolidated Network Planning System (CNPS) ***Description:*** This is not a New Start as this activity for CNPS was previously included in the FY 2023 WGS-11+ BOOM Major Thrust. CNPS is an existing ground system with Northrup Grumman Corporation (NGC) that performs WGS payload planning, allocating users to beams, at all five WSOCs and also at the Regional SATCOM Support Centers (RSSCs). WGS-BOOM-GSCCE is one of three BOOM development efforts to best improve the ability to rapidly plan WGS-11 & 12 missions. WGS-BOOM-CNPS	-	0.000	10.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206433SF *I Wideband Global SATCOM (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
development will upgrade CNPS planning in a higher classification and enable automated mission checks of redacted mission information, eliminating current manual processes for users at different classification levels. ***FY 2023 Plans:*** FY 2023 plans for WGS-11 BOOM-PCMS development were included under the WGS-11+ BOOM Major Thrust. ***FY 2024 Plans:*** Complete acquisition for PCMS enhancement and award contract from an open competition to commence PCMS design and development phase. Support power control and management interface capability with terminals to implement automated configuration, control and monitoring for rapid re-planning. PCMS will enhance elements along both the mission planning and then mission execution timelines along with early indication of issues to support continuation or restoral of services. Document interface requirements for terminals to be compatible with PCMS. Preparation activities to prepare for a parallel verification testing during WGS-11 on orbit checkout in FY 2025. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to separating out the WGS-BOOM-CNPS development effort previously included in the FY 2023 WGS-11+ BOOM Major Thrust.			
Title: WGS-BOOM Development - Power Control Management Subsystem (PCMS) ***Description:*** This is not a New Start as this activity for PCMS was previously included in the FY 2023 WGS-11+ BOOM Major Thrust. WGS-BOOM-PCMS is one of three BOOM development efforts to best improve the ability to rapidly plan WGS-11 & 12 missions. PCMS will establish machine-to-machine connection to terminals to provide automated RF configuration management when problems are indicated and rapid restoral of services to begin before operators identify a discrepancy. ***FY 2023 Plans:*** FY 2023 plans for WGS-11+ BOOM-PCMS development were included under the WGS-11+ BOOM Major Thrust. ***FY 2024 Plans:*** Complete acquisition for PCMS enhancement and award contract from an open competition to commence PCMS design and development phase. Support power control and management interface capability with terminals to implement automated configuration, control and monitoring for rapid re-planning. PCMS will enhance elements along both the mission planning and then mission execution timelines along with early indication of issues to support continuation or restoral of services. Document interface requirements for terminals to be compatible with PCMS. Preparation activities to prepare for a parallel verification testing during	-	0.000	32.205

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206433SF *I Wideband Global SATCOM (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
WGS-11+ on orbit checkout in FY 2025. Activities may include, but are not limited to: program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to separating out the WGS-BOOM-PCMS development effort previously included in the WGS-11+ BOOM Major Thrust.			
Accomplishments/Planned Programs Subtotals	0.000	48.288	49.445

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 GAP000: *Wideband Gapfiller Satellites (Space)*	0.000	463.982	-	-	-	-	-	-	-	0.000	463.982

Remarks

E. Acquisition Strategy

WGS-BOOM development strategy strives to provide WGS enterprise enhancements efficiently using existing designs with reduced non-recurring engineering by leveraging, where possible, existing contracts and government relationships. To maximize resourced efforts and meet the speed of need, this strategy to initiate BOOM development enhancements relies heavily on work already being performed by the USSF and U.S Army to support WGS-11 launch in FY 2025 and WGS-12 launch in FY 2027. Award modifications to the existing Firm-Fixed Price (FFP) contracts for GSCCE and CNPS BOOM enhancements to Boeing in FY 2023 (USSF contract) and Northrup Grumman Corporation (NGC) (USA contract) in FY 2024, respectively, to leverage existing USA contracts with each respective Prime contractor for ongoing baseline GSCCE and CNPS system upgrades needed to add WGS-11 & 12 to the WGS constellation. The PCMS enhancement is expected to be competitively awarded in FY 2023. The PTS Program Office will support PCMS and CNPS development with contracts executed by US Army Wideband Product Office, Project Management Integrated Enterprise Network's (PM IEN).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206433SF / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
WGS-BOOM Planning Development, Systems Integration and Test	Various	Various : Various	-	-		43.390	Jan 2023	2.223	Jan 2024	-		2.223	0.000	45.613	-
WGS-BOOM - GSCCE	SS/FFP	Boeing : El Segundo, CA	-	-		-		-		-		-	0.000	0.000	-
WGS-BOOM - CNPS	SS/FFP	NGC : Orlando, FL	-	-		-		10.000	Mar 2024	-		10.000	0.000	10.000	-
WGS-BOOM - PCMS	C/TBD	TBD : TBD	-	-		-		32.000	Jan 2024	-		32.000	0.000	32.000	-
SBIR/STTR	Allot	Various : TBD	-	-		-		1.731	Mar 2024	-		1.731	0.000	1.731	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	-		1.429	Jan 2023	0.865	Jan 2024	-		0.865	0.000	2.294	-
SE&I	C/FP	Linquest : El Segundo, CA	-	-		1.900	Jan 2023	0.820	Jan 2024	-		0.820	0.000	2.720	-
		Subtotal	-	-		46.719		47.639		-		47.639	0.000	94.358	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	-		0.700	Jan 2023	1.756	Nov 2023	-		1.756	0.000	2.456	-
Other Support	Various	Various : Various	-	-		0.869	Jan 2023	0.050	Jan 2024	-		0.050	0.000	0.919	-
		Subtotal	-	-		1.569		1.806		-		1.806	0.000	3.375	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		48.288		49.445		-		49.445	0.000	97.733	N/A

Remarks

BOOM-GSCCE $23M fully funded in FY23 will support FY24 efforts. BOOM-PCMS $18M partially funded in FY23

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206433SF / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*

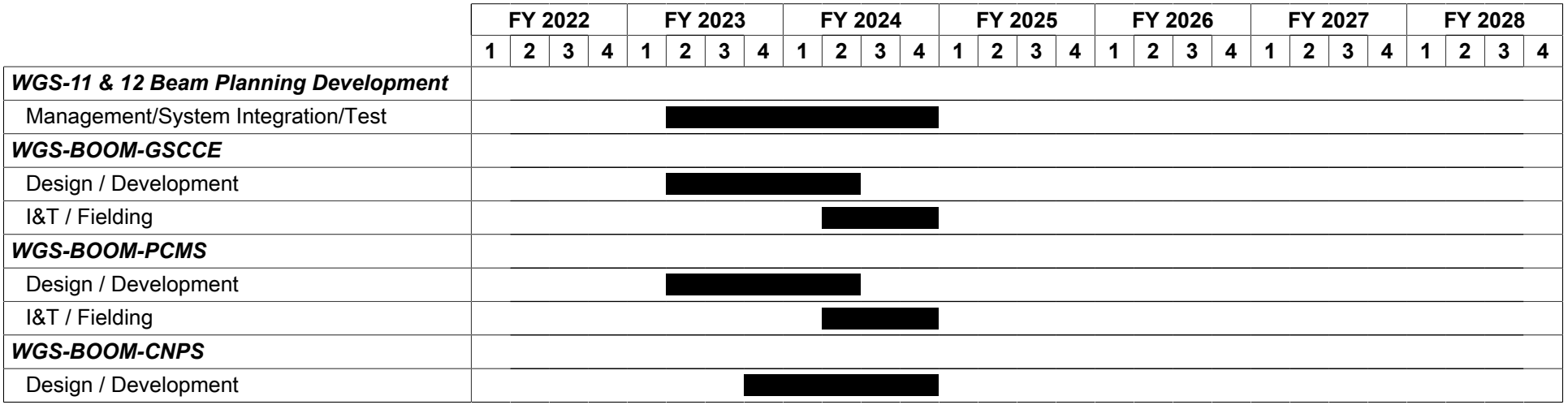

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206433SF / *Wideband Global SATCOM (SPACE)*	**Project (Number/Name)** 657107 / *WGS Space Systems Resiliency Upgrade*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
WGS-11 & 12 Beam Planning Development				
Management/System Integration/Test	2	2023	4	2024
WGS-BOOM-GSCCE				
Design / Development	2	2023	2	2024
I&T / Fielding	2	2024	4	2024
WGS-BOOM-PCMS				
Design / Development	2	2023	2	2024
I&T / Fielding	2	2024	4	2024
WGS-BOOM-CNPS				
Design / Development	4	2023	4	2024

Note

Funding ends in FY 2024. GSCCE and PCMS schedule events continue efforts begun in FY 2023, included in WGS-11+Beam Planning Development funding/schedule line items in FY 2023.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206440SF / *Next-Gen OPIR -- Ground*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	542.477	582.529	661.367	0.000	661.367	557.034	371.352	286.668	297.024	Continuing	Continuing
657106: *Next-Gen OPIR-Ground*	-	542.477	582.529	661.367	0.000	661.367	557.034	371.352	286.668	297.024	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 5, PE 1206440SF, project 657106, E-FORGE, is a new start.

In accordance with Congressional transfer direction in the FY 2023 enacted budget, funds in Program Element (PE) 1206442SF, Project 657106, Next-Gen OPIR Ground, have been transferred to 1206440SF, Next-Gen OPIR - Ground. FY 2024 and beyond budget is now included in this PE.

A. Mission Description and Budget Item Justification

Next-Generation Overhead Persistent Infrared (Next-Gen OPIR) Ground (Project 657106): Next-Gen OPIR Ground, also known as Future Operationally Resilient Ground Evolution (FORGE), consists of a modern Command and Control (C2) capability, modernization of Mission Data Processing (MDP) to implement an open framework and develop mission applications, required development and upgrades to Relay Ground Stations (RGS), and Endurable FORGE (E-FORGE), to provide a modern survivable and endurable architecture to meet USSF current and future space domain needs. FORGE will provide the flexibility and scalability to integrate new satellites, sensors and capabilities more rapidly and efficiently in order to meet evolving threats and warfighter needs. The Next-Gen OPIR Ground efforts enable cyber enhancements for both space and ground systems. FORGE C2 will introduce infrastructure and common platform services, mission unique software such as Telemetry, Tracking, and Commanding (TT&C), and mission management. E-FORGE will introduce development for a survivable mobile antenna and mission data processing system. E-FORGE is a new start in FY2024, and the USSF is still developing the E-FORGE operating concept and acquisition strategy. To support initial Next-Gen OPIR Space satellite launches without driving risk into the FORGE development schedule, the program has established a risk reduction ground capability, Next-Gen OPIR Interim Operations (NIO), based on a limited Space Based Infrared System (SBIRS) Block 20 solution.

The total cost of the FORGE Rapid Prototype Middle Tier of Acquisition (MTA) effort is 2,422.6 million. The RGS development and fielding is not contained in the MTA effort, as it consists of stand-alone Acquisition Category (ACAT) III efforts. The FORGE Rapid Prototype is not fully funded across the Future Years Defense Program. The Department of the Air Force is assessing all options to address the funding shortfalls for MTA programs including additional funding in a future budget request, performance trades based on technical maturity, or transition to alternative pathways.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose capabilities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206440SF *I Next-Gen OPIR -- Ground*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Next-Gen OPIR Ground system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	542.477	0.000	0.000	0.000	0.000
Current President's Budget	542.477	582.529	661.367	0.000	661.367
Total Adjustments	0.000	582.529	661.367	0.000	661.367
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-30.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	612.529			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	661.367	0.000	661.367

Change Summary Explanation

FY 2023: +612.529M; in accordance with Congressional direction in the FY 2022 and FY 2023 enacted budgets, funds in PE 1206442SF, Project 657106, Next-Gen OPIR Ground, have transferred to PE 1206440SF.
FY 2023: -30.000M; Congressionally directed reduction for mission data processing excess to need.
FY 2024: +661.367M; in accordance with Congressional direction in the FY 2022 enacted budget, funds in PE 1206442SF, Project 657106, Next-Gen OPIR Ground, have transferred to PE 1206440SF and for inflation.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Command and Control (C2)	56.210	77.573	109.580
Description: The Space Force is transitioning to Enterprise Ground Services (EGS), a Government-owned ground architecture that focuses on infrastructure and common platform services, while expanding available services as they mature. FORGE C2 creates Mission Unique Software (MUS) and provides sensor/spacecraft specific C2 capabilities that use EGS messaging standards in order to transition C2 of the legacy SBIRS constellation and Next-Gen OPIR Geosynchronous Earth Orbit (GEO) (NGG) to FORGE and to launch Next-Gen OPIR Polar (NGP).			
FY 2023 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206440SF *I Next-Gen OPIR -- Ground*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Due to challenges in aligning the EGS and FORGE development schedules, the FY 2023 plans for the C2 thrust have changed since the FY 2023 President's Budget R-doc. Updated plans are reflected below. GEO Non-Integrated Tactical Warning/Attach Assessment (ITW/AA) Ops Migration to EGS (GNOME): Continue development and integration of C2 Mission Management MUS and core application for a GEO space vehicle. Command and Control Transition (C2X): Continue development of SBIRS Transport Network. Continue SBIRS C2 MUS development. Conduct risk reduction activities and begin development for infrastructure and platform capabilities needed for C2. Award contract to begin prototyping and demonstrating C2 application development for NGP as well as the user interface needed to integrate SBIRS, NGG, and NGP assets on FORGE C2. ***FY 2024 Plans:*** GNOME: Complete development and integration of C2 Mission Management MUS and core application for a GEO space vehicle. C2X: Complete development of SBIRS Transport Network. Continue SBIRS C2 MUS development. Begin initial integration needed to migrate SBIRS, NGG, and NGP assets on FORGE C2. Conduct risk reduction activities and begin development for infrastructure and platform capabilities needed for C2. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to a ramp up in the development of MUS, development of infrastructure and platform, and initial integration activities with the C2 infrastructure and platform.			
Title: Mission Data Processing (MDP)	275.993	248.782	269.141
Description: The FORGE MDP effort creates a replacement for the existing legacy SBIRS Ground mission processing applications which have cyber security and scalability limitations. MDP is creating a cyber-resilient, flexible, and scalable open framework capable of meeting current and future threats. MDP will plan OPIR and other mission data resource utilization to meet warfighter requirements. MDP provides the ability to ingest and publish varying levels of processed data for enhanced processing, perform efficient and systematic upgrades, and orchestrate real-time wideband processing for ITW/AA and non-ITW/AA mission areas. The MDP system provides modular mission applications to meet the future challenges of Missile Warning (MW), Missile Defense (MD), Battlespace Awareness (BA), and Technical Intelligence (TI). MDP is critical to making cyber-secure, effective use of the increased amounts of data that will be collected by Next-Gen OPIR. ***FY 2023 Plans:*** Deliver non-ITW/AA certified framework to Mission Control Station (MCS) and MCS-Backup. Continue development of follow-on MDP Application Framework (MDPAF) effort. Continue development of MDP Application Provider (MDPAP) effort and			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206440SF *I Next-Gen OPIR -- Ground*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
SBIRS Legacy sensor specific processing (SSP) software. Continue development for SSP to support migration of all SBIRS Highly Elliptical Orbit (HEO) and GEO assets to FORGE framework. Conduct required studies to identify shared platform, infrastructure, and data layer solutions that will inform future concepts and activities in support of enterprise open frameworks and architectures as well as risk reduction activities, technical analysis for common platform, infrastructure and data layers for ground and communication systems to build upon. FY 2023 funding will allow the program to implement system resiliency, cyber security and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, and prototyping. ***FY 2024 Plans:*** Deliver follow-on applications for SBIRS non-ITW/AA data processing. Continue development of follow-on MDPAF effort. Continue follow-on development of MDPAP effort for ITW/AA data processing. Deliver and field mission applications for non ITW/AA data processing. Continue follow-on development for SSP to support migration of all SBIRS HEO and GEO assets to FORGE framework. Integrate entire mission data processing thrust area (MDPAF, MDPAP, and SSP) and begin sub-system level testing using operational data. FY 2024 funding will allow the program to implement system resiliency, cyber security and be responsive to evolving threats necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, and prototyping. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to ramp up in MDPAP and SSP development to support SBIRS and Next-Gen ITW/AA data processing.			
Title: Next-Gen Transition ***Description:*** Next-Gen is the development to transition future OPIR space systems to using FORGE for mission processing and C2. Included in this effort is the development of an interim system (NIO) to ensure the most critical ground processing is ready in time for the first Next-Gen OPIR satellite launch. NIO will create mono tracks and publish those mono tracks to the existing SBIRS Block 20 ground system for fusion and dissemination to the warfighter. ***FY 2023 Plans:*** Continue development of the risk reduction system and conduct early integration and testing events. Continue integration of FORGE C2 functions. Continue install of hardware at the Consolidated and Continental United States (CONUS) Relay ground sites. Continue integration of mission data processing applications into the framework to support NGG. Continue to execute NGG and NGP contract. Start Space to Ground capability testing with NGG-1. ***FY 2024 Plans:***	183.880	174.174	134.854

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Complete Space to Ground capability testing with NGG-1. Complete development of the interim system, and final integration and testing events prior to NGG-1 launch. Continue development and integration of the mission unique software needed for C2 for NGG and NGP. Continue integration of multiple mission data processing applications into the framework to support NGG. Begin development needed to support NGG-2 launch. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to completion of core development efforts to support NGG-1 launch.			
Title: Relay Ground Station - Asia (RGS-A) ***Description:*** This is not a New Start as funding was previously included in the FORGE - Relay Ground Stations (RGSs) Major Thrust. This effort is now segregated as an ACAT III program. OPIR data collected in space must be relayed to ground entry points and routed to provide warfighters with timely information. The legacy SBIRS ground architecture requires RGS upgrades and new RGSs to receive OPIR data from legacy and future Next-Gen OPIR assets. This effort will provide data to the MCS for processing and dissemination to warfighters and National Command Authorities. The RGS modernization effort will include the ability to operate antennas, process data, and support older Defense Support Program (DSP) assets. This activity is for the Asia ground station portion of the FORGE - RGS architecture and includes 6 antennas. ***FY 2023 Plans:*** Continue build-out of RGS-A site facility which is an integral part of RGS development. Continue antenna/infrastructure installation and prepare for check out. Purchase high-value antenna and associated hardware for RGS-A site ramp up of labor/construction activities. ***FY 2024 Plans:*** Purchase final mission equipment and complete site construction activities. Begin final system installation and checkout. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to ramp down in site installation activities.	26.394	72.000	67.792
Title: Relay Ground Stations (RGSs) ***Description:*** OPIR data collected in space must be relayed to ground entry points and routed to provide warfighters with timely information. The legacy SBIRS ground architecture requires RGS upgrades and new RGSs to receive OPIR data from legacy and future Next-Gen OPIR assets. This effort expands two additional RGSs that will use common hardware capable of supporting all Next Gen-OPIR space assets. This effort will provide data to the MCS for processing and dissemination to warfighters and National Command Authorities. The RGS modernization effort will include the ability to operate antennas, process data, and support older DSP assets. This activity is for RGS's not included in the RGS-A portion of the FORGE - RGS architecture.	0.000	10.000	45.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206440SF *I Next-Gen OPIR -- Ground*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: Perform site surveys and planning for the second and third RGS sites. ***FY 2024 Plans:*** Award second site, RGS-X in Europe, contract to design and purchase ITW/AA-class antenna and associated hardware for the Next-Gen Constellation. Complete site approval process and preliminary design. Release Request for Proposal (RFP) for third RGS site (the third site is a CONUS site split between RGS-S and RGS-N sites) and execute site preparations. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to ramp up in the second and third site development and associated long lead hardware items.			
Title: E-FORGE ***Description:*** Endurable FORGE (E-FORGE) provides continuous survivable and endurable non-imaging infrared for Missile Warning (MW) reporting across all phases of military operations to Integrated Tactical Warning and Attack Assessment (ITW/AA), Chairman, Joint Chiefs of Staff (CJCS) and Nuclear Command and Control System (NCCS) architectures. E-FORGE enables the processing of SBIRS GEO 1-6 and the Next-Gen OPIR MW assets through a survivable mobile antenna system, a modernized and mobile data processing platform, and an integrated data architecture for missile warning. Additionally, E-FORGE will integrate nuclear detonation detection (NUDET) data from GPS sensors and utilize protected MILSATCOM for strategic reporting. This is a new start. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** E-FORGE will begin initial studies/prototyping needed for the development of a survivable mobile antenna system and mobile shelters. Additionally, E-FORGE will begin development of a mobile data processing platform to include mission unique software that will support the survivable endurable architecture. Additional activities include, but are not limited to, intra and inter program office technical support for requirements analysis and technical assistance. E-FORGE is a new start activity. As a new start, the operating concept is still being finalized. Future allocation of resources to this PE will be used to assist in the employment of the operating concept, once approved. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increase due to the start of initial prototype/development efforts required for mobile mission data processing to meet Next Generation OPIR capabilities in support of presidential directives.	0.000	0.000	35.000
Accomplishments/Planned Programs Subtotals	542.477	582.529	661.367

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206440SF *I Next-Gen OPIR -- Ground*

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The Next-Gen OPIR Ground program is executing an acquisition strategy using Middle Tier of Acquisition (MTA) authority for Rapid Prototyping approved via Acquisition Decision Memorandum on 5 Dec 19.

To support this acquisition strategy, the program will follow an agile approach to develop capabilities and a robust DevSecOps (Development/Security/Operations) solution to deliver the capabilities. The FORGE program is pursuing a rapid prototyping approach founded primarily on software and infrastructure reuse, partnerships with other programs, limited scope, use of existing contracts where necessary, and maximizing competition where possible. For the MDP thrust, the FORGE program is using competitive use Other Transaction (OT) authorities to develop the framework and the applications. For the C2 thrust, the program team is assessing whether the use of existing Space Systems Command (SSC) contracts with an emphasis to on-ramp to Enterprise Ground Services is still the appropriate strategy or if an update to the strategy is required. For the Next-Gen Transition effort, the program is using the Next-Gen GEO and Next-Gen Polar contract with the prime contractor. The program is executing the MDP, C2, and NIO thrusts within the scope of its Middle Tier of Acquisition authorities. The program is executing the RGS thrust using traditional acquisition authorities. RGS-A was designated an ACAT III by the MDA.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206440SF / *Next-Gen OPIR -- Ground*	Project (Number/Name) 657106 / *Next-Gen OPIR-Ground*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
C2	Various	Various : TBD	-	56.210	Jan 2022	77.574	Jun 2023	109.580	Apr 2024	-		109.580	Continuing	Continuing	-
MDP	Various	Various : TBD	-	223.513	Nov 2021	187.343	Nov 2022	215.469	Nov 2023	-		215.469	Continuing	Continuing	-
Next-Gen Transition	Various	Various : TBD	-	183.880	Nov 2021	174.174	Nov 2022	134.854	Nov 2023	-		134.854	Continuing	Continuing	-
RGS-A	Various	NWIC and Northrop Grumman : Boulder, CO	-	26.394	Nov 2021	72.000	Nov 2022	67.792	Nov 2023	-		67.792	Continuing	Continuing	-
RGSs	TBD	Various : TBD	-	0.000		10.000	Mar 2023	45.000	May 2024	-		45.000	Continuing	Continuing	-
E-FORGE	Various	Various : TBD	-	0.000		0.000		35.000	Jan 2024	-		35.000	Continuing	Continuing	-
SE&I	TBD	TBD : TBD	-	15.253	Dec 2021	21.197	Dec 2022	14.580	Dec 2023	-		14.580	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corporation : El Segundo, CA	-	5.434	Jan 2022	3.646	Jan 2023	3.381	Jan 2024	-		3.381	Continuing	Continuing	-
		Subtotal	-	510.684		545.934		625.656		-		625.656	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corporation : El Segundo, CA	-	3.848		4.782	Jan 2023	4.036	Jan 2024	-		4.036	Continuing	Continuing	-
A&AS	Various	Various : TBD	-	27.670		31.538	Feb 2023	31.400	Nov 2023	-		31.400	Continuing	Continuing	-
Other Support	Various	Various : TBD	-	0.275		0.275	Nov 2022	0.275	Nov 2023	-		0.275	Continuing	Continuing	-
		Subtotal	-	31.793		36.595		35.711		-		35.711	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	542.477		582.529		661.367		-		661.367	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206440SF / *Next-Gen OPIR -- Ground*	**Project (Number/Name)** 657106 / *Next-Gen OPIR-Ground*

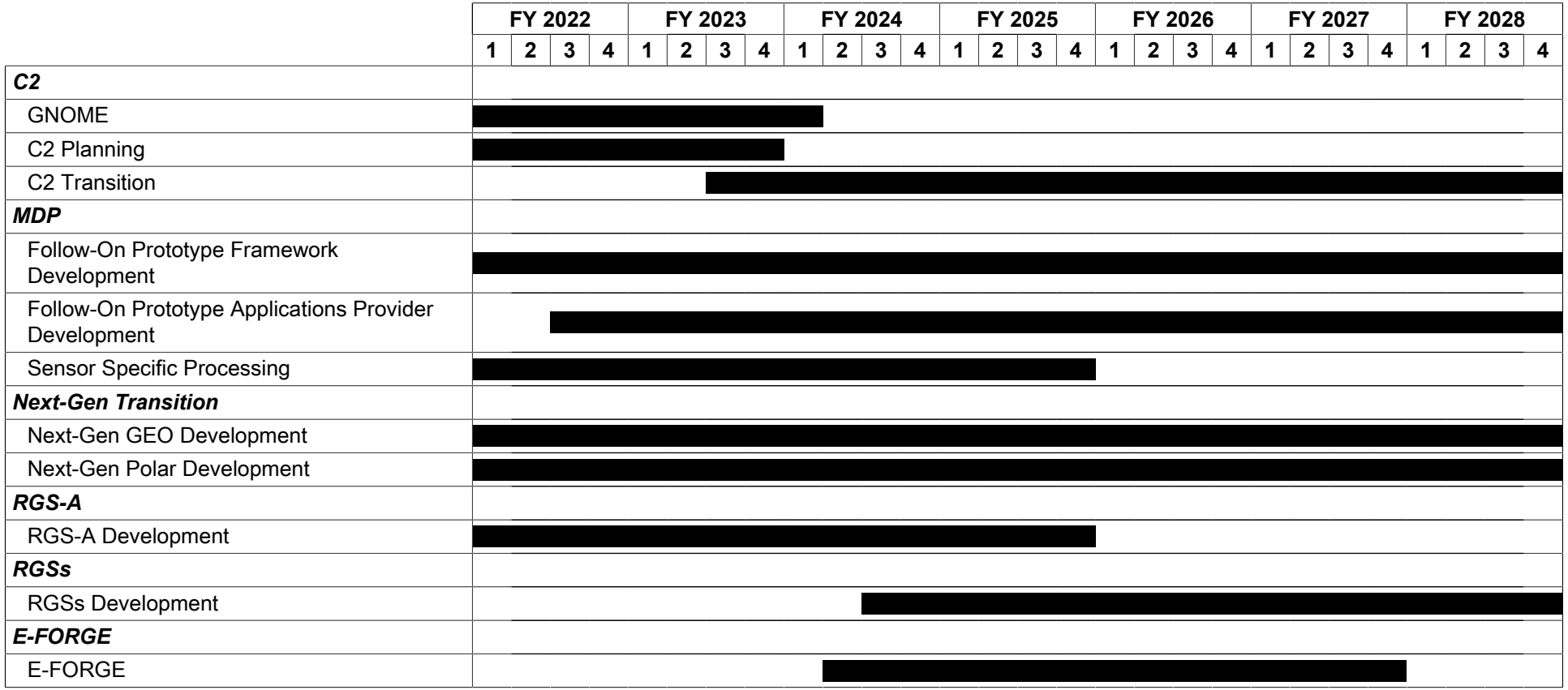

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206440SF / *Next-Gen OPIR -- Ground*	**Project (Number/Name)** 657106 / *Next-Gen OPIR-Ground*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
C2				
GNOME	1	2022	1	2024
C2 Planning	1	2022	4	2023
C2 Transition	3	2023	4	2028
MDP				
Follow-On Prototype Framework Development	1	2022	4	2028
Follow-On Prototype Applications Provider Development	3	2022	4	2028
Sensor Specific Processing	1	2022	4	2025
Next-Gen Transition				
Next-Gen GEO Development	1	2022	4	2028
Next-Gen Polar Development	1	2022	4	2028
RGS-A				
RGS-A Development	1	2022	4	2025
RGSs				
RGSs Development	3	2024	4	2028
E-FORGE				
E-FORGE	2	2024	4	2027

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206442SF *I Next Generation OPIR*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	125.853	226.601	222.178	0.000	222.178	227.501	230.095	233.231	241.905	Continuing	Continuing
657009: *Space Mod Initiative*	-	97.978	196.884	191.144	0.000	191.144	195.324	199.418	201.926	209.470	Continuing	Continuing
657123: *Integration*	-	27.875	29.717	31.034	0.000	31.034	32.177	30.677	31.305	32.435	Continuing	Continuing

Note

In accordance with Congressional direction in the FY 2022 and FY 2023 enacted budgets, funds in Project 657120, Next-Gen OPIR Block 0 GEO have transferred to Program Element 1206443SF, Next-Gen OPIR - GEO. FY 2024 and beyond budget is included in this PE.

In accordance with Congressional direction in the FY 2022 and FY 2023 enacted budgets, funds in Project 657121, Next-Gen OPIR Block 0 Polar have transferred to Program Element 1206444SF, Next-Gen OPIR - Polar. FY 2024 and beyond budget is included in this PE.

In accordance with Congressional direction in the FY 2022 and FY 2023 enacted budgets, funds in Project 657106, Next-Gen OPIR Ground (FORGE) have transferred to Program Element 1206440SF, Next-Gen OPIR - FORGE. FY 2024 and beyond budget is included in this PE.

A. Mission Description and Budget Item Justification

The Next-Generation Overhead Persistent Infrared (Next-Gen OPIR) program will succeed the current Space Based Infrared System (SBIRS) and will provide improved missile warning, missile defense, battlespace awareness, and technical intelligence collection capabilities that are more survivable against emerging adversary threats. The program will deliver satellites in a diverse set of orbits to meet mission coverage needs; a modular, extensible, and cyber-hardened ground system to operate and process mission data downlinked from on-orbit assets; an on-ramp to demonstrate novel infrared technologies; and an integration effort will identify, plan, manage and execute integration activities at the enterprise level. Due to funding transfers to segregate Next-Gen OPIR into other Program Elements, PE 1206442SF is now comprised of two projects: 1. Next-Gen OPIR Space Modernization Initiative (SMI) and 2. Integration.

1. SMI (Project 657009/Program Element 1206442SF): To better enable response to emerging global missile threats, SMI advances capabilities and reduces risk through three major thrust areas: Demonstrations/Prototypes, Technology Maturation, and Data Exploitation. Demonstrations mature technologies by delivering ground and on-orbit prototypes. They advance OPIR capabilities for missile warning and tracking, ensuring a low risk, smooth transition of advanced technology to future operational systems. Each year, Space System Command (SSC) conducts a review of all technical development needs for future OPIR systems across the stakeholder community to include the Missile Defense Agency, Space Development Agency, Air Force Research Lab, and mission partners to prioritize technical investment and develop transition roadmaps. The investments described align to the OPIR tech needs published in the Portfolio Decision Support Tool (PDST). Technology Maturation focuses development on advanced infrared sensing optics and electronics, resiliency hardware and software, and on-board processing algorithms and on-board computers. Data Exploitation provides return-on-investment aimed at ingest and fusion of current and future multiple sensor program data to enhance missile warning, missile defense, battlespace awareness and technical intelligence mission capabilities. This includes the processing and exploitation of the Wide Field of View (WFOV) Geosynchronous Earth Orbit (GEO) wideband sensor data focused on dimmer threat targets, as well as future program data including Next-Gen GEO, Missile Track Custody (MTC) Medium-Earth Orbit (MEO), and others. Data Exploitation includes maintaining the Tool, Applications, and Processing (TAP) Lab facility where enhanced

software applications and algorithms for detection, tracking and visualization are developed and delivered in support of the Space Operations Command, Delta 4, 11th Space Warning Center and 566th Intelligence Squadron operators within the OPIR Battlespace Awareness Center (OBAC) at Buckley Space Force Base (SFB). The TAP Lab facility is also host to current SBIRS program Contract Logistics Support (CLS) activities, Future Operationally Resilient Ground Evolution (FORGE) mission data processing development and testing, and is expected to host Next-Generation Interim Control Center (NICC)-Next-Gen Interim Operations (NIO) Command and Control (C2) for GEO and potentially MTC Mission Data Processing (MDP) and C2. Data Exploitation also supports other mission areas to include Civil Support such as wildland fire tracking solutions. SMI supports Next-Gen OPIR by maturing new technologies to enable detection of new and challenging missile threats. SMI funds engineering activities to reduce both production and future system costs through manufacturing and producibility enhancements, and technology insertion. SMI includes studies and risk reduction activities to evolve the current Program of Record (PoR) constellation and/or simultaneously mature breakthrough technologies to create a leap in capability for follow-on systems to include FORGE, Next-Gen GEO and Polar, and Resilient Missile Warning/Missile Track (MW/MT) MEO.

2. Integration (Project 657123/Program Element 1206442SF): The Next-Gen OPIR Integration project includes efforts associated with the Government's primary role in, and tasks necessary to accomplish, the critical lead system integration function between the OPIR enterprise segments (Next-Gen GEO, Next-Gen Polar, Next-Gen Ground, and the Resilient MW/MT MEO/Low Earth Orbit (LEO) architecture). This includes Enterprise Systems Engineering and Integration (SE&I) activities and Digital Engineering activities, such as Model Based System Engineering (MBSE). The focus of the Integration project is on system-level integration activities, between the Next-Gen OPIR segments, such as Space to Ground. This differs from integration within the individual program segments, which refers to subsystem-level integration between subsystems such as a spacecraft bus to the mission payload. The Government Integrator directs the Next-Gen OPIR current enterprise architecture and system definition, controls and validates interfaces, ensures compatibility of Next-Gen systems, and develops/manages plans for execution and fielding of the Next-Gen OPIR Enterprise. Further, the Integrator, through various Federally Funded Research and Development Centers (FFRDCs), government partners, and contractors, executes unique MBSE and integration requirements of each segment by providing modeling, simulation, and technical analyses of Government-directed enterprise level trades among the Next-Gen OPIR segments. These trades lead to definition, management, maintenance, and evolution of the Next-Gen OPIR Enterprise requirements and interface technical documents to ensure the integrity of the enterprise technical baseline.

Space acquisition must respond with speed and agility to emerging adversary threats. SSC has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Next-Gen OPIR weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206389SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because the majority of Projects under PE 1206442SF have been declared Section 804 Rapid Prototype efforts conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force					Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*		R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*			
B. Program Change Summary ($ in Millions)	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**
Previous President's Budget	125.853	3,479.459	2,951.422	0.000	2,951.422
Current President's Budget	125.853	226.601	222.178	0.000	222.178
Total Adjustments	0.000	-3,252.858	-2,729.244	0.000	-2,729.244
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	-27.200			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	-3,225.658			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-2,729.244	0.000	-2,729.244

Change Summary Explanation

FY 2023: -1,713.933M; transfer funding for PE 1206442SF, Next-Generation OPIR Space, Block 0 GEO Project 657120 to correct PE 1206443SF, Next-Generation OPIR Space, Block 0 GEO Project 657120.

FY 2023: -899.196M; transfer funding for PE 1206442SF, Next-Generation OPIR Space, Block 0 Polar Project 657121 to correct PE 1206444SF, Next-Generation OPIR Space, Block 0 Polar Project 657121.

FY 2023: -612.529M; transfer funding for PE 1206442SF, Next-Generation OPIR, Ground (FORGE) Project 657106 to correct PE 1206440SF, Next-Generation OPIR, Ground (FORGE) Project 657106.

FY 2023: -27.200M; Congressionally directed reduction for inadequate justification.

FY 2024: -148.517M; transfer funding and effort for the MEO Missile Tracking Demonstration portion of PE 1206442SF, Next-Generation OPIR, Space Mod Initiative Project 657009 to PE 1206447SF, Resilient Missile Warning Missile Tracking, Resilient MW/MT - MEO Project 657MEO to centralize Missile Warning Missile Tracking activities and improve transparency.

FY 2024: -901.615M; transfer funding for PE 1206442SF, Next-Generation OPIR Space, Block 0 GEO Project 657120 to correct PE 1206443SF, Next-Generation OPIR Space, Block 0 GEO Project 657120.

FY 2024: -1002.309M; transfer funding for PE 1206442SF, Next-Generation OPIR Space, Block 0 Polar Project 657121 to correct PE 1206444SF, Next-Generation OPIR Space, Block 0 Polar Project 657121.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206442SF *I Next Generation OPIR*

FY 2024: -658.406M; transfer funding for PE 1206442SF, Next-Generation OPIR, Ground (FORGE) Project 657106 to correct PE 1206440SF, Next-Generation OPIR, Ground (FORGE) Project 657106.

FY 2024: -19.392M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +0.995M PBD Inflation Rates for Non-Pay and Non-Fuel Purchases.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*	Project (Number/Name) 657009 / *Space Mod Initiative*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
657009: *Space Mod Initiative*	-	97.978	196.884	191.144	0.000	191.144	195.324	199.418	201.926	209.470	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Next-Gen OPIR Space Modernization Initiative (SMI) (Project 657009): To better enable response to emerging global missile threats, SMI advances capabilities and reduces risk through three major thrust areas: Demonstrations/Prototypes, Technology Maturation, and Data Exploitation. Demonstrations mature technologies by delivering ground and on-orbit prototypes. Demonstrations advance OPIR capabilities for missile warning and tracking ensuring a low risk, smooth transition of advanced technology to future operational systems. Technology Maturation focuses investments on high pay-off critical components to reduce production risks and development costs. Technology Maturation focuses development on advanced IR sensing optics and electronics, resiliency hardware and software, and on-board processing algorithms and on-board computers. Data Exploitation provides return-on-investment aimed at ingest and fusion of current and future multiple sensor program data to enhance missile warning (MW), missile defense (MD), battlespace awareness (BA) and technical intelligence (TI) mission capabilities. This includes the processing and exploitation of the Wide Field of View (WFOV) Geosynchronous Earth Orbit (GEO) wideband sensor data focused on dimmer threat targets, as well as future programs data including Next-Gen GEO, Missile Track Custody (MTC) Medium-Earth Orbit (MEO), and others. Data Exploitation includes maintaining the Tool, Applications, and Processing (TAP) Lab facility where enhanced software applications and algorithms for detection, tracking and visualization are developed and delivered in support of the Space Operations Command, Delta 4, 11th Space Warning Center and 566th Intelligence Squadron operators within the Overhead Persistent Infrared Battlespace Awareness Center (OBAC) at Buckley Space Force Base (SFB). Data Exploitation also supports other mission areas to include Civil Support such as wildland fire tracking solutions. Additionally, data exploitation funds facilities and integration to support initial prototype operations until a transition to a space force operational unit is feasible. SMI supports Next-Gen OPIR by maturing new technologies to enable detection of new and challenging missile threats. SMI funds engineering activities to reduce both production and future system costs through manufacturing and producibility enhancements, and technology insertion. SMI includes studies and risk reduction activities to evolve the current Program of Record (PoR) constellation and/or simultaneously mature breakthrough technologies to create a leap in capability for follow-on systems to include FORGE, Next-Gen GEO and Polar, and Resilient Missile Warning/Missile Track (MW/MT) MEO.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Demonstrations/Prototypes	5.612	108.100	32.295
Description: Demonstrations and prototypes mature and prove viability of OPIR technologies, missions, and performance with ground and on-orbit prototypes. They enable transition of improved capabilities to full scale architectures and inform critical decisions for future fielding as well as support maturation of Mission Data Processing (MDP) algorithms for tactical and strategic applications by providing additional sensors and algorithms to advance detection and tracking. The MEO MTC effort leveraged the MTC Digital Engineering Risk Reduction in FY 2021-FY 2023 and transitioned out of SMI in FY 2024 to support the first Epoch described in PE 1206447SF BPAC 657MEO. The effort successfully demonstrated a digital engineering design for warning and tracking that met the Force Design and Analysis of Alternatives (AoA) criteria for an initial			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
warfighting capability. The SMI effort was critical to competing, maturing, designing, testing, and validating a system capable of tracking emerging missile threats outlined in the Missile Warning Missile Defense Capability Development Document (CDD). The WFOV demonstration matures WFOV technology and validates multi-mission capabilities including the potential for a single sensor to simultaneously perform strategic and tactical missions. WFOV successfully launched on 1 Jul 22 (FY 2022). The WFOV program will transition from Demonstrations to Data Exploitation after calibration and experimentation is completed in FY 2023. ***FY 2023 Plans:*** Missile Track Custody Demonstrations: Continue to execute up to two Other Transaction Agreements to build and mature digital engineering Model-Based Systems Engineering (MBSE) tools to model performance against the Missile Track Custody Technical Requirements Document (TRD) and the Missile Warning and Missile Defense Capabilities OPIR Capability Development Document (CDD). Select up to two vendors to proceed on to perform development culminating in a Space Vehicle Critical Design Review (CDR). Conduct a digital Space Vehicle Preliminary Design Review. Continue spacecraft bus development and purchase long lead parts. Conduct integrated demonstrations of the payload. Develop bus-to-payload interfaces, conduct spacecraft-to-ground requirements analysis and conduct early integration testing. Perform demonstrations to validate systems meet space system CDR entrance and exit criteria. Continue to mature Government Reference Digital Engineering Environment, MBSE and Performance Models to ensure that, as the designs mature, the Government can continue to manage risk while understanding system level performance or cost trades. Rapidly respond to implement system resiliency and situational awareness necessary to operate in a contested space domain. Activities may include, but are not limited to, program office support, studies, technical analysis, modeling, simulation, experimentation, prototyping. ***FY 2024 Plans:*** WFOV Program will transition to Data Exploitation in FY 2024. In the execution of the MEO/Low Earth Orbit (LEO) pivot, Space Systems Command (SSC) was designated as the lead end-to-end systems integrator and chartered to contribute to establishing a combined program office with the Space Development Agency (SDA) and Missile Defense Agency (MDA). As the SSC MEO and SDA LEO programs deploy capabilities in spiral increments, a centralized Digital Engineering Environment is necessary to capture MBSE requirements management and system level performance in support of multiple programs. In FY 2024, the OPIR Digital Engineering Demo will capture performance across sensors in development, current program of record sensors, and future government reference sensors to feed the requirements baseline for future OPIR spirals. This digital engineering effort will build upon the force design for a high-fidelity systems model that performs full system requirements traceability and detailed performance modeling of system in build. This effort will also demonstrate the use of cloud-based tools and models to share across SDA, MDA, Space Warfighting Analysis Center (SWAC), and others.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
There are two efforts that are on contract as of FY 2022. The first is the MEO specific transition to Secret Collateral Cloud using the Air Force's Cloud 1. The MEO program will leverage expertise to support a contract in FY 2024 to perform digital engineering and integration. The second is the OPIR Modeling and Simulation Center of Excellence established in FY 2022 to determine constellations and performance level trades using MEO, LEO, GEO, Highly Elliptical Orbit (HEO), and FORGE detailed models. To improve communication path diversity and delivery of low latency data without significantly ramping up ground entry points, development and test of Low Size Weight and Power (SWaP), high bandwidth, agile crosslinks for Medium Earth Orbit systems are necessary. Additionally, there is increasing demand for resiliency and communication path diversity of OPIR data driving the need for MEO to participate in enterprise networking of missile warning/tracking information. MEO Epoch 1 crosslinks were simplified in scope to preserve schedule and lower technical risks for initial performance/demonstration of utility. Epoch 2 must expand crosslink performance to pass and route tracking and warning data for correlation and fusion in multiple locations. As such, a demo is required prior to the start of Epoch 2 satellite development to enable a technology on-ramp. The Resilient MW/MT MEO Program Management Office (PMO) plans to combine funds with other mission partners to develop an enterprise capability. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to the MTC Demonstration activity transferring to centralize Missile Warning and Missile Tracking activity and improve budget transparency.			
Title: Technology Maturation	7.502	2.432	39.037
Description: Assess technology needs to support resiliency of PoR assets and future architectures that are responsive to the evolving threat environment. Perform trade and design studies to assess obsolescence, affordability, capability design modifications, and concept of operations (CONOPS) for the OPIR mission. Mature technologies and manufacturability to reduce cost, schedule, and technical risk for new component and subsystem designs that may be used in the future systems. Mature technologies including algorithms, Focal Plane Arrays (FPA), optical filters, on-board processors, auxiliary resiliency payloads, and other payload components for future missile warning satellites, and reconstitution capabilities. Develop modeling and simulation (M&S) capabilities, and engineering model prototypes for hardware/software integration and testing. These efforts will reduce risk and mature technologies applicable to future systems and architectures. Additionally, develop test beds to validate/verify requirements and ensure technical maturity for next-generation payload technologies as well as threat mitigation components and techniques. As a result of the SWAC AoA and Force Design, several key technologies areas were highlighted to execute the MEO/LEO pivot. A detailed manufacturability study was conducted in coordination with the SWAC during the AoA that recommend several critical technology maturation areas. ***FY 2023 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Evolve ongoing OPIR technology maturation efforts to further accelerate data-processing technologies, including resilient, onboard GEO algorithms, delivering standard scenes, and studies to investigate minimum detectable targets and raid scenarios. Continue to mature additional technologies in support of emerging program of record needs, including resilient, high dynamic range FPAs, resilient onboard MEO algorithms, radiation hardened memory, and reduced cost cryo-coolers. Advance prototyping resilient hardware and maturing critical technologies that include large format FPAs, resilient FPAs, resilient processing algorithms, pointing mirrors, threat sensors, and processors for earliest integration into Next-Gen OPIR or similar programs. Maintain and enhance efforts to develop technology options to address emerging threats and stressing targets to current and future OPIR systems. Progress development and space qualification of emerging technologies to reduce risk for Next-Gen OPIR satellites. Boost development of system resiliency and advanced technology concepts via ground and on-orbit demonstrations to validate performance, develop CONOPS, and prove enhanced system capabilities. Expand the development of test bed components for resiliency, requirements verification/validation, and to enhance technology maturation. ***FY 2024 Plans:*** Technology maturation will develop the next generation of FPAs that have higher dynamic range and increased resiliency. SSC will work with vendors to improve FPA manufacturing capability for larger format focal plane arrays to support the growing demands from sensor builders. FY 2024 funds will also support development of optimized intelligent tasking management. This effort will enhance the minimum-viable product for MEO Epoch 1 with scalability for future MEO growth to account for optimal tasking of area collection and real-time hypersonic containment. Furthermore, technical maturation will target investments in three-dimensional (3D) track correlation using artificial intelligence and machine learning for multi-orbit, higher volume sensor constellations. Additionally, funding will support filter technology and manufacturability to improve protection of sensors. Technology maturation will continue to invest in resilient processing algorithms and testbeds to support the hardware focused investments. Finally, additional technical maturation is required to support the crosslink demonstration in support of Epoch 2. Advances in technology should enable backwards compatibility in Epoch 2. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to support key technology insertion activities needed to accelerate MW/MT Epoch capability that require mature and manufacture-ready technology. In particular, for Epoch 2 and beyond, hardware technical maturation is necessary for focal plane arrays, coatings, and crosslinks. For improved performance and meeting tracking requirements in complicated missile raid scenarios, technical software maturation is required for next generation technologies in both fusion and tasking. These advances if successful, can transition as early as Epoch 1 to improve initial performance.			
Title: Data Exploitation	84.864	86.352	119.812
Description: Data exploitation efforts will exploit existing and future OPIR, environmental weather, and ground radar data sources including Defense Support Program (DSP), SBIRS HEO, SBIRS GEO Scanner, SBIRS GEO Starer, WFOV demonstration (launched 01 Jul 2022), Geostationary Operational Environmental Satellites-R series (GOES-R) East/West, prototypes, and future program data sources. Exploitation efforts include RDT&E and integrating multiple sensor data through collection, processing,			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
fusion, data dissemination, application and algorithm development and testing, network connectivity, and sensor performance assessments. SBIRS, WFOV and other space and ground-based sensors provide rich data sets for exploitation and fusion with the objective of filling sensor capability gaps in support of the new dim target threats. The SMI Data Exploitation TAP Lab provides researchers and developers access to raw and processed data and advanced DevSecOps (Development/Security/Operations) tools to develop applications and algorithms for delivery to the Buckley SFB OBAC in support of MW, MD, BA and TI mission areas. SMI data exploitation efforts are complementary to, and enhance, the exploitation capabilities delivered by the PoR and prototypes while pathfinding for future sensor PoRs. While performing data exploitation, the TAP Lab will serve as the primary software factory DevSecOps pipeline and subject matter experts to on-board new sensors into known operational fusion and correlation capabilities. SSC, SDA, and MDA will collaborate for future ground reference architecture for MEO and LEO that relies on sensors delivering formatted data to the Real-Time Transfer Service (RTS). Once published to the RTS, operational warning and defense software could then fuse and correlate data across sensors from all orbits to generate a 3D track. The 3D track will allow warning and defense operational systems to distribute and message appropriately. The TAP Lab will work with both the MEO MTC program office and SDA for early integration and testing using the FORGE framework. The TAP Lab is a critical piece in the future sensor proliferation as it provides a test and demo suite of resources to streamline sensor acceptance into certified warning and defense operations. Data exploitation efforts also evaluate tools for C2, mission management, and MDP to reduce risk to current and future programs. Data exploitation has also focused on pathfinding and evolving PoR ground systems to an open architecture framework. By incorporating C2, the TAP Lab offers the capability for launch and early orbit support as well operations and integration of future government owned, contractor operated OPIR prototypes. SMI ground system development activities seek to demonstrate the performance of an evolved ground system architecture capable of supporting multiple satellites, payloads, and missions through management and data processing. These efforts seek to lower operating costs with enhanced net-centric and service-oriented features with a new flexible expansion capability. Data exploitation efforts also support demonstration and prototype architecture planning and experimentation to include WFOV and other future sensor programs. ***FY 2023 Plans:*** Continue to innovate wildland fire tracking capabilities and incorporate applications into national fire tracking solution. Continue operations and Data Exploitation efforts on WFOV system as the satellite transitions from on-orbit check-out to its detailed experimentation plan. Incorporate results from WFOV payload calibration into WFOV MDP software. Develop and test WFOV calibration algorithm and execute the WFOV on-orbit calibration. Continue expanding operational capability of the data exploitation lab enabling applications to advance from a prototype state to a near-fully operational capability. Continue to support development of experimental operations and additional uses of the program of record data in the OBAC. Develop prototype processes for managing an open framework architecture. Develop applications for the OBAC that transition to the FORGE. Continue to support			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
experimentation, technology maturity, and evolution of exploitation algorithms and continue to provide enhanced ground segment capability and tools for C2, data collection, mission processing, and data dissemination via the Space Enterprise Consortium (SpEC) Other Transaction Agreements (OTAs) and Air Force Research Lab AFRL Broad Agency Announcement (BAA) contract vehicles. Enhance mission resiliency and data exploitation of SBIRS and other OPIR data using BAAs and OTAs. Continue to collaborate with the Intelligence Community (IC) and MDA to enhance Joint OPIR Ground (JOG) study initiatives. Continue to develop and demonstrate the performance of a Government owned open and extensible evolved ground system architecture to support multiple satellites, payloads, and missions, as required. Evolve data processing for infrared payload applications with enhanced net-centric and service-oriented features.			
FY 2024 Plans: Continue to innovate wildland fire tracking capabilities and incorporate applications into national fire tracking solutions. Deliver High Altitude Dim Event Stalker (HADES) suite of applications and algorithms that include target detection, track fusion and common operating picture visualization along with near-real-time recording capabilities to enhance ability to report on PACOM Joint Emergent Operational Need/Joint Urgent Operational Need (JEON/JUON) threats. This includes ingesting and tuning the HADES suite of applications to exploit the recently launched WFOV sensor data. Develop CONOPS for the WFOV 6-degree starer sensor over USINDOPACOM and participate in demonstrations and exercises with the community to ensure timely data delivery. Refine and improve WFOV calibration, experimentation, exploitation and data delivery as user requests increase and more stakeholders find utility with the new sensor data. WFOV data will be used to path find new algorithm processing chains at the TAP Lab, transition to the OBAC, and deliver new products to the warfighter community. Develop capabilities for HADES to ingest ground radar data as well as other available platform data available on RTS to fuse, evolve, and enhance the ability to detect and track missile, air, and other emerging threats. Expand exploitation lab sources and OBAC applications to support development of experimental operations. Develop prototype processes for managing an open framework architecture. Develop applications for the OBAC that transition to the FORGE. Support deployment, testing, and integration of the FORGE framework and all updates. Enhance mission resiliency and data exploitation of SBIRS and other OPIR data using BAAs and OTAs. Continue to collaborate with the IC and MDA to enhance JOG study initiatives. Continue to develop and demonstrate the performance of a Government owned open and extensible evolved ground system architecture to support multiple satellites, payloads, and missions, as required. Evolve data processing for infrared payload applications with enhanced net-centric and service-oriented features. In preparation for MEO and LEO Tracking Tranche 1 sensors, the TAP Lab will demonstrate a pipeline to on-board sensors into operations using a 3D track correlation and fusion ground capability, which will expedite transition of new sensors into operational systems. Additionally, it will create test, calibration, and tuning routines necessary for MEO and LEO performance validation to ensure downstream warning and defense operations can ingest sensor data. Collaborating with the FORGE MDP Application Provider, the TAP Lab will develop and incorporate 3D tracks for observers in hybrid constellations into a M&S tool to allow			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
enterprise-level tracking performance prediction against multiple scenarios based on data and analysis from multiple flight demo systems. 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, modeling, simulation, experimentation, prototyping. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to WFOV launch and aligned under data exploitation as a contributing sensor to the program of record by enhancing MW/MD/BA/TI and civil capabilities. Additionally, will expand the DevSecOps pipeline to onboard Next-Gen, MTC, SDA Tranche 1, other space and ground-based sensor data, and serve as pathfinder to transition the FORGE to ops to replace Block 20 legacy ground system.			
Accomplishments/Planned Programs Subtotals	97.978	196.884	191.144

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPAF 01 MSSBIR: *SBIR High (Space)*	156.481	0.000	-	-	-	0.000	0.000	-	-	0.000	156.481

Remarks

D. Acquisition Strategy

The program office will use a variety of acquisition approaches to execute various concept studies, technology maturation efforts, testbed/prototype demonstrations, and data exploitation initiatives and projects. The program office will collaborate with appropriate contracting agencies to support each individual effort. Data exploitation efforts in the laboratory and the OBAC will leverage existing external contracts, as well as new internal competitive contracts. Activities, such as SBIRS obsolescence and affordability enhancements to the existing satellite design, will leverage existing Program of Record contracts. Technology maturation and component prototyping and/or qualification could leverage existing contracts. BAAs and OTAs are planned in collaboration with AFRL and other government agencies. Where practical, other efforts are competed. A SSC BAA will be used to acquire and mature high priority technology items. Federally Funded Research and Development Center (FFRDC), University Affiliated Research Centers (UARCs), and Systems Engineering and Technical Assistance (SETA) contractors will also be used to conduct and support studies. New technology, replacement components, and system designs will be acquired with government data rights to the maximum extent, allowing incorporation into future OPIR satellite production or system development. Contracting partnerships with other agencies will also be used to study, develop, demonstrate, and prove emerging capabilities. To accelerate contracting actions and program execution, the SpEC will be utilized to execute OTAs to conduct data exploitation improvements at the OBAC and TAP Lab. A local SSC contract is being utilized for services at the OBAC and TAP Lab.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*	Project (Number/Name) 657009 / *Space Mod Initiative*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstrations/Prototypes (Demos)	Various	Various : Various	-	4.000	Dec 2021	97.737	Dec 2022	0.000	Dec 2023	-		0.000	Continuing	Continuing	-
Demos - MEO Digital Engineering	Various	Various : Various	-	-		-		7.830	Dec 2023	-		7.830	Continuing	Continuing	-
Demos - OPIR Center of Excellence	Various	Various : Various	-	-		-		3.524	Dec 2023	-		3.524	Continuing	Continuing	-
Demos - Low SWaP Crosslink	Various	Various : Various	-	-		-		14.529	Dec 2023	-		14.529	Continuing	Continuing	-
Technology Maturation (Tech Mat)	Various	Various : Various	-	5.347	Jan 2022	2.199	Jan 2023	0.000	Jan 2024	-		0.000	Continuing	Continuing	-
Tech Mat - Resilient FPAs	MIPR	SAF/FMBIB : Washington, DC	-	-		-		14.400	Jan 2024	-		14.400	Continuing	Continuing	-
Tech Mat - Intelligent Tasking	Various	Various : Various	-	-		-		3.848	Jan 2024	-		3.848	Continuing	Continuing	-
Tech Mat - 3D Correlation/ Fusion	Various	Various : Various	-	-		-		3.848	Jan 2024	-		3.848	Continuing	Continuing	-
Tech Mat - Filters and Coating	MIPR	Various : Various	-	-		-		1.931	Jan 2024	-		1.931	Continuing	Continuing	-
Tech Mat - Resilient Algorithms/Test Bed	MIPR	Various : Various	-	-		-		3.848	Jan 2024	-		3.848	Continuing	Continuing	-
Tech Mat - Crosslink Enabling Tech	Various	Various : Various	-	-		-		3.412	Jan 2024	-		3.412	Continuing	Continuing	-
Data Exploitation (Data Ex)	Various	Various : Various	-	68.677	Jan 2022	73.836	Jan 2023	74.851	Jan 2024	-		74.851	Continuing	Continuing	-
Data Ex - TAP Lab and OBAC Support Services (TLOSS)	Various	Net-Centric Design Prof : Boulder, CO	-	-		-		18.000	Jan 2024	-		18.000	Continuing	Continuing	-
Data Ex - Wide Field of View (WFOV) Activities	MIPR	NASA : Moffett Field, CA	-	-		-		19.040	Jan 2024	-		19.040	Continuing	Continuing	-
Enterprise SE&I	Various	Various : Various	-	2.252	Dec 2021	6.633	Dec 2022	6.500	Dec 2023	-		6.500	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corporation : El Segundo, CA	-	3.580	Oct 2021	3.202	Oct 2022	3.298	Jan 2024	-		3.298	Continuing	Continuing	-
		Subtotal	-	83.856		183.607		178.859		-		178.859	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*	Project (Number/Name) 657009 / *Space Mod Initiative*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : Various	-	9.803	Dec 2021	7.493	Dec 2022	8.080	Oct 2023	-		8.080	Continuing	Continuing	-
A&AS	Various	Various : Various	-	4.068	Oct 2021	5.384	Oct 2022	3.805	Oct 2023	-		3.805	Continuing	Continuing	-
Other Support	Various	Various : Various	-	0.251	Jan 2022	0.400	Jan 2023	0.400	Oct 2023	-		0.400	Continuing	Continuing	-
		Subtotal	-	14.122		13.277		12.285		-		12.285	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	97.978		196.884		191.144		-		191.144	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

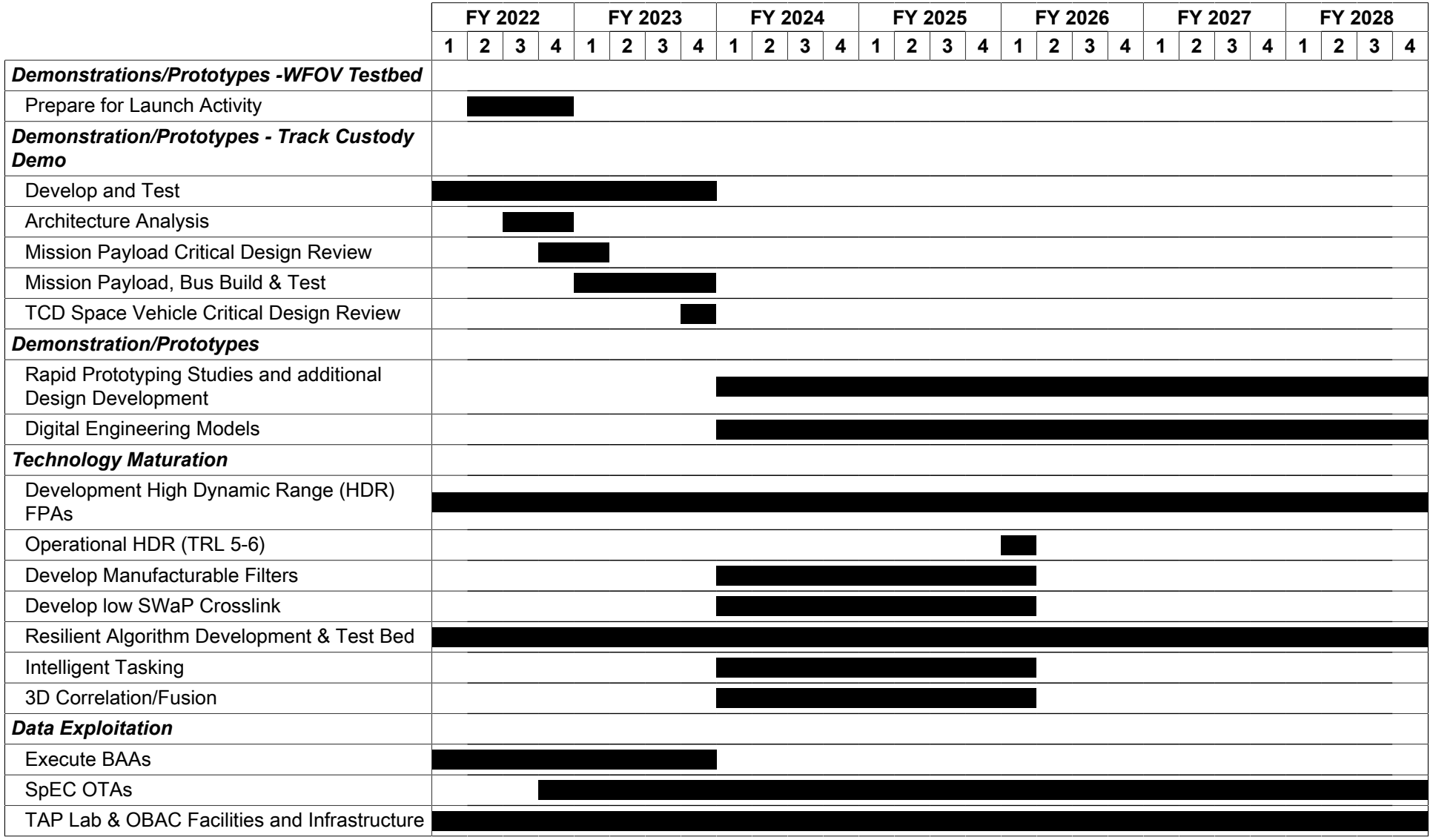

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

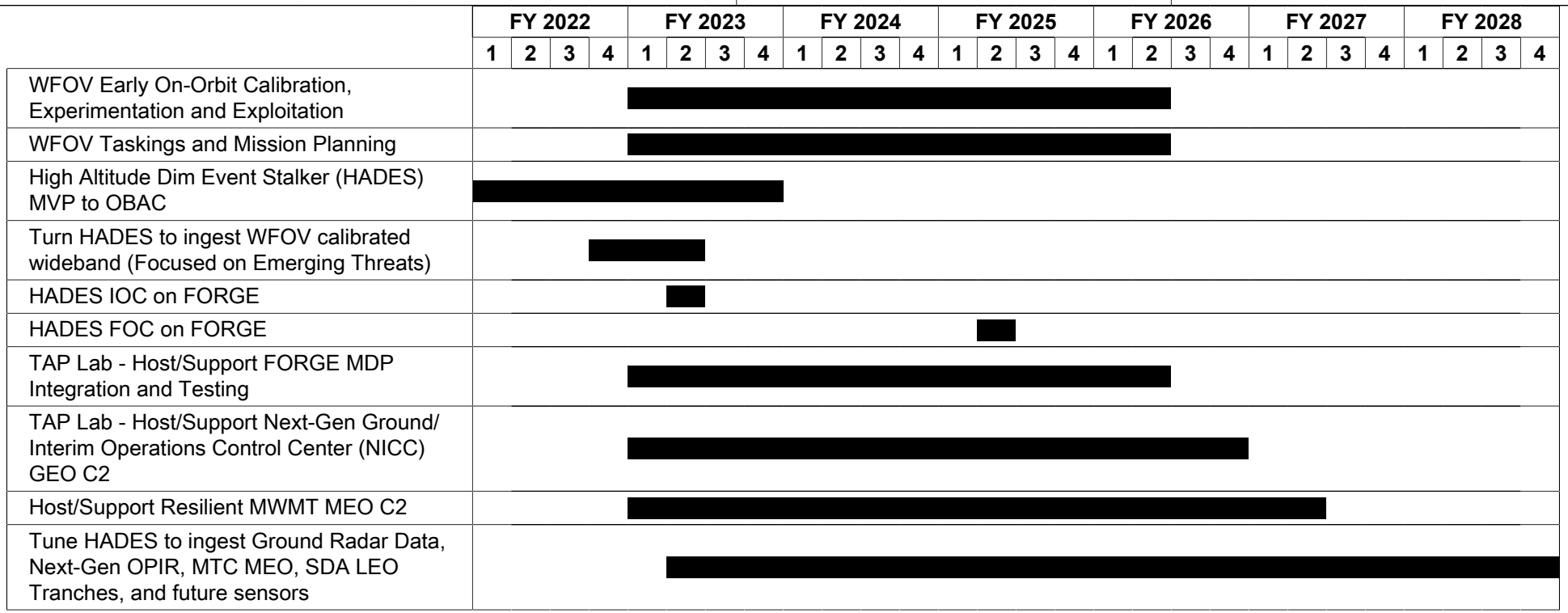

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Demonstrations/Prototypes -WFOV Testbed				
Prepare for Launch Activity	2	2022	4	2022
Demonstration/Prototypes - Track Custody Demo				
Develop and Test	1	2022	4	2023
Architecture Analysis	3	2022	4	2022
Mission Payload Critical Design Review	4	2022	1	2023
Mission Payload, Bus Build & Test	1	2023	4	2023
TCD Space Vehicle Critical Design Review	4	2023	4	2023
Demonstration/Prototypes				
Rapid Prototyping Studies and additional Design Development	1	2024	4	2028
Digital Engineering Models	1	2024	4	2028
Technology Maturation				
Development High Dynamic Range (HDR) FPAs	1	2022	4	2028
Operational HDR (TRL 5-6)	1	2026	1	2026
Develop Manufacturable Filters	1	2024	1	2026
Develop low SWaP Crosslink	1	2024	1	2026
Resilient Algorithm Development & Test Bed	1	2022	4	2028
Intelligent Tasking	1	2024	1	2026
3D Correlation/Fusion	1	2024	1	2026
Data Exploitation				
Execute BAAs	1	2022	4	2023
SpEC OTAs	4	2022	4	2028
TAP Lab & OBAC Facilities and Infrastructure	1	2022	4	2028

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
WFOV Early On-Orbit Calibration, Experimentation and Exploitation	1	2023	2	2026
WFOV Taskings and Mission Planning	1	2023	2	2026
High Altitude Dim Event Stalker (HADES) MVP to OBAC	1	2022	4	2023
Turn HADES to ingest WFOV calibrated wideband (Focused on Emerging Threats)	4	2022	2	2023
HADES IOC on FORGE	2	2023	2	2023
HADES FOC on FORGE	2	2025	2	2025
TAP Lab - Host/Support FORGE MDP Integration and Testing	1	2023	2	2026
TAP Lab - Host/Support Next-Gen Ground/Interim Operations Control Center (NICC) GEO C2	1	2023	4	2026
Host/Support Resilient MWMT MEO C2	1	2023	2	2027
Tune HADES to ingest Ground Radar Data, Next-Gen OPIR, MTC MEO, SDA LEO Tranches, and future sensors	2	2023	4	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*	Project (Number/Name) 657123 / *Integration*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
657123: *Integration*	-	27.875	29.717	31.034	0.000	31.034	32.177	30.677	31.305	32.435	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Government works with the Enterprise System Engineering & Integration (SE&I) contractor as a team to define the Next-Gen OPIR enterprise architecture, control and validate interfaces, ensure compatibility of Next-Gen OPIR systems, and develop/manage plans for fielding the Next-Gen OPIR segments. Further, the Enterprise SE&I executes system-level integration requirements between segments such as Space to Ground. This differs from integration within each segment; integration within segments refers to subsystem-level integration between subsystems such as a spacecraft bus to the mission payload. The Government Integrator is responsible for defining the Next-Gen OPIR enterprise architecture, controls and validates interfaces, ensures compatibility of Next-Gen OPIR systems, and develops/manages plans for fielding the Next-Gen OPIR Enterprise. Further, the Integrator executes Model Based System Engineering (MBSE) through modeling, simulation, and technical analyses of Government-directed enterprise level trades among the Next-Gen OPIR segments. These trades lead to definition, management, maintenance, and evolution of the Next-Gen OPIR Enterprise technical requirements and interface documents to ensure the integrity of the enterprise technical baseline.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Next-Gen OPIR Space, Integration	27.875	29.717	31.034
Description: The Integration (Project 657123) project includes the efforts associated with the Government's primary role and tasks necessary to accomplish the critical lead system integration function with the OPIR enterprise material segments (Next-Gen Geosynchronous Earth Orbit (GEO) (NGG), Next-Gen Polar (NGP), Next-Gen Ground, and the Resilient Missile Warning/ Missile Track (MW/MT) architecture). The Next-Gen OPIR Program Manager is responsible for directing the Next-Gen OPIR current Enterprise architecture, system definition, controls and validates interfaces, ensures compatibility of Next-Gen systems, and develops/manages plans for execution and fielding of the Next-Gen OPIR Enterprise. ***FY 2023 Plans:*** Continue to execute critical System of Systems planning and execution. Scheduled activities: NGG space-to-ground compatibility testing. Plan for major pre-launch enterprise integration events including NGG pre-launch readiness testing. Activities include, but not limited to, management of the technical baseline; continued definition of space to ground interfaces, Early Integration Demonstration activities, Space to Ground integration and test planning activities, cross-segment engineering trades, and hosted payload integration and test activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support studies, technical analysis experimentation, and prototyping. ***FY 2024 Plans:*** Continue to plan and execute the critical lead system integration function across the System of Systems. Activities include NGG space-to-ground compatibility testing and planning for major pre-launch enterprise integration events such as NGG pre-launch			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
readiness testing. Continue development of Space/Ground interface, analysis for the Future Operationally Resilient Ground Evolution (FORGE) Next-Gen GEO Transition, analysis and integration for NGG space vehicle 2 bus integration and intersegment testing. Conduct NGP System level Critical Design Review (CDR) with NGP prime contractor. Conduct System Requirements Review for Survivable/Endurable Next-Gen OPIR requirements. Continue management of missile warning technical baseline and cross-segment requirement verification and test activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis experimentation, and prototyping. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to inflation, an increase in NGG pre-launch preparations, and NGP CDR.			
Accomplishments/Planned Programs Subtotals	27.875	29.717	31.034

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Space Force will exercise complete ownership of the architecture, system definition, technical baseline, and integration of Next-Gen OPIR space and ground segments. While this complex intersegment integration is traditionally performed by a prime contractor under a systems development contract, for Next-Gen OPIR, this approach requires the government to be the integrator. To execute this responsibility, the government leverages systems engineering and integration expertise from the SE&I contractor. The Program Office intends to contract for this capability through a SE&I follow-on Contract. There is a contractor finishing the execution of the current SE&I contract in 2022 with options into FY 2023, and the follow-on effort will be a competitive award expected for award in FY 2023. In this effort, the contractor will be tightly integrated with the government team to assist in executing the government lead system integration and validation function. This function requires system analysis, integration planning, integration execution, leveraging that expertise from the Prime Contractors for NGG, NGP, and FORGE. These prime contractors have System Engineering, Integrations and Test (SEIT) scope on the respective contracts.

The follow-on SE&I contract will encompass two functions: first, it primarily supports the Enterprise SE&I effort captured in this Integration Project. Secondly, the contract includes scope to execute SE&I requirements internal to each segment.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*	Project (Number/Name) 657123 / *Integration*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Enterprise SE&I Direct Support	Various	Various : Various	-	24.070	Jan 2022	22.153	Jan 2023	17.988	Jan 2024	-		17.988	Continuing	Continuing	-
OPIR Modeling & Simulation	Various	Various : Various	-	3.311	Jan 2022	7.000	May 2023	12.000	Jan 2024	-		12.000	Continuing	Continuing	-
		Subtotal	-	27.381		29.153		29.988		-		29.988	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	0.494	Oct 2022	0.543	Feb 2023	1.024	Oct 2023	-		1.024	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		0.021	Jan 2023	0.022	Oct 2023	-		0.022	Continuing	Continuing	-
		Subtotal	-	0.494		0.564		1.046		-		1.046	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	27.875		29.717		31.034		-		31.034	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657123 / *Integration*

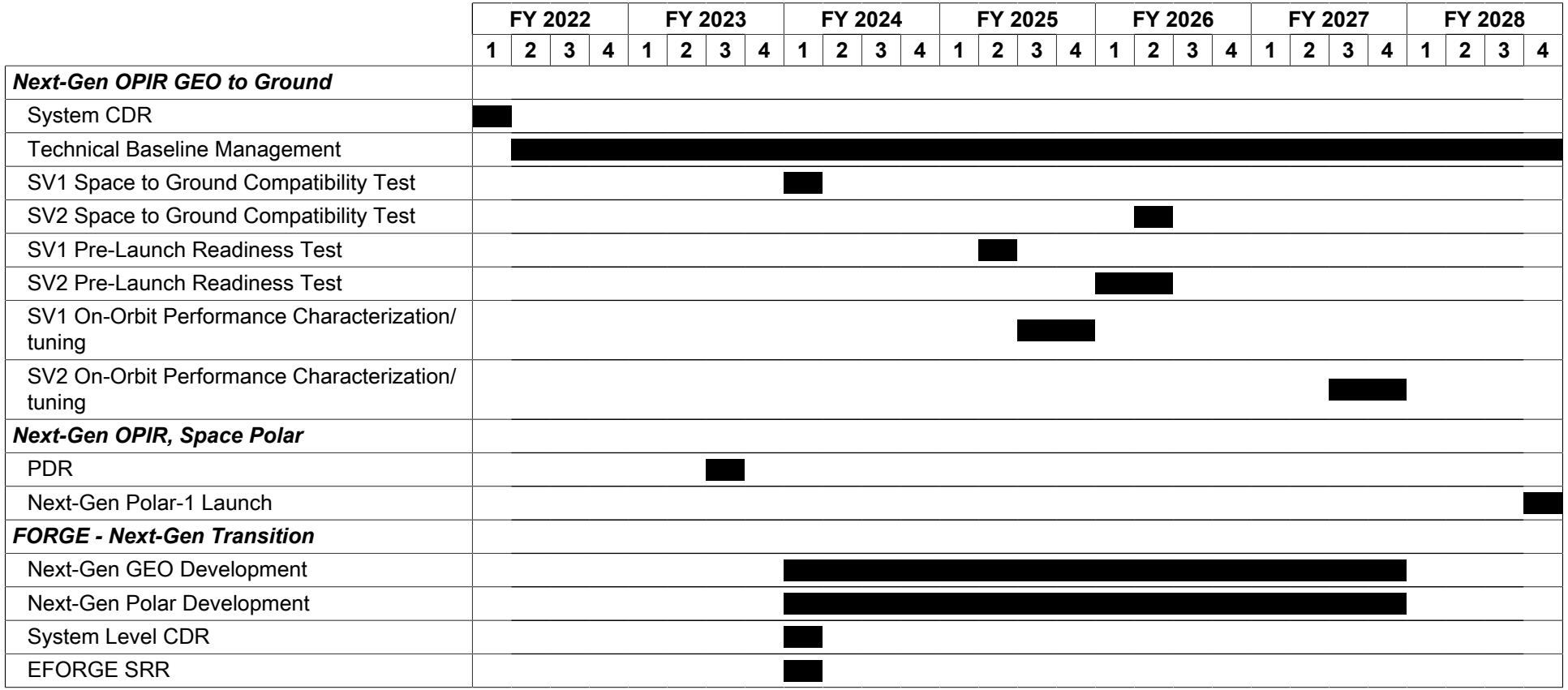

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657123 / *Integration*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Next-Gen OPIR GEO to Ground				
System CDR	1	2022	1	2022
Technical Baseline Management	2	2022	4	2028
SV1 Space to Ground Compatibility Test	1	2024	1	2024
SV2 Space to Ground Compatibility Test	2	2026	2	2026
SV1 Pre-Launch Readiness Test	2	2025	2	2025
SV2 Pre-Launch Readiness Test	1	2026	2	2026
SV1 On-Orbit Performance Characterization/tuning	3	2025	4	2025
SV2 On-Orbit Performance Characterization/tuning	3	2027	4	2027
Next-Gen OPIR, Space Polar				
PDR	3	2023	3	2023
Next-Gen Polar-1 Launch	4	2028	4	2028
FORGE - Next-Gen Transition				
Next-Gen GEO Development	1	2024	4	2027
Next-Gen Polar Development	1	2024	4	2027
System Level CDR	1	2024	1	2024
EFORGE SRR	1	2024	1	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206443SF / *Next-Gen OPIR -- GEO*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	1,199.193	1,694.933	719.731	0.000	719.731	509.910	449.160	484.857	508.622	Continuing	Continuing
657120: *Next-Gen OPIR Space GEO*	-	1,199.193	1,694.933	719.731	0.000	719.731	509.910	449.160	484.857	508.622	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In accordance with Congressional transfer direction in the FY 2023 enacted budget, funds in Program Element (PE) 1206442SF, Project 657120, Next-Gen OPIR Space, Block 0 GEO, have been transferred to 1206443SF, Next-Gen OPIR - GEO. FY 2024 and beyond budget is now included in this PE.

A. Mission Description and Budget Item Justification

Next-Generation Overhead Persistent Infrared (Next-Gen OPIR) Geosynchronous Earth Orbit (GEO) (Project 657120): The primary mission is to provide initial missile warning of a ballistic missile attack on the US, deployed forces and allies. The Next-Gen OPIR GEO (NGG) missile warning satellites enhance detection and improve reporting of intercontinental ballistic missile launches, submarine ballistic missile launches, and tactical ballistic missile launches. Development consists of new payloads in a highly resilient bus, providing real-time persistent global infrared coverage to meet validated Joint Requirements Oversight Council (JROC) requirements on current and future space domain demands. The Program Office is acquiring the NGG capability in two contract actions. Phase 1 awarded in August 2018 encompasses requirements analysis, design/development, critical path flight hardware procurement, and risk reduction efforts leading to a System Critical Design Review (CDR) in October 2021. Phase 2 was awarded in January 2021 for the manufacturing, assembly, system integration and test, launch, and early on-orbit test through operational acceptance of NGG satellites 1-3.

The Department has assessed the third satellite vehicle is not required as a result of continued positive performance of the SBIRS constellation and the anticipated full operational capability of the Medium Earth Orbit (MEO), Program Element 1206447SF/ Low Earth Orbit (LEO), Program Element 1206446SF missile tracking constellation. The program has removed the third satellite development efforts from the FY 2024 budget request.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose capabilities.

The Next-Gen OPIR Space Rapid Prototype (RP) Middle Tier of Acquisition (MTA) effort will close NLT 1QFY2024. Beyond the MTA portion, both NGG and NGP activities are expected to be designated as Major Capability Acquisition programs.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206443SF *I Next-Gen OPIR -- GEO*

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Next-Gen OPIR GEO system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	1,199.193	0.000	0.000	0.000	0.000
Current President's Budget	1,199.193	1,694.933	719.731	0.000	719.731
Total Adjustments	0.000	1,694.933	719.731	0.000	719.731
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-19.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	1,713.933			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	719.731	0.000	719.731

Change Summary Explanation

FY 2023: +1,173.933M; in accordance with Congressional direction in the FY 2023 enacted budget, funds in PE 1206442SF, Project 657120, Next-Gen OPIR Space, Block 0 GEO, have transferred to PE 1206443SF.
FY 2023: -19.000M; Congressionally directed reduction for Product Development excess to need.
FY 2024: +719.731M; budget submitted previously in PE 1206442SF, now submitted in PE 1206443SF includes inflation and reduced due to NGG-3 removal and higher USSF priorities.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Next-Gen OPIR GEO	1,199.193	1,694.933	719.731
Description: Development of the Next-Gen OPIR GEO missile warning satellites with a proven bus, new hardened sensors, and auxiliary payloads for increased resilience. The space segment for GEO missile warning satellites consists of a resilient architecture providing real time persistent global equatorial infrared coverage. The first GEO satellite is required in 2025.			
FY 2023 Plans: Continue Phase 2 efforts to build and deliver 2 GEO space vehicles (SVs). Continue assembly, integration and test of two competing payloads. Complete testing of at least one flight mission payload for SV #1 and delivery for integration into the SV.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206443SF *I Next-Gen OPIR -- GEO*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue efforts to manufacture, build, integrate, and test the GEO SV #1, including the first system-level integrated testing to enable discovery and correction of defects critical to launch. Conduct mission and auxiliary payload integration onto SV #1. Conduct SV #1 acoustic test. Continue critical path flight hardware procurement for SVs #2. Begin efforts to manufacture, build, integrate, and test the GEO SV #2, including early subsystem integration and testing. Rapidly respond to updated intelligence on threats and implement system resiliency and situational awareness necessary to operate in a contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, modeling, simulation, experimentation, prototyping. ***FY 2024 Plans:*** FY 2024 funds are required to preserve 2025 initial launch capability (ILC) for SV #1, perform space/ground integration activities, and continue build and integration activities for SV #2. Continue Phase 2 efforts to build and deliver 2 GEO SVs. Conduct system-level assembly and test for the GEO SV #1, including space-to-ground testing to enable discovery and correction of defects critical to launch. Conduct environmental thermal-vacuum testing for the fully assembled SV #1. Continue assembly, integration and test of the second of two competing payloads. Complete testing of the flight mission payload for SV #2 and delivery for integration into the SV. Continue flight hardware procurement for SV #2. Continue efforts to manufacture, build, integrate, and test the GEO SV #2, including subsystem integration and testing. Continue Enterprise Planning and support for secure communications including government-furnished flight cryptologic units, long-haul communications, launch integration efforts, etc., which were carried in the core project cost category in previous years. Rapidly respond to updated intelligence on threats and implement system resiliency and situational awareness necessary to operate in a contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, modeling, simulation, experimentation, prototyping. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to completion of most of the non-recurring engineering and long-lead procurements for the program, delivery of the first mission payload, completion of a significant portion of the build and integration work for SV #1, and the off-ramp of SV #3 scope.			
Accomplishments/Planned Programs Subtotals	1,199.193	1,694.933	719.731

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The Space Force intends to rapidly acquire Next-Gen systems in order to out-pace adversary missile and counterspace threats while maintaining survivable, global missile warning capability sufficient to enable a transition to the future Force Design architecture. Next-Gen OPIR GEO consists of 2 Next-Gen GEO satellites. The

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206443SF / *Next-Gen OPIR -- GEO*

Next-Gen OPIR Space program is designated a Middle Tier Acquisition (MTA) Rapid Prototype effort under Section 804 of the 2016 National Defense Authorization Act (NDAA). The Next-Gen OPIR GEO program portion of the MTA is expected to be re-designated an Acquisition Category (ACAT)-1B Major Capability Acquisition program in 2023. The first GEO satellite is required by 2025. The program office awarded a sole source contract under the authority of a Justification & Authorization document. The Next-Gen GEO Phase 1 contract was awarded in FY 2018, consisting of requirements development, critical path flight hardware procurement, and risk reduction efforts culminating in an October 2021 System Critical Design Review (CDR). The Next-Gen GEO Phase 2 modification was awarded in January 2021, and includes scope for parts procurement, assembly, integration, test, launch, and checkout of 3 GEO space vehicles. The third space vehicle will be de-scoped from the contract as a result of continued positive performance of the SBIRS constellation and the anticipated operational capability of the Medium Earth Orbit (MEO), Program Element 1206447SF/ Low Earth Orbit (LEO), Program Element 1206446SF missile tracking constellation.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206443SF / *Next-Gen OPIR -- GEO*	Project (Number/Name) 657120 / *Next-Gen OPIR Space GEO*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next-Gen OPIR GEO (Phase 1 & 2)	Various	Lockheed Martin; Various : Various	-	1,144.922	Oct 2021	1,625.859	Oct 2022	614.264	Oct 2023	-		614.264	Continuing	Continuing	-
Enterprise Crypto	Various	General Dynamics; Various : Various	-	-		-		10.991	Oct 2023	-		10.991	Continuing	Continuing	-
Comm GFP	C/CPFF	Sev1 Tech : El Segundo, CA	-	-		-		2.097	Oct 2023	-		2.097	Continuing	Continuing	-
Launch Support	Various	Various : Various	-	-		-		16.492	Oct 2023	-		16.492	Continuing	Continuing	-
SE&I	Various	Various : Various	-	16.589	Nov 2021	18.441	Dec 2022	23.033	Nov 2023	-		23.033	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corporation : El Segundo, CA	-	15.201	Oct 2021	20.555	Oct 2022	17.505	Oct 2023	-		17.505	Continuing	Continuing	-
		Subtotal	-	1,176.712		1,664.855		684.382		-		684.382	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corporation : El Segundo, CA	-	7.756	Oct 2021	12.621	Oct 2022	10.267	Oct 2023	-		10.267	Continuing	Continuing	-
A&AS	Various	Various : TBD	-	14.266	Feb 2022	17.051	Feb 2023	24.666	Feb 2024	-		24.666	Continuing	Continuing	-
Other Support	Various	Various : TBD	-	0.459	Oct 2021	0.406	Oct 2022	0.416	Oct 2023	-		0.416	Continuing	Continuing	-
		Subtotal	-	22.481		30.078		35.349		-		35.349	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1,199.193		1,694.933		719.731		-		719.731	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206443SF / *Next-Gen OPIR -- GEO*	**Project (Number/Name)** 657120 / *Next-Gen OPIR Space GEO*

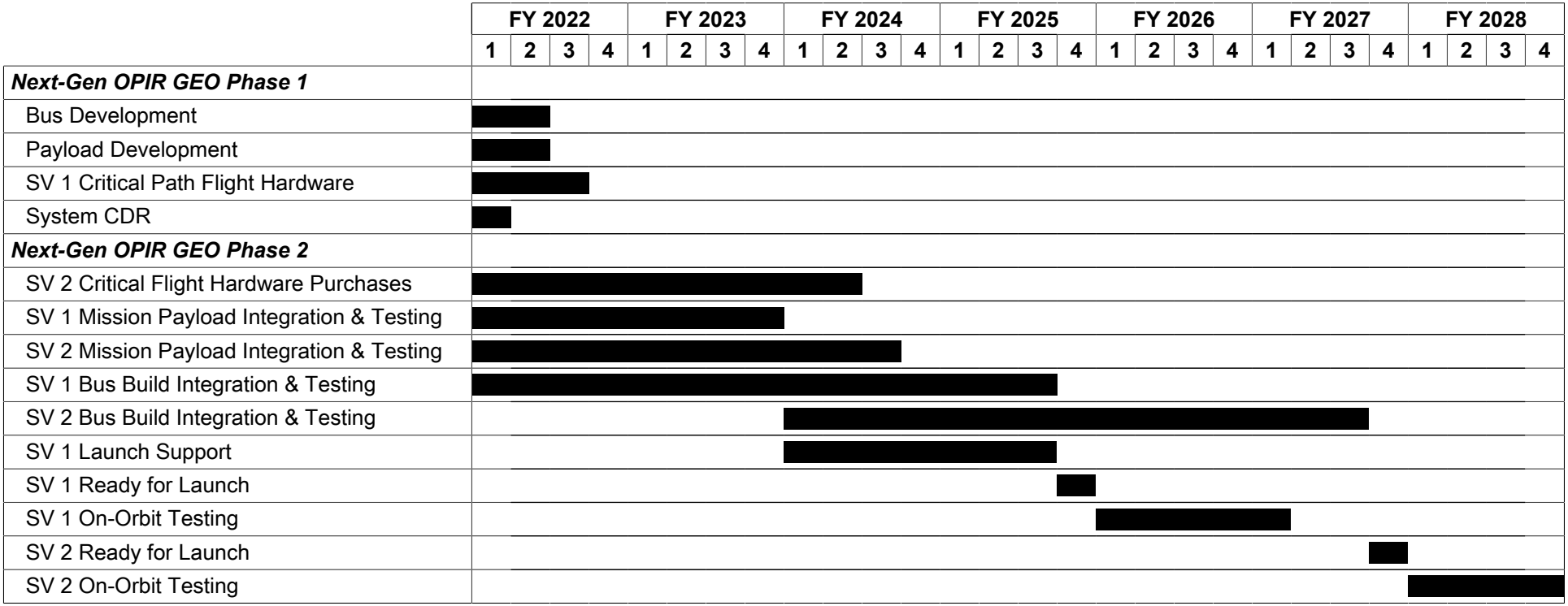

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206443SF / *Next-Gen OPIR -- GEO*	**Project (Number/Name)** 657120 / *Next-Gen OPIR Space GEO*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Next-Gen OPIR GEO Phase 1				
Bus Development	1	2022	2	2022
Payload Development	1	2022	2	2022
SV 1 Critical Path Flight Hardware	1	2022	3	2022
System CDR	1	2022	1	2022
Next-Gen OPIR GEO Phase 2				
SV 2 Critical Flight Hardware Purchases	1	2022	2	2024
SV 1 Mission Payload Integration & Testing	1	2022	4	2023
SV 2 Mission Payload Integration & Testing	1	2022	3	2024
SV 1 Bus Build Integration & Testing	1	2022	3	2025
SV 2 Bus Build Integration & Testing	1	2024	3	2027
SV 1 Launch Support	1	2024	3	2025
SV 1 Ready for Launch	4	2025	4	2025
SV 1 On-Orbit Testing	1	2026	1	2027
SV 2 Ready for Launch	4	2027	4	2027
SV 2 On-Orbit Testing	1	2028	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206444SF *I Next-Gen OPIR -- Polar*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	471.398	849.196	1,013.478	0.000	1,013.478	897.341	473.874	440.220	385.170	Continuing	Continuing
657121: *Next-Gen OPIR Space, Block 0 Polar*	-	471.398	849.196	1,013.478	0.000	1,013.478	897.341	473.874	440.220	385.170	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In accordance with Congressional transfer direction in the FY 2023 enacted budget, funds in Program Element (PE) 1206442SF, Project 657121, Next-Gen OPIR Space, Block 0 Polar, have been transferred to 1206444SF, Next-Gen OPIR - Polar. FY 2024 and beyond budget is now included in this PE.

A. Mission Description and Budget Item Justification

Next-Generation Overhead Persistent Infrared (OPIR) Space, Block 0 Polar (Project 657121): The primary mission is to provide initial missile warning of a ballistic missile attack on the US, its deployed forces, and its allies. Next-Gen OPIR Space enhances detection and improves reporting of intercontinental ballistic missile launches, submarine launched ballistic missile launches, and tactical ballistic missile launches. Development consists of the Next-Gen OPIR Polar (NGP) missile warning satellites with new payloads in a highly resilient bus, providing real-time persistent global infrared coverage to meet validated Joint Requirements Oversight Council (JROC) requirements on current and future space domain demands.

The Program Office is acquiring the NGP capability through three contract phases. Phase 0, awarded in June 2018, encompassed system requirements analysis and risk reduction efforts, which led to a March 2020 System Requirements Review (SRR). Phase 1, awarded in May 2020, encompasses engineering design, unit hardware procurement, component and subsystem qualification and design, critical path flight hardware procurement, and risk reduction efforts leading to a System Critical Design review (CDR) in FY 2024. Phase 2 will be awarded prior to System CDR for the manufacturing, assembly, integration & test, launch and early on orbit test, through operational acceptance of NGP satellites 1 and 2.

The Next-Gen OPIR Space Rapid Prototype (RP) Middle Tier of Acquisition (MTA) effort will close NLT 1QFY2024. Beyond the MTA portion, both NGG and NGP activities are expected to be designated as Major Capability Acquisition programs.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC 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 Next-Gen OPIR Polar system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206444SF / *Next-Gen OPIR -- Polar*

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	471.398	0.000	0.000	0.000	0.000
Current President's Budget	471.398	849.196	1,013.478	0.000	1,013.478
Total Adjustments	0.000	849.196	1,013.478	0.000	1,013.478
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-90.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	40.000			
• Congressional Directed Transfers	0.000	899.196			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	1,013.478	0.000	1,013.478

Change Summary Explanation

FY 2023: +899.196M; in accordance with Congressional transfer direction in the FY 2023 enacted budget, funds in PE 1206442SF, Project 657121, Next-Gen OPIR Space, Block 0 Polar, have transferred to PE 1206444SF.

FY 2023: -90.000M; Congressionally directed reduction for expenditure delays relating to undefinitized contract action.

FY 2023: +25.000M; Congressional add for schedule risk reduction.

FY 2023: +15.000M; Congressional add for onboard resilience.

FY 2024: +1013.478M; in accordance with Congressional transfer direction in the FY 2022 enacted budget, funds in PE 1206442SF, Project 657121, Next-Gen OPIR Space, Block 0 Polar, have transferred to PE 1206444SF and for inflation.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Next-Gen OPIR Space, Block 0 Polar	471.398	849.196	1,013.478
Description: Development of the Next-Gen OPIR Polar (NGP) missile warning satellites using a proven bus with modifications, auxiliary payloads for improved resiliency, and new hardened sensors. The Polar space segment will consist of two NGP satellites in a resilient architecture, providing real time persistent infrared coverage of the northern hemisphere.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206444SF / *Next-Gen OPIR -- Polar*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024

FY 2023 Plans:

Continue to execute system engineering and bus maturation activities leading to Preliminary Design Review (PDR). Scheduled activities include Internal Design Reviews (IDRs) which flow into Preliminary Design Audits (PDAs); the completion of the IDRs and PDAs are unique to Northrup Grumman for pre-PDR readiness. The activities supporting Space Vehicle development are to continue and mature the bus design and complete unit and sub-system level IDRs. The Communications Payload (CPL) and Cryptographic units will continue engineering, design, and hardware/software risk reduction activities to support System PDR. Many of the early stages of component-level IDRs will complete to solidify CPL preliminary design. The acceleration and execution of the SV, ground cryptographic equipment designs, and hardware prototyping will support timely completion of NGP design integration. This includes design and test plans for space to ground testing, delivery of cybersecurity design documents, and completion of cross-agency design audits to mature the Polar cybersecurity approach. Additionally, the execution of the Cyber Table Top exercises will identify design security risks that can be mitigated pre-PDR; and complete the Cybersecurity Strategy which will inform the decision for Authority to Operate. Assembly, Integration and Test (AI&T) path to PDR includes completion of Producibility & Ground System Engineering (GSE) Requirements: documentation and product development such as AI&T Plan & Procedures; Mechanical Ground System Engineering (MGSE); Electrical Ground System Engineering (EGSE), and significant oversight of factory facilities modernization and test bed development.

FY 2024 Plans:

FY 2024 funds are required to execute the program Critical Design Review (CDR) campaign, begin preparations for the production, assembly, test, and launch phase of the program, and preserve FY 2028 initial launch capability (ILC) for satellite vehicle (SV) #1. Conduct critical design activities for communications payload, cryptographic units, auxiliary payloads, satellite bus, mission payload, mission unique ground system, and hardware/software early risk reduction activities to support the CDR. Scheduled activities include IDRs to demonstrate individual units are at CDR maturity. This will flow into Critical Design Audits (CDAs) to demonstrate subsystem CDR maturity and the Baseline Technical Review 9 (BTR-9), an interim review to synchronize design and analysis cycles, as well as on-going system preparation and execution, to lead to the CDR milestone. Finalize efforts to develop Engineering Design Units and Flight Hardware for component and subsystem qualification of design. Additionally, preparation work for phase 2 set to be awarded in 2nd Quarter FY 2024, to begin Polar SV 1 AI&T, which will bring the program from CDR through launch, early on orbit testing and operational acceptance. Procure long lead items to support Phase 2 scheduled dates. Continue Enterprise Planning and support for secure communications including government-furnished flight cryptologic units, long-haul communications, ground integration, launch integration efforts, etc. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping.

FY 2023 to FY 2024 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206444SF *I Next-Gen OPIR -- Polar*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 funding increased to support post-PDR activities, including bus, communication payload, cryptographic units and mission payload critical design audits with ramp up leading to system CDR in 2024. Additionally, final engineering design unit hardware procurement, component and subsystem qualification & design, and critical path flight hardware procurement will occur. Finally, preparation work for phase 2 set to be awarded in 2nd Quarter FY 2024 will be accomplished, which will include all work required to execute hardware/software procurement and integration activities, to include launch, early orbit testing and operational acceptance.			
Accomplishments/Planned Programs Subtotals	471.398	849.196	1,013.478

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The Space Force intends to rapidly acquire Next-Gen systems to out-pace adversary missile and counterspace threats while maintaining survivable, global missile warning capability sufficient to enable a transition to the future Force Design Architecture. Next-Gen Polar consists of 2 satellites. The Next-Gen OPIR Space program has been designated a Middle Tier Acquisition (MTA) Rapid Prototype effort under Section 804 of the 2016 National Defense Authorization Act (NDAA). The purpose of the MTA is to develop and qualify up to two competitive mission payloads. Following completion of the MTA activity, the NGP program will transition to a Major Capability Acquisition program by the end of FY 2023. The first GEO satellite is required by FY 2025 and the first Polar satellite is required in FY 2028. The program office awarded a sole source contract under the authority of a Justification & Authorization document. The NGP Phase 0 was awarded in FY 2018, consisting of requirements development, and culminated in a March 2020 SRR. Phase 1 was awarded May 2020, encompassing requirements review, design, development, critical path flight hardware procurement, and risk reduction efforts leading to a System CDR no later than FY 2024 for NGP SVs 1 and 2. Phase 2 will be awarded prior to System CDR, encompassing build, integration, test, launch, and transition to operations for NGP SVs 1 and 2.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206444SF / *Next-Gen OPIR -- Polar*	Project (Number/Name) 657121 / *Next-Gen OPIR Space, Block 0 Polar*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next-Gen OPIR Space,Block 0 Polar Phase 1 & 2	SS/CPIF	Northrop Grumman : Redondo Beach, CA	-	441.192	Oct 2021	780.516	Oct 2022	936.190	Oct 2023	-		936.190	Continuing	Continuing	-
Enterprise Comm and Crypto	Various	Various : Various	-	-		34.768	Dec 2022	32.200	Dec 2023	-		32.200	Continuing	Continuing	-
SE&I	Various	Various : Various	-	4.399	Dec 2021	8.192	Dec 2022	11.630	Dec 2023	-		11.630	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corporation : El Segundo, CA	-	9.661	Oct 2021	8.775	Oct 2022	12.330	Oct 2023	-		12.330	Continuing	Continuing	-
		Subtotal	-	455.252		832.251		992.350		-		992.350	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corporation : El Segundo, CA	-	5.939	Dec 2021	4.251	Dec 2022	6.544	Dec 2023	-		6.544	Continuing	Continuing	-
A&AS	Various	Various : Various	-	10.010	Feb 2022	12.520	Feb 2023	14.406	Feb 2024	-		14.406	Continuing	Continuing	-
Other Support	Various	Various : Various	-	0.197	Oct 2021	0.174	Oct 2022	0.178	Oct 2023	-		0.178	Continuing	Continuing	-
		Subtotal	-	16.146		16.945		21.128		-		21.128	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	471.398		849.196		1,013.478		-		1,013.478	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206444SF / *Next-Gen OPIR -- Polar*	**Project (Number/Name)** 657121 / *Next-Gen OPIR Space, Block 0 Polar*

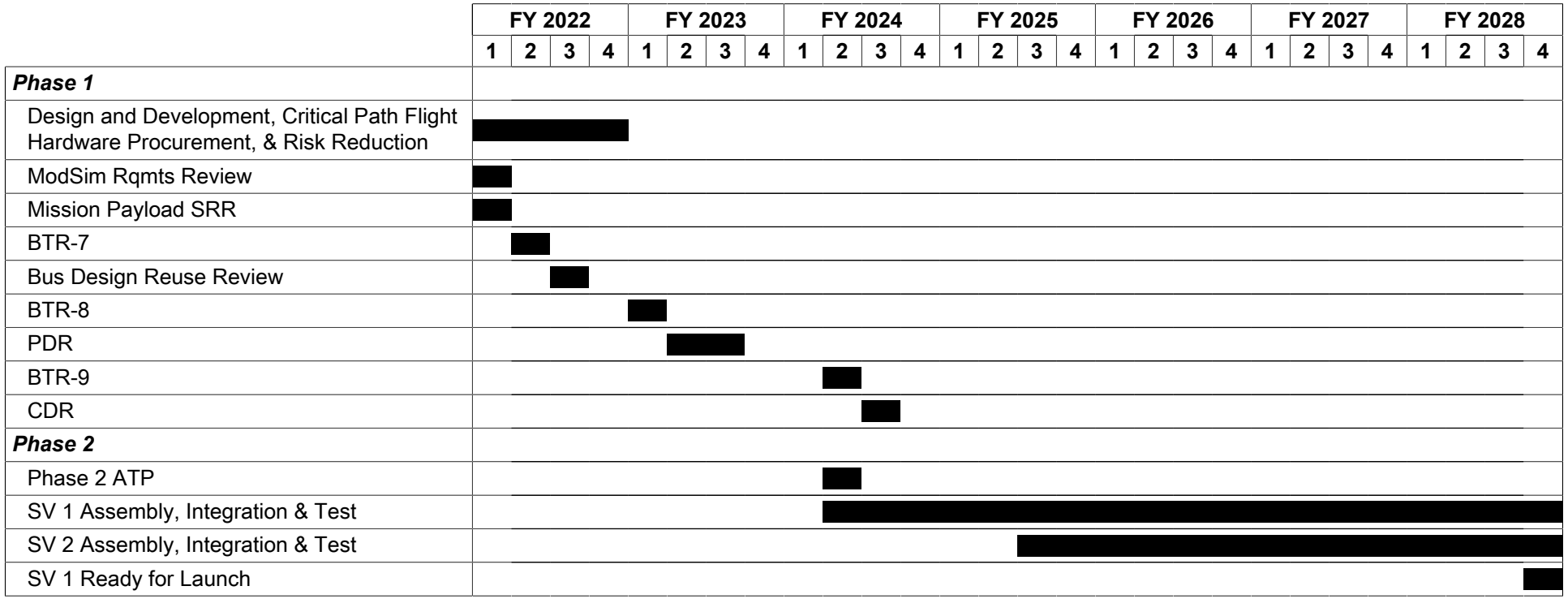

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206444SF / *Next-Gen OPIR -- Polar*	**Project (Number/Name)** 657121 / *Next-Gen OPIR Space, Block 0 Polar*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Phase 1				
Design and Development, Critical Path Flight Hardware Procurement, & Risk Reduction	1	2022	4	2022
ModSim Rqmts Review	1	2022	1	2022
Mission Payload SRR	1	2022	1	2022
BTR-7	2	2022	2	2022
Bus Design Reuse Review	3	2022	3	2022
BTR-8	1	2023	1	2023
PDR	2	2023	3	2023
BTR-9	2	2024	2	2024
CDR	3	2024	3	2024
Phase 2				
Phase 2 ATP	2	2024	2	2024
SV 1 Assembly, Integration & Test	2	2024	4	2028
SV 2 Assembly, Integration & Test	3	2025	4	2028
SV 1 Ready for Launch	4	2028	4	2028

Note

Next-Gen Polar (Project 657121) efforts continue past 2028.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	22.603	23.413	73.501	0.000	73.501	129.249	132.282	70.680	73.175	0.000	524.903
650140: *COMSATCOM*	-	0.000	13.668	73.501	0.000	73.501	124.272	132.282	70.680	73.175	0.000	487.578
651126: *COMSATCOM Infrastructure*	-	22.603	9.745	0.000	0.000	0.000	4.977	0.000	0.000	0.000	0.000	37.325
Program MDAP/MAIS Code: 351												

A. Mission Description and Budget Item Justification

Commercial Satellite Communication (COMSATCOM) Integration develops, prototypes and demonstrates the capabilities required to fully leverage COMSATCOM as part of the Department of Defense's (DoD) SATCOM enterprise. The United States Space Force (USSF) has determined that an enterprise approach to the procurement, delivery and management of its SATCOM capabilities is the best means to create an environment that is responsive to Combatant Commanders and other users across the spectrum of conflict. In addition, an enterprise approach will improve affordability, Department purchasing power and mission assurance. Project 650140, COMSATCOM Enterprise Integration of Fighting SATCOM, will rapidly prototype and deliver Enterprise Management and Control (EM&C) integration tools and mission applications enabling warfighters to operate responsive and resilient SATCOM as a single enterprise. Project 651126, COMSATCOM Infrastructure, will develop and stand up COMSATCOM business and customer management tools, finalizing the Congressionally directed migration from Defense Information Systems Agency (DISA) systems to USSF systems. Development of enhanced COMSATCOM acquisition capabilities leverage enterprise innovation activities focused on transforming how DoD acquires, accesses and deploys COMSATCOM capabilities.

The Luxembourg (LUX) Medium Earth Orbit (MEO) activity is an initial effort for the USSF to partner, explore, prototype, and integrate an international commercial SATCOM service into the DoD SATCOM enterprise. LUX MEO establishes the baseline satellite capability in partnership with the LUX Ministry of Defense (MoD), leveraging the commercial satellite communications system in MEO.

This funding will be used to demonstrate the onboarding of MEO commercial SATCOM services into the SATCOM architecture and Space Data Transport Force Design. Demonstrations will include utilizing Enterprise Management and Control (EM&C) for provisioning and planning, usage of Protected Tactical Waveform (PTW) over MEO Commercial SATCOM and integration of Protected Tactical Enterprise Services (PTES) hubs into commercial SATCOM capable gateways. Early adaption of capability will also be used to prototype and demonstrate fiber resiliency for large gateway backhaul via space. Capacity will further be used to demonstrate platforms use of multi-orbital terminals for Airborne Intelligence, Surveillance, and Reconnaissance (AISR), maritime communications and communications on the move. Luxembourg is also procuring commercial SATCOM services and will contribute to international demonstration and testing of integrated and interoperable ground and space architecture elements. This partnership will also enable additional international partners to join and demonstrate the ability to bulk buy future capacity together to drive cost savings.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206445SF *I Commercial SATCOM (COMSATCOM) Integration*

authorities and contract mechanisms to deliver capability sooner, SSC 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 COMSATCOM for weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in PE 1206445SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	23.400	23.513	21.380	0.000	21.380
Current President's Budget	22.603	23.413	73.501	0.000	73.501
Total Adjustments	-0.797	-0.100	52.121	0.000	52.121
• Congressional General Reductions	0.000	-0.100			
• 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	-0.797	0.000			
• Other Adjustments	0.000	0.000	52.121	0.000	52.121

Change Summary Explanation

FY22: -$0.797M; Small Business Innovation Research
FY23: -$0.100M; Congressional General Reduction
FY 2024: +$59.400M; to fund Luxembourg Medium-Earth Orbit Global SATCOM partnership.
FY 2024: -$0.141M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.
FY 2024: -$7.5M; to account for the availability of prior year execution balances.
FY 2024: +0.362M; PBD inflation rates for Non-Pay and Non-Fuel Purchases.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	Project (Number/Name) 650140 / *COMSATCOM*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
650140: *COMSATCOM*	-	0.000	13.668	73.501	0.000	73.501	124.272	132.282	70.680	73.175	0.000	487.578
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The backbone of Fighting SATCOM is a SATCOM EM&C capability for an Integrated SATCOM Enterprise. This is the foundation for SATCOM integration into an operational level Command and Control (C2) system that enables the end-to-end sensor-to-shooter execution serving the protect and defend, as well as theatre support missions for United States Space Command (USSPACECOM) and the Theater Combatant Commands. SATCOM EM&C applications will provide critical services to our warfighters to facilitate timely, quality driven battlespace decisions for SATCOM allocation and use. The effort leverages a Development Security Operations (DevSecOps) platform to rapidly prototype and deliver EM&C mission applications enabling responsive, resilient SATCOM for the Single Warfighting Commander, National Space Defense Center (NSDC), Combined Space Operations Center (CSpOC), SATCOM Integrated Operations Division (SIOD), Regional SATCOM Support Centers (RSSC), Space and Missile Defense Command (SMDC) Satellite Operations Brigade, and other C2 centers. Enterprise-level architecture, prototyping, test, and experimentation will drive Commander's acceptance of capabilities and enable integrated mission systems with machine-to-machine connections. SATCOM EM&C applications are delivered in capability categories including integrating data management, automating resource allocation, and fusing situational awareness.

In addition to USSF developed EM&C capabilities, USSF will demonstrate the onboarding of MEO commercial SATCOM services into the SATCOM architecture and Space Data Transport Force Design. The LUX MEO activity is an initial effort for the USSF to partner, explore, prototype, and integrate an international commercial SATCOM service into the DoD SATCOM enterprise. Demonstrations will include utilizing EM&C for provisioning and planning, usage of PTW over MEO Commercial SATCOM and integration of PTES hubs into commercial satellite capable gateways. Early adoption of capability will also be used to prototype and demonstrate fiber resiliency for large gateway backhaul via space. Capacity will further be used to demonstrate platforms use of multi-orbital terminals for AISR, maritime communications and communications on the move. Luxembourg is also procuring commercial SATCOM services to contribute to international demonstration and testing of integrated and interoperable ground and space architecture elements. This international partnership intends to demonstrate the ability to jointly procure communication capacity services that will result in a higher return on US DoD SATCOM investment and potentially lead to future international partnering opportunities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Enterprise Integration of Fighting SATCOM	-	13.668	13.834
Description: SSC is developing the EM&C capability to support Chief of Space Operations' (CSO) Fighting SATCOM Vision. Leveraging the Capability Roadmap Architecture and Situational Awareness/Common Operating Picture previously developed, prototyping efforts focus on improving the user interface/experience, integrating global spectrum usage, providing status of SATCOM systems (ground and space), Electro-Magnetic Interference (EMI) characterization, and development of SATCOM registries.			
FY 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	**Project (Number/Name)** 650140 / *COMSATCOM*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
This effort continues plans initiated in the FY 2021 Congressional add and leverages the FY 2021 prototyping and integration efforts to mature EM&C. FY 2023 funding will be used to continue integration of data sources into the Situational Awareness/ Common Operating Picture (SA/COP) capability matured with FY 2021 funding to include MILSATCOM and Commercial systems. Maturing the SA/COP capability includes data visualization providing integrated picture of SATCOM related sensors networks and functionality for defensive space control. In addition, this effort leverages FY 2021 prototyping efforts to continue development of Enterprise Planning capability to reduce human burden in planning efforts and integrate SA/COP capabilities, as well as planning efforts for delivery of Mission Management and Analytical Tools capabilities to facilitate operational dynamic roaming by leveraging machine-to-machine interfaces. Invest in tools to support EMI/RF characterization. Integrate with DISA's SATCOM Ordering Management and Situational Awareness Tool (SOMSAT). Continue to leverage a DevSecOps platform and pipeline, and other contract vehicle(s) as required, to rapidly prototype and deliver EM&C mission applications, and fund supporting infrastructure, IT, and cyber efforts to support this platform. Continue to define Flexible Network Interface and Flexible Terminal Interface standards and support implementation to facilitate data exchange between terminals, network operations centers, and EM&C. Fund the development and integration of MILSATCOM (e.g. WGS), commercial (e.g. mPOWER), and international partner (e.g. UK Skynet) systems into the enterprise architecture. Rapidly respond to implement system resiliency necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2024 Plans:*** FY 2024 funding will be used to continue integration of data sources into the planning and mission management capability areas to include MILSATCOM, Commercial, and International Partner systems. The enterprise situational awareness will continue to include an integrated visualization of SATCOM related terminal and service providers with an addition to mission and threat profiles. Develop mobility and continuous communications through the use of automated resource allocation, and restoral for Enterprise Planning capabilities to facilitate uninterrupted operational roaming by leveraging machine-to-machine interfaces. Advance developed tools to support Electro-magnetic Interface / Radio-Frequency (EMI/RF) characterization and mitigation with EMI reporting, spectral monitoring, and EMI event evolution capabilities. Continue to leverage and mature the DevSecOps platform processes, and other contract vehicles as required, to rapidly deliver and enhance incremental mission applications, infrastructure, IT and cyber efforts. Support implementation of Flexible Network Interface and Flexible Terminal Interface standards, and facilitate data exchange between terminals, network operations centers, and EM&C. All activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to fund platform and prototyping demonstrations.			
Title: International MEO SATCOM	-	-	59.667

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	**Project (Number/Name)** 650140 / *COMSATCOM*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: US DoD and LUX MoD is pursuing a Global Commercially Contracted [GCC] SATCOM Support Partnership (SP) through the NATO Support and Procurement Agency (NSPA) to establish a contracting mechanism to procure commercially available SATCOM on behalf of both nations and leverage economies of scale. By partnering with the LUX MoD for mPOWER satellite access, the DoD can leverage a multi-year international arrangement to drive affordability, resiliency, and flexibility into military SATCOM architectures that align with USSF SATCOM vision to deploy multi-orbit, multi-frequency capabilities. This international partnership intends to demonstrate the ability to jointly procure communication capacity services that will result in a higher return on US DoD SATCOM investment and lead to future international partnering opportunities. ***FY 2024 Plans:*** Procure and integrate with commercial SATCOM services to prototype and demonstrate the capabilities of International Commercial MEO SATCOM. Commercial SATCOM capacity and terminals will support Combatant Command requirements for SATCOM support services and other required commercial support services. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to fund Luxembourg MEO Global SATCOM partnership and begin capability integration.			
Accomplishments/Planned Programs Subtotals	-	13.668	73.501

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

Fighting SATCOM Integration leverages Other Transaction Authority (OTA) agreement awards through the Space Enterprise Consortium to rapidly develop prototype capabilities in operationally relevant timelines. Early risk reduction and delivery of first operational prototypes began in FY 2021. Individual prototype efforts are competitively awarded fixed-price agreements leveraging non-traditional defense contractors. USSF is developing a SATCOM EM&C acquisition strategy and capability roadmap for technology insertion for SATCOM, leveraging various contract vehicle(s) to incrementally deliver capability enhancements while relying on a mix of contractor and SE&I support for integration of these capabilities into a consolidated EM&C system. Prototyping efforts will work in concert with this strategy.

The LUX MEO COMSATCOM capacity will be acquired by Space Systems Center/Commercial Satellite Communications Office in coordination with the PATS Program Office, SSC/IA, and the NATO Support Procurement Agency (NSPA). The DoD and LUX Minister of Defense activated the Global Commercially Contracted SATCOM Support Partnership with NSPA on 31 October 2022 to enable combined contracting for commercial SATCOM capabilities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	**Project (Number/Name)** 650140 / *COMSATCOM*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Fighting SATCOM DevOPs Platform, Systems Integration, Prototyping	Various	Various : TBD	-	-		4.971	Mar 2023	4.976	Dec 2023	-		4.976	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	-		0.381	Feb 2023	0.500	Jan 2024	-		0.500	Continuing	Continuing	-
SE&I	C/CPIF	Linquest : El Segundo, CA	-	-		7.400	Feb 2023	8.303	Feb 2024	-		8.303	Continuing	Continuing	-
LUX MEO	TBD	TBD : TBD	-	-		-		54.895	Nov 2023	-		54.895	Continuing	Continuing	-
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		2.572	Mar 2024	-		2.572	0.000	2.572	-
		Subtotal	-	-		12.752		71.246		-		71.246	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Not specified. : TBD	-	-		0.057	Feb 2023	-		-		-	Continuing	Continuing	-
A&AS	Various	Various : TBD	-	-		0.809	Nov 2022	2.205	Nov 2023	-		2.205	0.000	3.014	-
Other Support	TBD	Various : TBD	-	-		0.050	Oct 2022	0.050	Oct 2023	-		0.050	0.000	0.100	-
		Subtotal	-	-		0.916		2.255		-		2.255	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		13.668		73.501		-		73.501	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	**Project (Number/Name)** 650140 / *COMSATCOM*

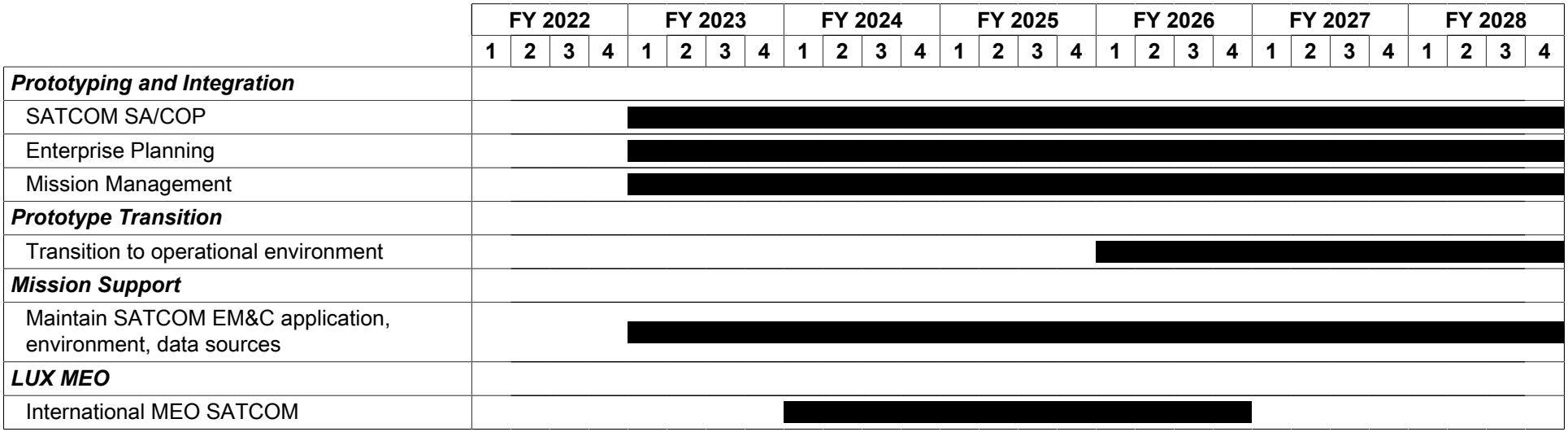

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	**Project (Number/Name)** 650140 / *COMSATCOM*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Prototyping and Integration				
SATCOM SA/COP	1	2023	4	2028
Enterprise Planning	1	2023	4	2028
Mission Management	1	2023	4	2028
Prototype Transition				
Transition to operational environment	1	2026	4	2028
Mission Support				
Maintain SATCOM EM&C application, environment, data sources	1	2023	4	2028
LUX MEO				
International MEO SATCOM	1	2024	4	2026

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	Project (Number/Name) 651126 / *COMSATCOM Infrastructure*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
651126: *COMSATCOM Infrastructure*	-	22.603	9.745	0.000	0.000	0.000	4.977	0.000	0.000	0.000	0.000	37.325
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In accordance with the FY2018 National Defense Authorization Act 1601(a), as amended, and on behalf of the CSO and in consultation with the DoD CIO, the USSF CSCO, serves as the sole authority for the procurement of COMSATCOM services for the DoD; this responsibility was previously held by DISA. In order to provide the joint warfighter with modernized access to COMSATCOM services and ensure combat effectiveness across all domains, the CSCO requires a comprehensive COMSATCOM Enterprise Technology (COMET) Systems of Systems to provide required business suite financial management and customer and contract support systems. The COMET programs implementation of the COMSATCOM Business Suite (CBS) tool is also critical to complete the Congressionally-mandated COMSATCOM mission transition from DISA to USSF. The CBS tool will have multiple components including: (1) Business Suite & Marketplace designed to automate and streamline requests for work and customer interaction, thereby replacing manual processes for over 100 different contracts valued at $5 billion over the future year defense program; (2) Financial Management System required to operate a new and cutting-edge Enterprise Space Activity Group (ESAG) under the Air Force Working Capital Funds (AFWCF); (3) Integration with third party systems and capabilities, including cloud-based hosting and EM&C - the nexus of future USSF space-based SATCOM Command and Control (C2).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: COMSATCOM Enterprise Technology (COMET) System of Systems	22.603	9.745	0.000
Description: The COMSATCOM Management and Control (CM&C) System of Systems, Major Thrust has been renamed the COMET System of Systems, Major Thrust and contains the same scope. SSC establishment of mission-critical COMSATCOM support systems to enable transformational change to the acquisition of COMSATCOM, increasing speed to service, improving quality of service, reducing costs, and laying the foundation to incorporate new industry innovations into the future. Development of the CBS tool will enable transition and enhance the existing COMSATCOM customer-facing tools and background financial management data systems from DISA to the USSF. The CBS tool is required to automate and securely distribute COMSATCOM services and capabilities to stakeholders in order to improve the ordering, billing, activation, provisioning, and other financial management tasks currently leveraging DISA capability. ***FY 2023 Plans:*** Funding in FY 2023 will continue FY 2022 integration work for the CSCO Marketplace and Financial Management Systems into third party systems, etc. FY 2023 funding will also provide any necessary enhancements required for optimized user experience at			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	**Project (Number/Name)** 651126 / *COMSATCOM Infrastructure*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
all hierarchal levels for the systems. Finally, FY 2023 funding will ensure establishment or continuation of Authority to Operate and associated risk management and cybersecurity requirements for the applicable systems. ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased to account for the availability of prior year execution balances.			
Accomplishments/Planned Programs Subtotals	22.603	9.745	0.000

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The current acquisition strategy is to perform competitive awards to qualified contractors via multiple contracting authorities. Efforts will include required compliance tools and processes supporting existing business models, necessary operational readiness updates to existing equipment, and other services required to implement the transition from DISA to USSF. Contracts may be competitively awarded, utilizing a to-be-determined contract type.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	**Project (Number/Name)** 651126 / *COMSATCOM Infrastructure*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
CBS Financial Management System	TBD	TBD : TBD	-	9.000	May 2023	3.345	May 2023	-		-		-	Continuing	Continuing	-
CBS Marketplace / Enterprise	TBD	TBD : TBD	-	11.023	May 2023	4.555	May 2023	-		-		-	Continuing	Continuing	-
CSCO Integration	TBD	TBD : TBD	-	-		1.845	Jul 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	20.023		9.745		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	National Capital region : TBD	-	2.580	Mar 2023	0.000	Apr 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	2.580		0.000		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	22.603		9.745		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	**Project (Number/Name)** 651126 / *COMSATCOM Infrastructure*

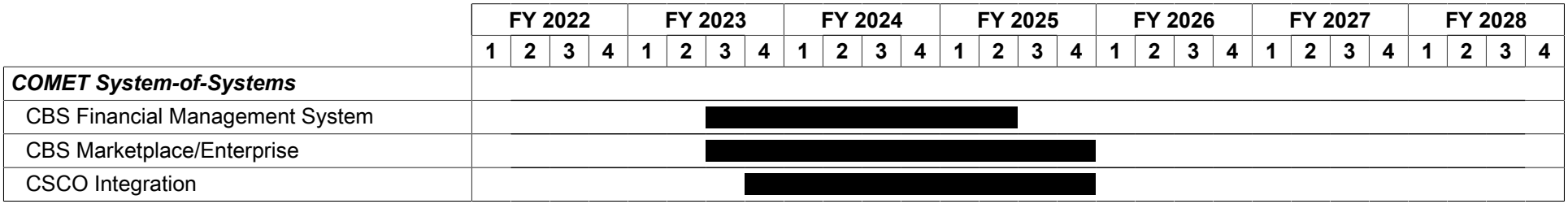

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206445SF / *Commercial SATCOM (COMSATCOM) Integration*	**Project (Number/Name)** 651126 / *COMSATCOM Infrastructure*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
COMET System-of-Systems				
CBS Financial Management System	3	2023	2	2025
CBS Marketplace/Enterprise	3	2023	4	2025
CSCO Integration	4	2023	4	2025

Note

No FY 2024 funding is requested. Activities in FY 2024 continue from the FY 2023 budget allcoation.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206446SF *I Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	786.340	1,266.437	0.000	1,266.437	1,004.406	989.673	3,272.593	3,185.318	Continuing	Continuing
657LEO: *Resilient MW/MT - LEO*	-	0.000	786.340	1,266.437	0.000	1,266.437	1,004.406	989.673	3,272.593	3,185.318	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program element includes funds for the Tranche 1 Tracking Layer program, which is a Middle Tier of Acquisition effort. The total cost of the Tranche 1 Tracking Layer Middle Tier of Acquisition effort is $2,612.0M. The Tranche 1 Tracking Layer program is fully funded across the Future Years Defense Program.

A. Mission Description and Budget Item Justification

The Space Development Agency (SDA) is developing and demonstrating next generation space capabilities for the joint warfighter enabled by proliferation of satellites in Low Earth Orbit (LEO) and a new acquisition model utilizing rapid spiral development. SDA is developing capabilities to address a wide range of Department of Defense (DoD) space needs as stated in the National Defense Strategy and DoD Space Vision, including advanced missile tracking and global surveillance enabling beyond-line-of-sight targeting. SDA will orchestrate the rapid development and fielding of the Proliferated Warfighter Space Architecture (PWSA), a resilient military sensing and data transport capability via a proliferated space architecture in LEO. This program element funds the development and demonstration of space technologies to deliver Missile Warning, Missile Tracking and Missile Defense (MW/MT/MD) capabilities including advanced missile tracking and fire control support to U.S. joint warfighting forces in bi-annual tranches, beginning in FY 2022.

This program element may include necessary civilian pay expenses and contractor support required to support delivery of the MW/MT/MD capability.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206446SF *I Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	499.840	723.621	0.000	723.621
Current President's Budget	0.000	786.340	1,266.437	0.000	1,266.437
Total Adjustments	0.000	286.500	542.816	0.000	542.816
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	286.500			
• 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	542.816	0.000	542.816

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 657LEO: *Resilient MW/MT - LEO*		
Congressional Add: *INDOPACOM Missile Tracking Demonstration Expansion*	0.000	250.000
Congressional Add: *Tranche 1 Space Resiliency Payloads*	0.000	22.500
Congressional Add Subtotals for Project: 657LEO	0.000	272.500
Congressional Add Totals for all Projects	0.000	272.500

Change Summary Explanation

The worked performed in this PE is a continuation of efforts that in FY 2022 are funded under RDT&E, Defense-Wide, PE 1206410SDA.

FY 2023 Congressional marks resulted in a net gain of $286.5M. Project 657LEO (Resilient MW/MT - LEO) was increased by $250.0M to support an INDOPACOM missile tracking demonstration expansion and increased by $22.5M to develop Tranche 1 space resiliency payloads. Project 657LEO was also increased by $14.0M for the Congressional Directed Transfer from SDA's RDT&E PE 1206448SF for the Resilient Missile Warning Missile Tracking Ground Segment.

FY 2024 increases to support Tranche 1 activities for space vehicle development, delivery, and test, and Tranche 2 activities.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)	0.000	513.840	1,266.437

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206446SF *I Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Rapidly develop, deploy and demonstrate prototype architecture that enables resilient Missile Warning/Missile Tracking/Missile Defense enabled by a proliferated Low Earth Orbit (pLEO) architecture. This effort will define, demonstrate, and deliver the architectures and standards necessary to fully populate a Missile Warning/Missile Tracking/Missile Defense LEO layer as part of the PWSA. ***FY 2023 Plans:*** Tranche 1: - Finalize design through Critical Design Reviews (CDRs) for the Tracking Layer Tranche 1 space vehicles. - Hold space vehicle Production Readiness Reviews (PRRs) and begin assembly, integration, and testing (AI&T). - Begin ground systems Missile Warning/Missile Tracking/Missile Defense (MW/MT/MD) integration at Tranche 1 Mission Operations Centers and MW/MT/MD enterprise locations. - Continue MW/MT/MD force design analysis. - Continue prototype efforts to integrate Fire Control systems into PWSA for Missile Defense. Tranche 2: - Leverage lessons learned and accomplishments from Tranches 0 and 1 to inform space vehicle, ground, and interoperability design requirements for Tranche 2. - Draft government reference architecture and requirements for Tranche 2 Tracking in coordination with Warfighter Council. ***FY 2024 Plans:*** Tranche 1 - Complete Optical Interoperability Testing (OIT) with Tranche 1 Transport Layer space vehicles to ensure optical connectivity. - Complete payload proto-qual assembly, integration and testing (AI&T). - Complete space bus proto-qual AI&T. - Produce payloads and space buses and conduct qualification testing. - Integrate payloads and buses and begin final space vehicle system AI&T. - Support ground activities to ensure integration with Operations Centers and prepare for Missile Warning/Missile Tracking integration. - Complete space vehicle flat sat development and begin operations testing. - Complete Tracking space vehicle component deliveries and vehicle assembly and integration. - Perform Tracking payload ground calibration and begin space vehicle environmental test campaigns. - Fire control prototype build. Tranche 2			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206446SF *I Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- Finalize design requirements for the Tracking Layer Tranche 2 space vehicles as informed by the Missile Warning/Missile Tracking force design analysis. - Draft acquisition plan and solicitation for Tracking Tranche 2. - Obtain Warfighter Council concurrence on Tracking Tranche 2 acquisition and MW/MT/MD enterprise integration plans. - Finalize Tracking Layer Tranche 2 performance requirements with the warfighter community. - Initiate Tranche 2 acquisition and source selection processes leading to space vehicle vendor procurement instruments. - Award Tranche 2 contracts for space vehicles. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** The increase between the FY 2023 amount and the FY 2024 amount reflects significant increase in Tranche 1 activities for space vehicle development, delivery, and test, and Tranche 2 activities.			
Accomplishments/Planned Programs Subtotals	0.000	513.840	1,266.437

	FY 2022	FY 2023
Congressional Add: INDOPACOM Missile Tracking Demonstration Expansion ***FY 2022 Accomplishments:*** N/A ***FY 2023 Plans:*** Develop additional plane of Wide Field of View (WFOV) Space Vehicles (SVs) in the PWSA Tracking Tranche 1 to increase global Missile Warning and Missile Tracking coverage in support of combatant commands to include INDOPACOM.	0.000	250.000
Congressional Add: Tranche 1 Space Resiliency Payloads ***FY 2022 Accomplishments:*** N/A ***FY 2023 Plans:*** Host auxiliary resiliency payload on T1 Tracking Layer spacecraft to demonstrate threat detection capability in Low Earth Orbit (LEO). This will augment current spacecraft resiliency by detecting directed energy threats and passing data to ground for further processing and characterization.	0.000	22.500
Congressional Adds Subtotals	0.000	272.500

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• RDTE 04 1206410SDA: *Space Technology Development and Prototyping*	550.000	-	-	-	-	-	-	-	-	0.000	550.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206446SF *I Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost

Remarks

The worked performed in this PE continues efforts that were previously funded in FY 2022 under RDT&E, Defense-Wide, PE 1206410SDA.

E. Acquisition Strategy

Partners for these activities may include Missile Defense Agency (MDA), Space Systems Command (SSC), DoD Combatant Commands, DoD research centers, small businesses, large defense contractors, commercial space providers, Federally Funded Research and Development Centers, and University Affiliated Research Centers. SDA's Tranche 1 Missile Warning/Missile Tracking/Missile Defense space systems are being acquired via Firm Fixed Price contracts conducted in accordance with Other Transaction Authority (OT) for prototyping processes.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206446SF / *Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)*	**Project (Number/Name)** 657LEO / *Resilient MW/MT - LEO*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Tracking Layer (Tranche 1 and 2)	Various	Various : Various	-	-		510.131	Jan 2023	1,263.164	Nov 2023	-		1,263.164	Continuing	Continuing	-
INDOPACOM Missile Tracking Demonstration Expansion - Additional Plane (Congressional Add)	Various	Various : Various	-	-		250.000	Feb 2023	-		-		-	Continuing	Continuing	-
Tranche 1 Space Resiliency Payloads (Congressional Add)	TBD	TBD : TBD	-	-		22.500	Apr 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	-		782.631		1,263.164		-		1,263.164	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Temp Civilian Support	Allot	TBD : TBD	-	0.000		0.500	Jan 2023	0.000		0.000		0.000	Continuing	Continuing	-
FFRDC Support	RO	Aerospace Corp. : El Segundo, CA	-	0.000		3.209	Jan 2023	3.273	Dec 2023	0.000		3.273	Continuing	Continuing	-
		Subtotal	-	0.000		3.709		3.273		0.000		3.273	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		786.340		1,266.437		0.000		1,266.437	Continuing	Continuing	N/A

Remarks

The worked performed in this PE continues efforts that were previously funded in FY 2022 under RDT&E, Defense-Wide, PE 1206410SDA.

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206446SF / *Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)*	**Project (Number/Name)** 657LEO / *Resilient MW/MT - LEO*

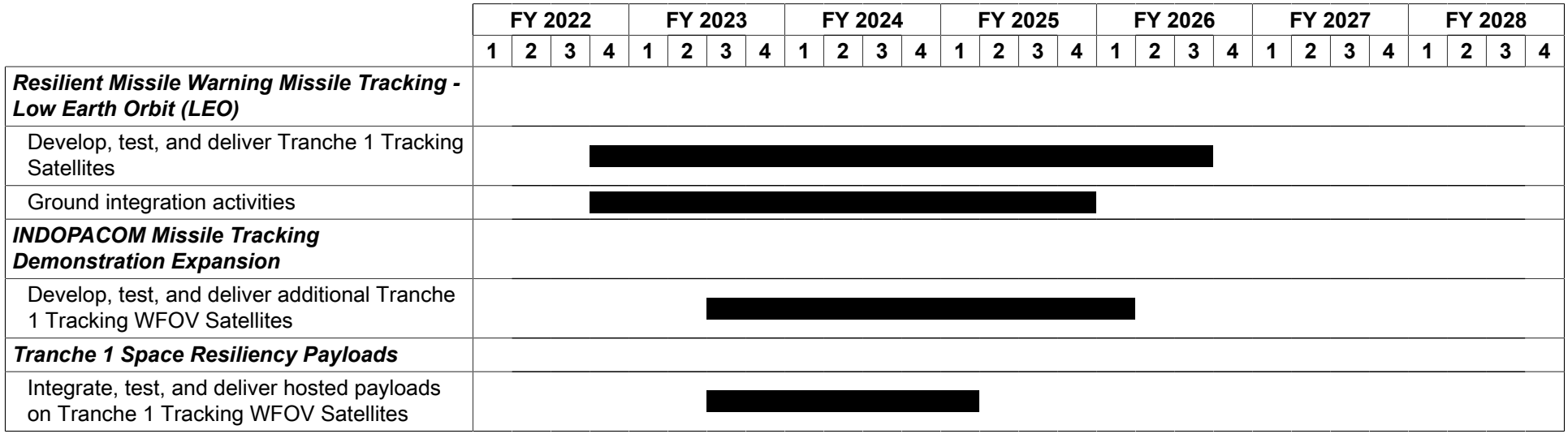

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206446SF / *Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)*	**Project (Number/Name)** 657LEO / *Resilient MW/MT - LEO*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO)				
Develop, test, and deliver Tranche 1 Tracking Satellites	4	2022	3	2026
Ground integration activities	4	2022	4	2025
INDOPACOM Missile Tracking Demonstration Expansion				
Develop, test, and deliver additional Tranche 1 Tracking WFOV Satellites	3	2023	1	2026
Tranche 1 Space Resiliency Payloads				
Integrate, test, and deliver hosted payloads on Tranche 1 Tracking WFOV Satellites	3	2023	1	2025

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206447SF *I Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	0.000	408.527	538.208	0.000	538.208	362.250	364.429	1,221.011	1,054.977	Continuing	Continuing
657MEO: *Resilient MW/MT - MEO*	-	0.000	408.527	538.208	0.000	538.208	362.250	364.429	1,221.011	1,054.977	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The FY 2023 enacted budget transferred all FY 2023 ground funding from PE 1206448SF - Resilient Missile Warning Missile Tracking (MW/MT) - Integrated Ground Segment, to three separate PEs including (1) PE 1206446SF - Resilient Missile Warning Tracking - Low Earth Orbit (LEO), (2) Space Development Agency (SDA) Launch PE 1203954SF, and (3) PE 1206447SF - Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO). In the FY 2024 budget submission, funds for MEO and LEO ground system activities are included within PE 1206448SF.

A. Mission Description and Budget Item Justification

The United States Space Force (USSF) Space Systems Command (SSC) and Space Development Agency (SDA) are collaborating to deliver Overhead Persistent Infrared (OPIR) capabilities, in concert with Department of Defense (DoD) and Intelligence Community (IC) partners, to support a proliferated space architecture, resilient-by-design, capable of operating through contested environments. SSC's Resilient MW/MT - MEO space and ground efforts pivot the Department of the Air Force's (DAF) legacy missile warning force design to a more resilient multi-orbit approach to counter advanced missiles, hypersonic glide vehicles, and fractional orbital bombardment threats. MW/MT - MEO is anchored in Missile Warning and Missile Defense Capability Development Document (CDD) requirements validated by the Joint Requirements Oversight Council (JROC). Constellation resiliency is foundational to the DAF's Resilient Missile Warning / Tracking force design; therefore, the OPIR Family of Systems, including MW/MT - MEO, is designed to work cohesively to gain and maintain custody of a spectrum of missile threats.

The MEO program will deploy space assets in multiple epochs to allow for incremental capability delivery and to ensure competition throughout the lifecycle of the program. Resilient MW/MT - MEO will bolster legacy Space Based Infrared Satellite (SBIRS) and Next-Gen OPIR capabilities and will independently satisfy all mission area CDD requirements for both missile warning and tracking by FY 2031. FY 2024 funding supports space segment long-lead parts purchases, space vehicle bus and main mission payload assembly, integration and test, and early on-orbit initialization studies for up to three (3) vendors to support the first Epoch 1 launch in FY 2026.

Using a Combined Program Office (CPO) construct, SSC, SDA, and the Missile Defense Agency (MDA) are teaming to develop and implement a system-of-systems integration strategy across for MW/MT/MD constellations supporting LEO, MEO, and GEO/Polar orbit regimes. Resilient MW/MT - MEO Epoch 1 is comprised of multiple space and ground lines of effort to include following space items:
- Space vehicle development efforts are currently underway with two (2) vendors [Raytheon (RTN) and Millennium Space Systems (MSS)] with contract options currently in place to deliver six (6) space vehicles. An additional three (3) space vehicles are required to close the MSS solution. With a congressional add in FY 2023, the program office is accelerating by placing an additional three (3) space vehicles on contract by 4Q FY 2023.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206447SF *I Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*

- Delivery of nine (9) total space vehicles [three (3) Raytheon and six (6) Millennium] includes: design, build, hardware integration, testing, delivery, launch vehicle integration, space vehicle launch & early orbit operations, calibration, tuning, flying, and delivery of formatted two-dimensional tracks into the Real-Time Transfer Service (RTS) for incorporation with other sensors data necessary for warning/tracking requirements and operations.
- FY 2023 congressional add allows for contract award for a third vendor previously identified in the original Epoch 1 source selection. Award decision for additional Epoch 1 spacecraft, beyond the nine (9) planned, is scheduled to occur NET September 4Q FY 2023 to one of three (3) potential vendors based on performance to-date. To support this plus up, the PEO directed 10M in additional funds to accelerate Epoch 1 FY 2023 developments.

Space acquisition teams must respond with speed and agility to emerging adversary threats. SSC has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MW/MT capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	139.131	267.358	0.000	267.358
Current President's Budget	0.000	408.527	538.208	0.000	538.208
Total Adjustments	0.000	269.396	270.850	0.000	270.850
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-21.200			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	130.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	160.596	270.850	0.000	270.850

Change Summary Explanation

FY 2023: +160.596M; transfer funding and effort for the MEO Ground Segment portion of shared PE 1206448SF, Project 657124, to PE 1206447SF, Resilient Missile Warning Missile Tracking, Resilient MW/MT - MEO Project 657MEO to centralize Missile Warning Missile Tracking activities and improve transparency.

FY 2023: +130.000M; Congressional Add for Epoch 1 acceleration and Vendor risk reduction.

FY 2023: -21.200M; MEO ground inadequate justification.

FY 2024: +148.517M; transfer funding and effort for the MEO Missile Tracking Demonstration portion of PE 1206442SF, Next Generation OPIR, Space Mod Initiative Project 657009 to PE 1206447SF, Resilient Missile Warning Missile Tracking, Resilient MW/MT - MEO Project 657MEO to centralize Missile Warning Missile Tracking activities and improve transparency.

FY 2024: +137.350M; realigned procurement funds from MW/MT to support Epoch 1 development and test activities.

FY 2024: -1.757M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +2.480M; inflation raises for non-pay & non-fuel purchases.

FY 2024: -15.740M; realigns funds to PE 1206448SF to support MW/MT to Full Operational Capability (FOC).

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Missile Warning / Missile Tracking - MEO Space and Ground	-	408.527	538.208
Description: Transitions the MEO Track Custody Demonstration (MTCD) under PE 1206442SF Next Generation OPIR, Space Modernization Initiative (Project 657009) from digital engineering to a future program of record. This activity funds development of MEO satellites, with two launches planned to deliver up to nine satellites by FY 2027, and ground efforts with operations necessary to deliver Initial Warfighting Capability (IWC) for the combined LEO and MEO architecture. IWC consists of regional tracking, mission management and control, and coordinated regional warning and access validated through on-orbit measurements. After performance validation is complete, prototype sensors will feed data directly to operational warning and defense systems. Furthermore, IWC will provide sensitivity to detect emerging threats, accurate tracking to contain maneuvering targets, and mission data delivery within required latency timelines to close the kill-chain. With additional congressional FY 2023 funding, the program is aggressively pursuing additional space capability beyond the first nine satellites for up to another plane of capability with the most mature design of the three vendor Epoch 1 baseline.			
FY 2023 Plans: Space Activities: Furthers efforts initiated in PE 1206442SF to rapidly transition the MTCD from a single satellite sensor demonstration to a multiple satellite coordinated prototype effort tied to a cross-linked initial warfighting capability of the future architecture. In coordination with funds in 1206442SF Next Generation OPIR Budget Program Accounting Code 657009, this program element will begin			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206447SF *I Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024

development of SVs 2 and beyond with plans to achieve a multiple orbital plane prototype. FY 2023 begins long lead purchases of flight parts to take two or more designs from payload critical design review through system Critical Design Review (CDR). Additionally, it begins crosslink development, communication system upgrades, and full spacecraft development to expand beyond a single demonstration to a multi-satellite, multi-plane prototype. Finally, bus integration and test begins after completion of system CDR. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc.

With the $130M congressional add, Epoch 1 vendors will receive additional funding to transition quickly from CDR into additional spacecraft production, and a third vendor was added to the Epoch 1 competition with work planned to mature their payload design and provide initial models. Additionally, the program added $10M to Vendor 2 SV 4-6 to expedite production of the full second Epoch 1 plane.

Ground Activities (included in FY 2023 due to shared space/ground PE):
This program element expands development for Command and Control (C2) and Mission Data Processing (MDP) to meet the initial warfighter capability for sensitivity, accuracy, and latency of the MW/MT MEO space layer. This includes investments in facilities, hardware, ground transport, Ground Entry Points (GEP), contract services, and any other general ground infrastructure required to standup an instantiation of the FORGE Mission Data Processing Application Framework (MDPAF) for MDP and establish appropriate C2 solutions. Leverage and expand upon existing Mission Data Processing Applications (MDPAPs) and Joint OPIR Ground initiatives to ensure rapid processing and dissemination to global warfighting community. In addition, this effort will support the planning and execution of performance and integration risk mitigation activities associated with C2 challenges, MDP expansion, and interagency integration. 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 2024 Plans:
The Space Vehicle CDRs kicks off FY 2024 efforts as the program finalizes two designs. Execute design, development, and integration of a MEO MW/MT constellation from two current vendors. Conduct Space Vehicle and System Critical Design Reviews and proceed to payload and bus build, integration, and test activities. Additionally, FY 2024 activities mature and finalize the crosslink design, communication system, and bus subsystems. Furthermore, completion of long lead spacecraft purchases and establishment of test equipment infrastructure, lab, and clean room processing is planned to support multi-vehicle test assembly. The program will continue to execute and build off of digital models and process workflow established in prior years under the track custody demonstration effort and conduct technical operations in a digital cloud-based ecosystem to host structural, functional, and performance models. Activities may include, but are not limited to, program office support, studies, technical

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206447SF *I Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
analysis, experimentation, prototyping, etc. Finally, FY 2024 activities are planned to include payload critical design review for a third vendor with all associated model deliveries and hardware/software ground demonstrations. The program plans to continue acquisition of additional Epoch 1 spacecraft with acceleration funds for up to another plane of capability. Also, to support up to a third plane of Epoch 1 spacecraft, the program added additional acceleration funds in FY 2024 to supplement the Congressional add and aggressively pursue additional Epoch 1 capabilities to address adversary hypersonic threats. The program office is allowing each solution to mature and the competition to continue until selecting a vendor for additional spacecraft development. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to execute MEO spacecraft and constellation design, build and test activities for two (2) vendors and nine (9) space vehicles.			
Accomplishments/Planned Programs Subtotals	-	408.527	538.208

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• 1206442SF: *Next Generation OPIR*	-	97.770	-	-	-	-	-	-	-	Continuing	Continuing
• 1206448SF: *Resilient Missile Warning Missile Tracking - Integrated Ground Segment*	-	-	252.784	-	252.784	280.234	291.495	287.930	267.962	Continuing	Continuing

Remarks

E. Acquisition Strategy

The Resilient MW/MT - MEO initiative began in FY 2019 as Next Gen OPIR "Block 1 Prototype" under the Next Gen OPIR Space Modernization Initiative (SMI) PE1206442SF. Six (6) missile track custody prototype contracts were competitively awarded under this effort which utilized a multi-phased contracting strategy to field an on-orbit "Missile Track Custody Demonstration" or the MTCD space vehicle. Early efforts also included digital engineering risk reduction which serves as the foundation for current Resilient MW/MT- MEO efforts.

In FY 2021, following the completion of the Space Warfighting Analysis Center (SWAC) force design for the Missile Warning / Missile Tracking mission area, MTCD efforts were formalized as Resilient MW/MT - MEO Epoch 1. May 2021 Epoch 1 contract awards were the result of a free, fair, and open competition where Five (5) vendors submitted proposals and Two (2) were selected to develop the first Six (6) vehicles fielded NLT FY 2027 as Resilient MW/MT - MEO Epoch 1. The Full Missile Warning / Missile Defense OPIR Capability Development Document (CDD) and Technical Requirements Document (TRD) included in the Request for Proposal (RFP).

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206447SF *I Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*

The Space Force will continue field capability under current contracts competitively awarded for the first three (3) vehicles from each contractor (Space Vehicles 1-6). In May 2022, the SFPEO for Space Sensing approved an acquisition strategy for all of Epoch 1 scope: Vehicles 1-6; additional vehicles to meet performance baseline (at least 3); command and control software; mission data processing software; operations and integration; and at least Two (2) Ground Entry Points (six total ground antennas) for command & telemetry.

In January 2023, the SFPEO for Space Sensing approved the acquisition strategy for Epoch 1 satellites 7-9 [Millennium Space Systems' delivery of an additional Three (3) space vehicles - SV's 4-6]. The program is developing the full acquisition strategy for all of Epoch 1 and targeting summer of 2023 to formally transition to a program of record. The strategy will include acceleration of additional spacecraft as part of the congressional plus up. The Epoch 1 requirements are derived from the Missile Warning and Missile Defense OPIR Enterprise CDD, validated by the JROC in May 2019. Epoch 1 serves as the first delivery of capability targeting polar warning and regional tracking coverage with launches in late calendar year 2026. Future epochs are planned for competitive awards and a follow-on acquisition strategy still in development. The acquisition strategy for the space and mission-unique ground portions of Epoch 1 was approved by the SFPEO for Space Sensing in May 2022.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206447SF / *Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*	**Project (Number/Name)** 657MEO / *Resilient MW/MT - MEO*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MW/MT MEO Epoch 1, Vendor 1 SV 1-3	C/CPIF	Raytheon : El Segundo, CA	-	-		105.814	Dec 2022	197.840	Dec 2023	-		197.840	Continuing	Continuing	-
MW/MT MEO Epoch 1, Vendor 2 SV 1-3	C/Various	Millennium Space Systems : El Segundo, CA	-	-		77.481	Mar 2023	64.380	Dec 2023	-		64.380	Continuing	Continuing	-
MW/MT MEO Epoch 1, Vendor 2 SV 4-6	C/CPIF	Millennium Space Systems : El Segundo, CA	-	-		-		109.860	Dec 2023	-		109.860	Continuing	Continuing	-
MWMT MEO Epoch 1, Acceleration Vendor 1 SV 1-3	C/CPIF	Raytheon : El Segundo, CA	-	-		60.000	Sep 2023	-		-		-	Continuing	Continuing	-
MWMT MEO Epoch 1, Acceleration Vendor 2 SV 1-3	C/CPIF	Millennium Space Systems : El Segundo, CA	-	-		20.000	Sep 2023	-		-		-	Continuing	Continuing	-
MWMT Acceleration Epoch 1, Vendor 2 SV 4-6	C/CPIF	Millennium Space Systems : El Segundo, CA	-	-		30.000	Aug 2023	-		-		-	Continuing	Continuing	-
MW/MT MEO Epoch 1, Vendor 3	TBD	TBD : TBD	-	-		30.000	May 2023	-		-		-	Continuing	Continuing	-
MW/MT MEO Epoch 1 Acceleration	C/FP	TBD : TBD	-	-		-		147.547	Dec 2023	-		147.547	Continuing	Continuing	-
MW/MT MEO Ground Entry Point (GEP)	MIPR	Northrop Grumman : Fairfax, VA	-	-		51.000	Mar 2023	-		-		-	Continuing	Continuing	-
MW/MT MEO Operations & Integration (O&I)	TBD	TBD : TBD	-	-		7.000	Mar 2023	-		-		-	Continuing	Continuing	-
MW/MT MEO Data Fusion	TBD	TBD : TBD	-	-		3.400	Mar 2023	-		-		-	Continuing	Continuing	-
Enterprise SE&I	Various	Various : TBD	-	-		4.900	Dec 2022	2.524	Dec 2023	-		2.524	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	-		2.608	Dec 2022	1.343	Jan 2024	-		1.343	Continuing	Continuing	-
		Subtotal	-	-		392.203		523.494		-		523.494	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206447SF / *Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*	**Project (Number/Name)** 657MEO / *Resilient MW/MT - MEO*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp. : El Segundo, CA	-	-		6.302	Jan 2023	3.245	Jan 2024	-		3.245	Continuing	Continuing	-
A&AS	Various	Various : TBD	-	-		9.822	Nov 2022	11.269	Nov 2023	-		11.269	Continuing	Continuing	-
Other Support	Various	Various : TBD	-	-		0.200	Nov 2022	0.200	Nov 2023	-		0.200	Continuing	Continuing	-
		Subtotal	-	-		16.324		14.714		-		14.714	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		408.527		538.208		-		538.208	Continuing	Continuing	N/A

Remarks

FY23 Notes:
-MEO Epoch 1 Vendor 1 47.000M to be funded out of SMI (PE 1206442SF, BPAC 657009) in 2023 for a total value of 212.816M.

-MEO Epoch 1 Vendor 2 38.400M to be funded out of SMI (PE 1206442SF, BPAC 657009) in 2023 for a total value of 155.902M.

FY24 Notes:
-A&AS Cost Growth is associated with the scope of Epoch 1 growing to include an additional vendor and spacecraft. Furthermore, costs increase to support the ground program's most critical year of development for the ground antennas and ops center.

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206447SF / *Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*	**Project (Number/Name)** 657MEO / *Resilient MW/MT - MEO*

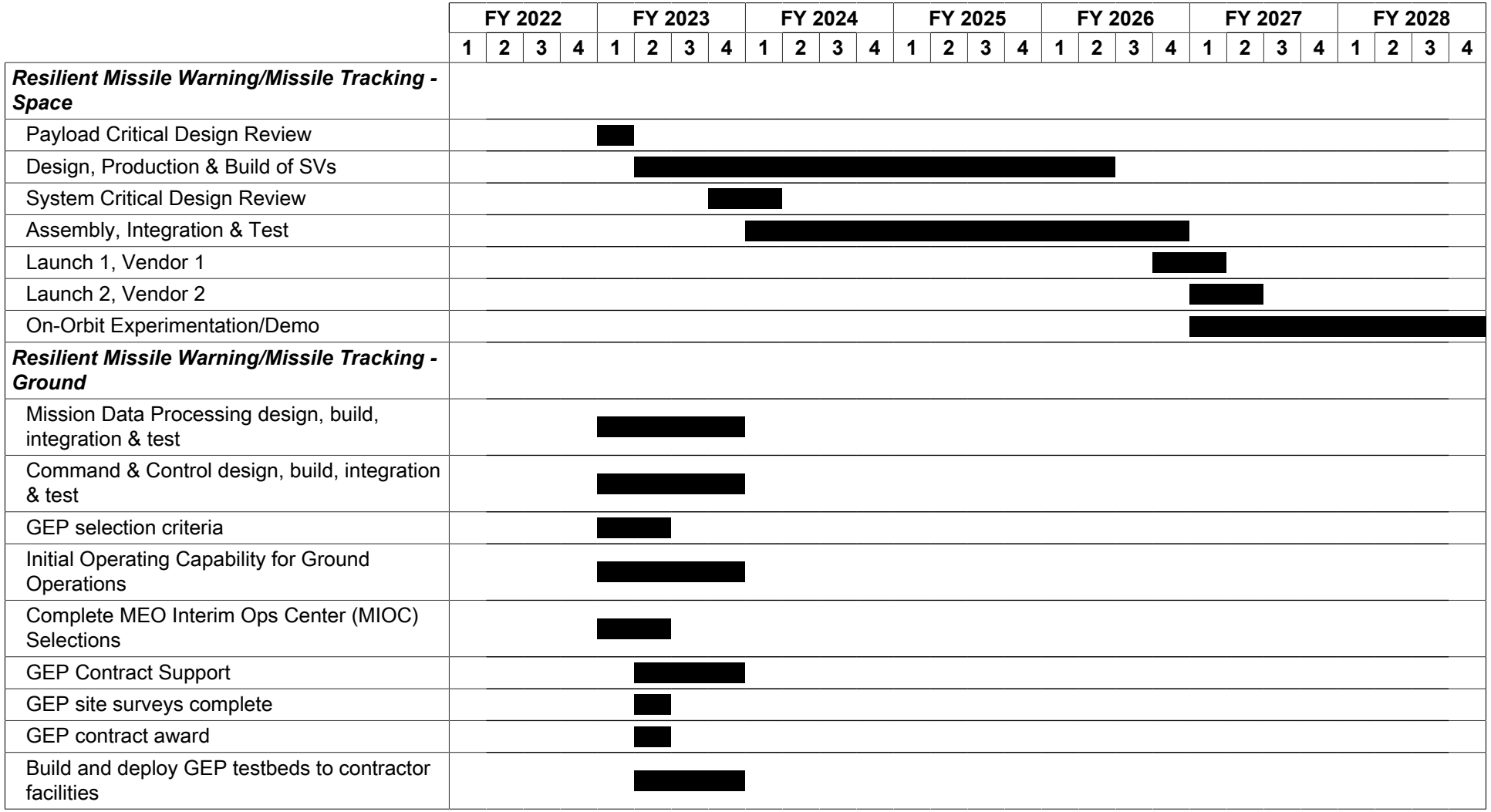

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206447SF / *Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*	**Project (Number/Name)** 657MEO / *Resilient MW/MT - MEO*

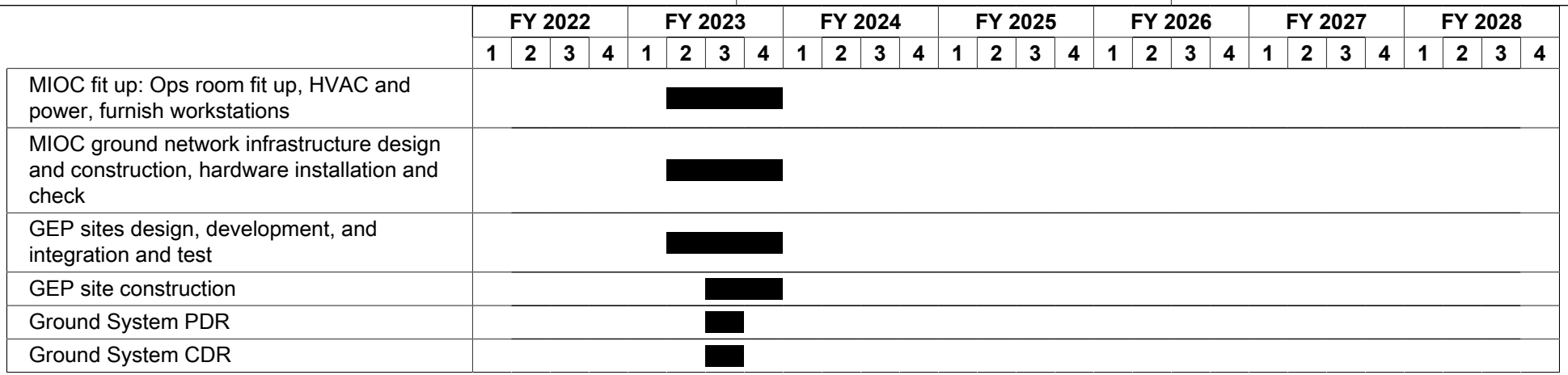

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206447SF / *Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*	**Project (Number/Name)** 657MEO / *Resilient MW/MT - MEO*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Resilient Missile Warning/Missile Tracking - Space				
Payload Critical Design Review	1	2023	1	2023
Design, Production & Build of SVs	2	2023	2	2026
System Critical Design Review	4	2023	1	2024
Assembly, Integration & Test	1	2024	4	2026
Launch 1, Vendor 1	4	2026	1	2027
Launch 2, Vendor 2	1	2027	2	2027
On-Orbit Experimentation/Demo	1	2027	4	2028
Resilient Missile Warning/Missile Tracking - Ground				
Mission Data Processing design, build, integration & test	1	2023	4	2023
Command & Control design, build, integration & test	1	2023	4	2023
GEP selection criteria	1	2023	2	2023
Initial Operating Capability for Ground Operations	1	2023	4	2023
Complete MEO Interim Ops Center (MIOC) Selections	1	2023	2	2023
GEP Contract Support	2	2023	4	2023
GEP site surveys complete	2	2023	2	2023
GEP contract award	2	2023	2	2023
Build and deploy GEP testbeds to contractor facilities	2	2023	4	2023
MIOC fit up: Ops room fit up, HVAC and power, furnish workstations	2	2023	4	2023
MIOC ground network infrastructure design and construction, hardware installation and check	2	2023	4	2023
GEP sites design, development, and integration and test	2	2023	4	2023

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206447SF / *Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*	**Project (Number/Name)** 657MEO / *Resilient MW/MT - MEO*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GEP site construction	3	2023	4	2023
Ground System PDR	3	2023	3	2023
Ground System CDR	3	2023	3	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206448SF *I Resilient Missile Warning Missile Tracking - Integrated Ground Segment*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	505.569	0.000	505.569	560.467	582.989	575.860	535.923	Continuing	Continuing
657124: *Resilient MW/MT*	-	0.000	0.000	505.569	0.000	505.569	560.467	582.989	575.860	535.923	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

The FY 2023 enacted budget transferred all FY 2023 funds from PE 1206448SF, Resilient Missile Warning Missile Tracking - Integrated Ground Segment, to RDT&E Program Element (PE) 1206446SF, Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO), RDT&E PE 1206447SF, Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO), and Procurement, Space Force (PROC, SF) Line Item SDALCH, Space Development Agency Launch.

A. Mission Description and Budget Item Justification

The United States Space Force (USSF) Space Systems Command (SSC) and Space Development Agency (SDA) are collaborating to deliver Overhead Persistent Infrared (OPIR) capabilities, in concert with Department of Defense (DoD) and Intelligence Community (IC) partners, to support a proliferated space architecture, resilient-by-design, capable of operating through contested environments. SSC's Resilient MW/MT - MEO space and ground efforts pivot the Department of the Air Force's (DAF) legacy missile warning force design to a more resilient multi-orbit approach to counter advanced missiles, hypersonic glide vehicles, and fractional orbital bombardment threats. MW/MT - MEO is anchored in Missile Warning and Missile Defense Capability Development Document (CDD) requirements validated by the Joint Requirements Oversight Council (JROC). Constellation resiliency is foundational to the DAF's Resilient Missile Warning / Tracking force design; therefore, the OPIR Family of Systems, including MW/MT - MEO, is designed to work cohesively to gain and maintain custody of a spectrum of missile threats.

The MEO program will deploy space assets in multiple epochs to allow for incremental capability delivery and to ensure competition throughout the lifecycle of the program. Resilient MW/MT - MEO will bolster legacy Space Based Infrared Satellite (SBIRS) and Next-Gen OPIR capabilities and will independently satisfy all mission area CDD requirements for both missile warning and tracking by FY 2031. FY 2024 funding supports space segment long-lead parts purchases, space vehicle bus and main mission payload assembly, integration and test, and early on-orbit initialization studies for up to three (3) vendors to support the first Epoch 1 launch in FY 2026. Furthermore, FY 2024 funding supports ground segment mission data processing application development, command and control software and facilities build, and ground entry point site construction by EOY FY 2025 to support on-orbit initialization.

To support the LEO Space layer specific ground functions, SDA's ground segment provides constellation management, ground-based data processing, dissemination, and management, space-to-ground verification and ground-based interoperability testing, support operations, and other integration activities for the SDA Tracking Layer and integrates it with the Missile Warning/Missile Tracking/Missile Defense (MW/MT/MD) enterprise. As a part of the Proliferated Warfighter Space Architecture (PWSA), the LEO MW/MT/MD ground segment leverages the Tranche 1 (T1) Transport Layer, and T1 Operations and Integration (O&I) Centers to provide MW/MT data to the Warfighter anywhere in the world. The T1 Tracking Layer, awarded in FY 2022, is the minimum viable product proliferated satellite constellation to provide global access for tracking of Hypersonic Glide Vehicles and other advanced missile threats. This program element funds required upgrades to the SDA ground segment in order to provide command and control, mission data processing, low latency data dissemination, support operations, and other ground functions to support the capabilities for T1 and future tranches.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206448SF *I Resilient Missile Warning Missile Tracking - Integrated Ground Segment*

Using a Combined Program Office (CPO) construct, SSC, SDA, and the Missile Defense Agency (MDA) are teaming to develop and implement a system-of-systems integration strategy across for MW/MT/MD constellations supporting LEO, MEO, and GEO/Polar orbit regimes. Resilient MW/MT - MEO Epoch 1 is comprised of multiple space and ground lines of effort to include following ground items:
- Develop mission data processing, on contract as of December 2022 and mission unique ground software.
- Perform the operations and integration of the space vehicles into the operations center for command and control at the Tools, Applications, and Processing (TAP) lab. Plan to have operations and integration contract award for MEO no later than 3Q FY 2023.
- Develop command and control software to enable traditional tracking, telemetry, commanding, tipping, and cueing across multiple collection layers. On contract as of December 2022. Additional ground applications (such as the ground resource manager) planned as part of the Operations and Integration contract in Summer 2023.
- Acquire, build, install, test, and operate ground-based antennas for uplink/downlink of commands and mission data. At least two sites and six apertures are required for Epoch 1. On contract as of February 2023.
- Test, assess, and validate sensor performance on the ground and on-orbit to ensure track data is integrated by Program of Record (PoR) data and fusion operational programs such as Future Operationally Resilient Ground Evolution (FORGE) (PE 1206440SF), Ballistic Missile Defense OPIR Architecture, other classified partners and missions, research and development multi-intelligence fusion (PE 1206442SF), and intelligence characterization. SV testing is on contract as of December 2022. Fusion software studies underway with FORGE program as of March 2023. Additional studies planned with Ballistic Missile Defense OPIR Architecture to start in FY 2024.
- Mature integrated digital model: support SSC's role as the mission area integrator, perform resiliency analyses, baseline future requirements, and assess performance against current and new targets. On contract as of May 2021.

Space acquisition teams must respond with speed and agility to emerging adversary threats. SSC has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver MW/MT capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206448SF *I Resilient Missile Warning Missile Tracking - Integrated Ground Segment*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	390.596	463.489	0.000	463.489
Current President's Budget	0.000	0.000	505.569	0.000	505.569
Total Adjustments	0.000	-390.596	42.080	0.000	42.080
• 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	-390.596	42.080	0.000	42.080

Change Summary Explanation

FY 2023: -390.6M; transferred from PE 1206448SF, Resilient Missile Warning Missile Tracking - Integrated Ground Segment, to RDT&E Program Element (PE) 1206446SF, Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO), PE 1206447SF, Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO) due to Congressional direction, and PROC, SF, Line Item SDALCH, Space Development Agency Launch.

FY 2024: -1.522M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +10.000M; to support OPIR Enterprise Ground Enhancements.

FY 2024: +31.480M; realigned funding from MEO PE 1206447SF and LEO PE 1206446SF for MW/MT to Full Operational Capability (FOC).

FY 2024: +2.122M; inflation Rates for Non-Pay and Non-Fuel Purchases.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Missile Warning (MW)/ Missile Tracking (MT) Ground Low Earth Orbit (LEO)	0.000	0.000	252.785
Description: Expands the existing Proliferated Warfighter Space Architecture (PWSA) to meet the Command and Control (C2), Mission Data Processing (MDP), Enterprise Integration, and Support Operations requirements for the Tranche 1 (T1) Tracking Layer and Tranche 2 (T2) Tracking Layer. The LEO MW/MT ground segment provides constellation management, ground-based data processing, dissemination, and management, space-to-ground verification and ground-based interoperability testing, support operations, and other integration activities for the SDA T1 Tracking Layer and integrates with the MW/MT/MD enterprise. This			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206448SF *I Resilient Missile Warning Missile Tracking - Integrated Ground Segment*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
includes the connection of T1 Operations centers with legacy and emerging MW/MT/MD capabilities to disseminate MW/MT/MD data in common message formats for rapid response to advanced missile threat. ***FY 2023 Plans:*** Funding for Ground efforts in FY 2023 was realigned to LEO PE 1206446SF. ***FY 2024 Plans:*** Continue executing the PWSA T1 programs initiated in FY 2022 to complete the LEO MW/MT ground segment required to support launches starting in FY 2025 and capability demonstration starting in FY 2026. Complete a Ground Readiness Review (GRR) to ensure integration with the Operations Centers and prepare for Missile Warning/ Missile Tracking integration. Continue developing the ground segment for T1. Begin planning to expand the T1 ground system to accommodate more satellite vehicles, greater volumes of sensor data, and add fire control sensors to deliver Missile Defense capability in addition to Missile Warning and Tracking in future tranches. This line supports investments in facilities, hardware, network management, Ground Entry Points (GEPs), Optical Ground Terminals (OGT), software development, mission payloads, contract services, and any other integration requirements to support the MW/MT/MD enterprise. These efforts will leverage and expand upon existing Mission Data Processing Applications (MDPAPs) and Joint OPIR Ground initiatives to ensure rapid processing and dissemination to global warfighting community. In addition, this effort will support the planning and execution of performance and integration risk mitigation activities associated with C2 challenges, MDP expansion, and interagency integration. Other activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2023 ground efforts were executed out of RDT&E, PE 1206446SF. The FY 2024 continues funding the ground segment and delivery of the T1 and T2 Tracking Layers.			
Title: Missile Warning (MW)/ Missile Tracking (MT) - Ground - Medium Earth Orbit (MEO)	0.000	0.000	252.784
Description: The Force Design and AoA laid out the initial framework and funding for the Space Force to aggressively pursue MEO satellites and ground by using spiral development to continue competition, control costs, insert technology when mature, and deliver capability incrementally. To responsively deliver capabilities, this PE will fund continued development of the MEO efforts through two (2) launches in late calendar year 2026 and operations in support of an initial warfighting capability for the combined LEO and MEO ground architecture. Initial Warfighting Capability is comprised of validating through on-orbit measurements the ability for regional tracking, mission management and control, and coordinated regional warning and access. After performance validation is complete, sensors will feed data directly to operational warning and defense systems. The initial warfighting capability will provide			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206448SF *I Resilient Missile Warning Missile Tracking - Integrated Ground Segment*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
sensitivity to detect emerging threats, accurate tracking to contain maneuvering targets, and deliver data within the required latency to close the kill-chain solution. ***FY 2023 Plans:*** Funding for Ground efforts in FY 2023 was realigned to MEO PE 1206447SF. ***FY 2024 Plans:*** Vendors will work with the chosen MDP and C2 Ops floor centers to integrate their ground architecture solutions in preparation for pre-launch and early orbit testing. GEP contractor will construct and connect dedicated GEPs in Continental United States (CONUS) and Outside Continental United States (OCONUS) locations with an expected completion in time to support Epoch 1 launch and early orbit operations. Expand development for C2 and MDP to meet the initial warfighter capability for sensitivity, accuracy, and latency of the MW/MT MEO space layer. In FY 2024 the TAP lab will begin to be outfitted with, hardware, software, and ground. Investments in FY 2024 will continue for GEP construction, contract services, operations and integration support, and any other general ground infrastructure required to standup an instantiation of the minimum viable ground infrastructure to support Epoch 1 space vehicles. Vendors will begin to incorporate an instantiation of the FORGE MDPAF for MDP and appropriate C2 solutions. Vendors will also leverage and expand upon existing Mission Data Processing Applications and Joint OPIR Ground initiatives to ensure rapid processing and dissemination of Epoch 1 sensor tracks to the global warfighting community. Develop initial integration modelling and simulation test cases and run for early integration testing with fusion and correlation operational warning and tracking systems. Plan and execute performance and integration risk mitigation activities associated with C2 challenges, MDP expansion, and interagency integration. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to ramping up ground software developments (mission data processing/command and control), performing early integration with the operations center, and building ground antennas all to support the Epoch 1 Initial Warfighting Capability.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	505.569

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• 1206447SF: *Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)*	-	408.527	-	-	-	363.709	367.092	1,224.222	1,059.145	Continuing	Continuing

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206448SF *I Resilient Missile Warning Missile Tracking - Integrated Ground Segment*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• 1206442SF: *Next Generation OPIR*	-	97.770	-	-	-	-	-	-	-	Continuing	Continuing

Remarks

E. Acquisition Strategy

LEO: SDA will continue execution of contracts competitively awarded in FY 2022 using funds from RDT&E program elements 1206310SDA, 1206410SDA, and 1206446SF. The SDA T1 programs will execute approved acquisition strategies to deliver a LEO proliferated constellation under the Middle Tier of Acquisition prototyping pathway. Additionally, SDA will begin T2 activities during this period, which will include warfighter council approval of acquisition plans, and award of T2 contracts. The T1 Tracking Layer will be the initial capability to support the architecture derived from the Missile Warning and Missile Defense OPIR Enterprise CDD, validated by the Joint Requirements Oversight Council (JROC) in May 2019. T2 will expand on the T1 Tracking Layer with additional satellites and fire control capability to support global coverage in LEO for the MW/MT/MD mission in order to close the kill chain with low latency. The MW/MT/MD - Ground - LEO project will leverage the efforts in all of the SDA T1 programs to provide low latency MW/MT/MD data to the enterprise.

MEO: The Space Force will deliver mission data processing and command and control software development under current contracts competitively awarded in FY 2021 under the NG OPIR PE 1206442SF. Consistent updates to the C2 and MDP software will be expected and Ground antenna contracts will be executing in FY 2024 led in collaboration with mission partners. The program office is leveraging a competitively awarded operations center and integration contract combined with mission partners. The program developed an acquisition strategy for all of Epoch 1 scope: vehicles 1-6; additional vehicles to meet performance baseline (at least 3); command and control software; mission data processing software; operations and integration, and at least 6 ground antennas for command & telemetry.

The Epoch 1 requirements are derived from the Missile Warning and Missile Defense OPIR Enterprise CDD, validated by the JROC in May 2019. Epoch 1 serves as the first delivery of capability targeting polar warning and regional tracking coverage with launches in late FY 2026. Future epochs are planned for competitive awards and a follow-on acquisition strategy still in development.

The acquisition strategy for the space and mission-unique ground portions of Epoch 1 were approved by the PEO for Space Sensing in May 2022.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206448SF / *Resilient Missile Warning Missile Tracking - Integrated Ground Segment*	**Project (Number/Name)** 657124 / *Resilient MW/MT*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
LEO: MW/MT Tracking Data Management	Various	multiple : multiple	-	-		-		53.300	Jan 2024	-		53.300	Continuing	Continuing	-
LEO: Enterprise Integration	Various	multiple : multiple	-	-		-		82.400	Mar 2024	-		82.400	Continuing	Continuing	-
LEO: MW/MT Ground Operations and Integration	Various	multiple : multiple	-	-		-		117.084	Nov 2023	-		117.084	Continuing	Continuing	-
MEO: Ground, Test, and Integration, Vendor 1	Various	Raytheon : El Segundo, CA	-	-		-		61.004	Dec 2023	-		61.004	Continuing	Continuing	-
MEO: Ground, Test, and Integration, Vendor 2	Various	Millennium : El Segundo, CA	-	-		-		67.938	Dec 2023	-		67.938	Continuing	Continuing	-
MEO: Ground Entry Point (GEP)	MIPR	Northrop Grumman : Fairfax, VA	-	-		-		71.000	Jan 2024	-		71.000	Continuing	Continuing	-
MEO: Operations and Integration (O&I)	Various	TBD : TBD	-	-		-		15.000	Jan 2024	-		15.000	Continuing	Continuing	-
MEO: Data Fusion	Various	TBD : TBD	-	-		-		21.000	Jan 2024	-		21.000	Continuing	Continuing	-
MEO: Enterprise SE&I	Various	Various : TBD	-	-		-		2.524	Dec 2023	-		2.524	Continuing	Continuing	-
MEO: Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	-		-		1.343	Jan 2024	-		1.343	Continuing	Continuing	-
		Subtotal	-	-		-		492.593		-		492.593	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MEO: FFRDC	RO	Aerospace Corp. : El Segundo, CA	-	-		-		3.245	Jan 2024	-		3.245	Continuing	Continuing	-
MEO: A&AS	Various	Various : Various	-	-		-		9.731	Nov 2023	-		9.731	Continuing	Continuing	-
		Subtotal	-	-		-		12.976		-		12.976	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206448SF / *Resilient Missile Warning Missile Tracking - Integrated Ground Segment*	Project (Number/Name) 657124 / *Resilient MW/MT*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		505.569		-		505.569	Continuing	Continuing	N/A

Remarks

Submitted FY 2024 Technical Adjustment for PE 1206446SF, Resilient Missile Warning Missile Tracking - Low Earth Orbit (LEO) and to PE 1206447SF, Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO).

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206448SF / *Resilient Missile Warning Missile Tracking - Integrated Ground Segment*	**Project (Number/Name)** 657124 / *Resilient MW/MT*

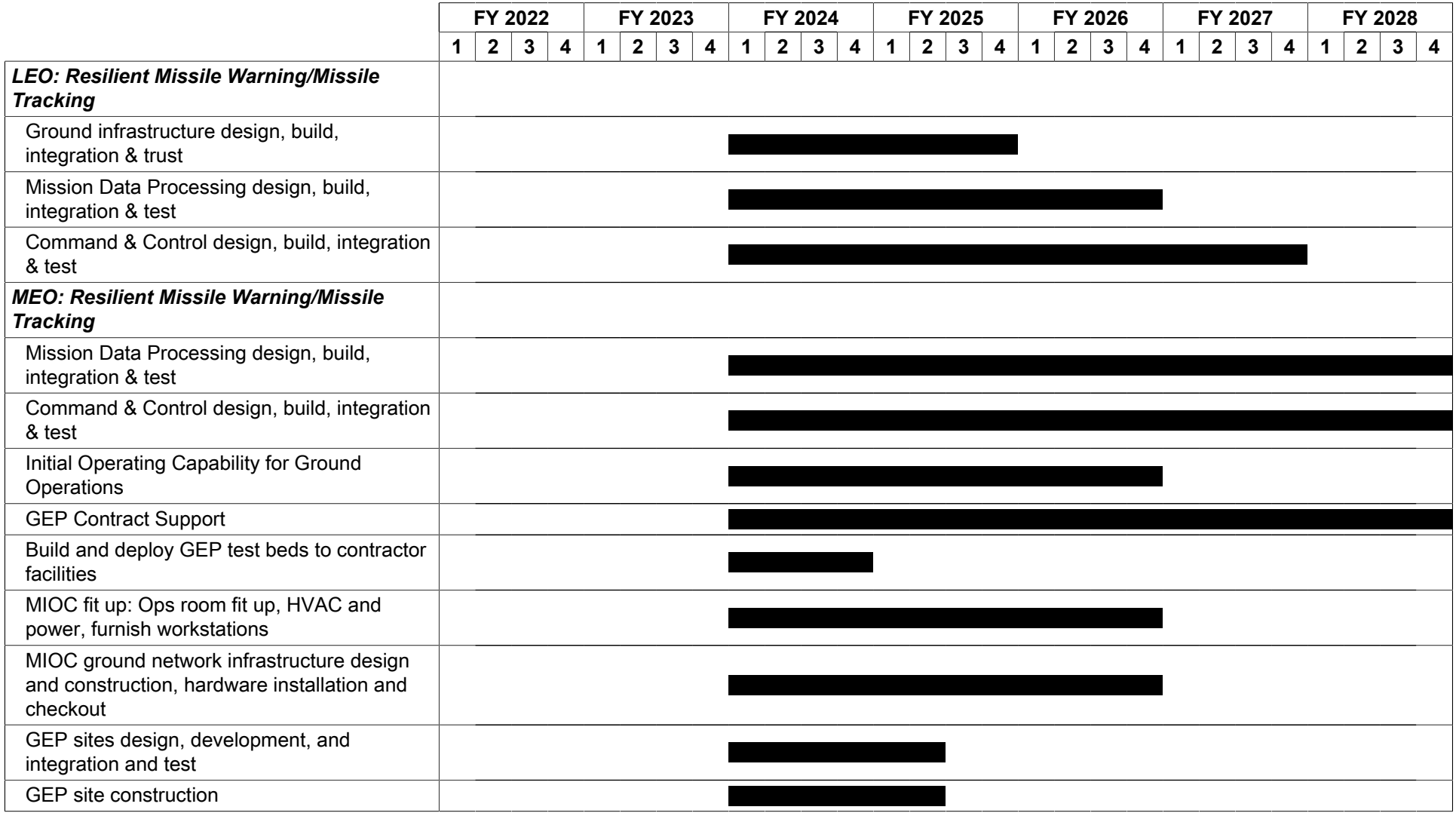

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206448SF / *Resilient Missile Warning Missile Tracking - Integrated Ground Segment*	**Project (Number/Name)** 657124 / *Resilient MW/MT*

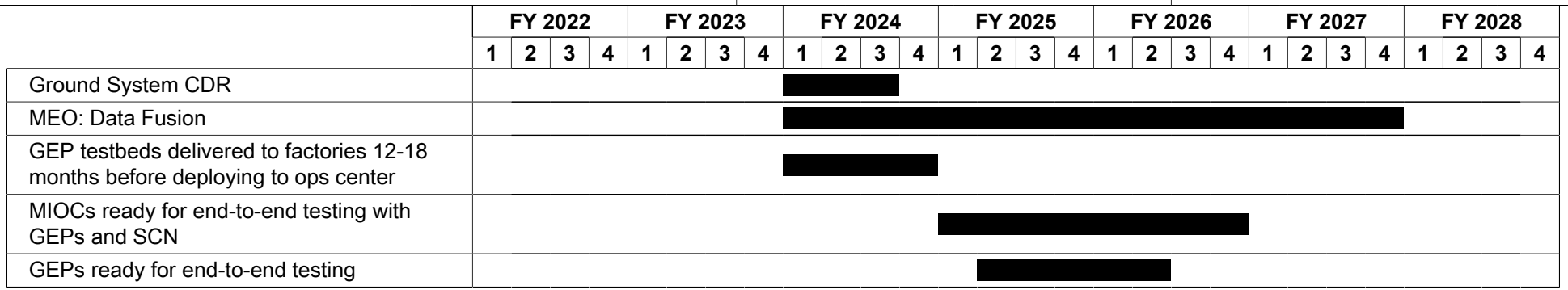

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206448SF / *Resilient Missile Warning Missile Tracking - Integrated Ground Segment*	**Project (Number/Name)** 657124 / *Resilient MW/MT*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
LEO: Resilient Missile Warning/Missile Tracking				
Ground infrastructure design, build, integration & trust	1	2024	4	2025
Mission Data Processing design, build, integration & test	1	2024	4	2026
Command & Control design, build, integration & test	1	2024	4	2027
MEO: Resilient Missile Warning/Missile Tracking				
Mission Data Processing design, build, integration & test	1	2024	4	2028
Command & Control design, build, integration & test	1	2024	4	2028
Initial Operating Capability for Ground Operations	1	2024	4	2026
GEP Contract Support	1	2024	4	2028
Build and deploy GEP test beds to contractor facilities	1	2024	4	2024
MIOC fit up: Ops room fit up, HVAC and power, furnish workstations	1	2024	4	2026
MIOC ground network infrastructure design and construction, hardware installation and checkout	1	2024	4	2026
GEP sites design, development, and integration and test	1	2024	2	2025
GEP site construction	1	2024	2	2025
Ground System CDR	1	2024	3	2024
MEO: Data Fusion	1	2024	4	2027
GEP testbeds delivered to factories 12-18 months before deploying to ops center	1	2024	4	2024
MIOCs ready for end-to-end testing with GEPs and SCN	1	2025	4	2026
GEPs ready for end-to-end testing	2	2025	2	2026

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206853SF *I National Security Space Launch Program (SPACE) - EMD*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	195.093	232.648	82.188	0.000	82.188	23.351	7.277	2.823	4.317	0.000	547.697
650006: *Next Generation Launch System Investment*	-	195.093	232.648	82.188	0.000	82.188	23.351	7.277	2.823	4.317	0.000	547.697
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Prior Years Funding $2,089.431M was executed in PE 1206853F.

A. Mission Description and Budget Item Justification

The National Security Space Launch (NSSL) program provides a space launch service that satisfies the government's National Launch Forecast (NLF) requirements to place National Security Space (NSS) space vehicles on orbit. NSSL is a launch service, not a weapon system, which is primarily funded with production funds.

NSSL Phase 2 development, started late FY 2014, funds research and development activities and related studies, to include, but not limited to, investments in new and/or upgraded launch systems and associated launch facilities to meet NSS launch needs leveraging domestic commercial launch providers. The RDT&E program will also fund continued research and development activities, mission manifest capability development & future studies for emerging NSS launch needs. These efforts will develop technologies for space access, mobility, and logistics (SAML) through multiple public-private partnerships; help sustain the U.S. industrial base; address emergent needs for launch-related space access and lower procurement costs by promoting competition. Examples include, but are not limited to, orbital transfer, on-orbit servicing, digital engineering, debris removal and novel on-orbit propulsion technologies.

The Space Force will continue investments in the Launch Service Agreement (LSA) public-private partnership with United Launch Alliance Vulcan Centaur for launch system development. In addition, the Space Force will complete rocket propulsion system (RPS) with Aerojet Rocketdyne for the RL10 upper stage engine development and the associated technical maturation program. Future development to capitalize on new technology and innovations developed by industry may continue to utilize public-private partnerships. The Space Force will also be leveraging opportunities to integrate Department of Defense payloads on to launch services procured commercially or by other Government agencies (e.g. NASA) where excess margin is available.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) is transforming the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver NSSL system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206853SF *I National Security Space Launch Program (SPACE) - EMD*

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	201.510	124.103	82.361	0.000	82.361
Current President's Budget	195.093	232.648	82.188	0.000	82.188
Total Adjustments	-6.417	108.545	-0.173	0.000	-0.173
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	110.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-6.417	0.000			
• Other Adjustments	0.000	-1.455	-0.173	0.000	-0.173

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 650006: *Next Generation Launch System Investment*		
Congressional Add: *NSSL Payload Processing Facility*	-	80.000
Congressional Add: *Space Mobility and Logistics*	-	30.000
Congressional Add Subtotals for Project: 650006	-	110.000
Congressional Add Totals for all Projects	-	110.000

Change Summary Explanation

FY 2024: -0.541M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2023: -1.455M GCR FFRDC. +110.000M Congressional Add.

FY 2022: -6.417M for SBIR/STTR Transfer

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: NSSL Enabling Investments	16.871	0.000	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206853SF *I National Security Space Launch Program (SPACE) - EMD*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Enabling Investments are a continuous portfolio of RDT&E projects that will increase U.S. space dominance through the end of the decade and beyond. The portfolio consists of multiple public-private partnerships to develop technologies for space access, mobility, and logistics (SAML). Examples include, but are not limited to, orbital transfer, on-orbit servicing, digital engineering, and novel on-orbit propulsion technologies. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A			
Title: Launch Service Agreement ***Description:*** Invest in providers of domestic Launch Services. This investment enables the transition from the use of non-Allied space launch engines to commercial launch services that also meet NSS needs. Execute Other Transaction Authority (OTA) agreements to develop various industry solutions utilizing public-private partnerships. Continue the technical maturation and risk reduction activities in support of Launch Service OTAs. ***FY 2023 Plans:*** Continue NSSL Phase 2 public-private partnership investment with United Launch Alliance (ULA) for the development of the Vulcan Centaur launch system. This investment includes continued development for the heavy lift (Category C) capability of the Vulcan Centaur, including Design Certification Review, and continued West Coast space launch complex improvements. Additionally, FY 2023 funding will allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2024 Plans:*** Continue NSSL Phase 2 public-private partnership investment with United Launch Alliance (ULA) for the development of the Vulcan Centaur launch system. This investment includes continued development for the heavy lift (Category C) capability of the Vulcan Centaur, including Design Certification Review, and complete the West Coast space launch complex improvements. Additionally, FY 2024 funding will allow the program to rapidly respond to implement system resiliency and situational awareness	171.886	122.648	82.188

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206853SF *I National Security Space Launch Program (SPACE) - EMD*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2023 to FY 2024 decrease due to ramp down of Vulcan development and fewer milestone payments.			
Title: Rocket Propulsion System Development ***Description:*** Invest in domestic rocket propulsion systems (RPS) under the Launch Service Agreement Other Transaction Authority (OTA) agreements. This investment enables the transition from the use of non-Allied space launch engines to domestic rocket propulsion systems. Continue to execute a single RPS OTA agreement utilizing a public-private partnership. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A	6.336	0.000	0.000
Accomplishments/Planned Programs Subtotals	195.093	122.648	82.188

	FY 2022	FY 2023
Congressional Add: NSSL Payload Processing Facility ***FY 2023 Plans:*** Development of payload processing capabilities to support National Security payload processing to support launches from the Eastern Range	-	80.000
Congressional Add: Space Mobility and Logistics ***FY 2023 Plans:*** Investments leverage near-term operational capabilities of commercial services and residual RDT&E capacity, which enhance the National Security Space mission area. Funding exploits commercial Space Maneuver and Servicing (SMS) systems already operationally employed and accelerates the development of maneuver and refueling capability in support of Dynamic Space Operations and other operational requirements. Examples include, but are not limited to, SMS capabilities, on-orbit deployment of enabling and transformational technologies, and in-space transportation.	-	30.000
Congressional Adds Subtotals	-	110.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206853SF *I National Security Space Launch Program (SPACE) - EMD*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 NSSL00: *National Security Space Launch*	1,287.347	1,024.803	2,142.846	-	2,142.846	2,187.077	2,066.860	2,194.791	2,222.690	1,301.200	14,427.614

Remarks

E. Acquisition Strategy

Launch Enterprise will continue execution of NSSL Phase 2 Public-Private Partnership investments and NSSL Enabling Investments, including those for Next Generation Rocket Engine Testing and Upper Stage Resiliency Enhancements. Phase 2 consists of RDT&E investment in commercial launch system prototypes developed via the Space Force's Launch Service Agreements (LSAs) and Rocket Propulsion System (RPS) Other Transaction Authority (OTA) agreements to ensure two domestic launch service providers are certified to meet all NSS requirements. Phase 2 ends the use of the Russian RD-180 engine and leverages the U.S. launch industry to meet more stressing national security needs. This strategy ensures space launch operations meet requirements for Assured Access to Space (AATS) codified in 10 USC 2273 and Congressional direction to end U.S. reliance on non-allied propulsion systems. Enabling Investments, initiated by FY 2021 Congressional Adds and continued in FY 2022, are developing advanced space access capabilities to sustain competition for launch services starting in FY 2025 per the NSSL Phase 3 acquisition strategy. Development activities foster a robust launch industrial base and leverage launch innovation to maintain American leadership in launch capabilities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206853SF / *National Security Space Launch Program (SPACE) - EMD*	Project (Number/Name) 650006 / *Next Generation Launch System Investment*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
RPS OTA	C/Various	Aerojet Rocketdyne : Canoga Park, CA	-	6.336	Nov 2021	-		-		-		-	0.000	6.336	-
LSA OTA1	C/Various	United Launch Alliance : Denver, CO	-	132.124	Nov 2021	86.542	Nov 2022	56.660	Nov 2023	-		56.660	Continuing	Continuing	-
LNG/LOX Characterization Testing	Various	Various : Various	-	-		-		6.249	Dec 2023	-		6.249	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	14.286	Dec 2021	10.919	Dec 2022	2.730	Dec 2023	-		2.730	Continuing	Continuing	-
Enterprise System Engineering and Integration (SE&I)	C/CPFF	Various : Various	-	10.596	Nov 2021	10.024	Nov 2022	1.551	Nov 2023	-		1.551	Continuing	Continuing	-
NSSL Enabling Investments Orbital Transfer & Maneuver (OTM)	C/Various	Various : Various	-	16.871	Jun 2022	-		-		-		-	0.000	16.871	-
RDT&E SBIR/STTR	TBD	TBD : TBD	-	-		-		2.539	Mar 2024	-		2.539	Continuing	Continuing	-
NSSL Payload Processing Facility	C/TBD	TBD : TBD	-	-		80.000	Sep 2023	-		-		-	Continuing	Continuing	-
Space Mobility and Logistics	C/Various	TBD : TBD	-	-		30.000	Apr 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	180.213		217.485		69.729		-		69.729	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Organic Civilian Support	Reqn	DOD : El Segundo, CA	-	2.079	Oct 2021	2.142	Oct 2022	2.206	Oct 2023	-		2.206	Continuing	Continuing	-
		Subtotal	-	2.079		2.142		2.206		-		2.206	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206853SF / *National Security Space Launch Program (SPACE) - EMD*	Project (Number/Name) 650006 / *Next Generation Launch System Investment*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace : El Segundo, CA	-	1.229	Dec 2021	0.954	Dec 2022	0.982	Dec 2023	-		0.982	Continuing	Continuing	-
Advisory and Assistance Services	Various	Various : Various	-	5.141	Nov 2021	6.277	Nov 2022	7.485	Nov 2023	-		7.485	Continuing	Continuing	-
Other Support	Various	Various : Various	-	6.431	Nov 2021	5.790	Nov 2022	1.786	Nov 2023	-		1.786	Continuing	Continuing	-
		Subtotal	-	12.801		13.021		10.253		-		10.253	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	195.093		232.648		82.188		-		82.188	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206853SF / *National Security Space Launch Program (SPACE) - EMD*	**Project (Number/Name)** 650006 / *Next Generation Launch System Investment*

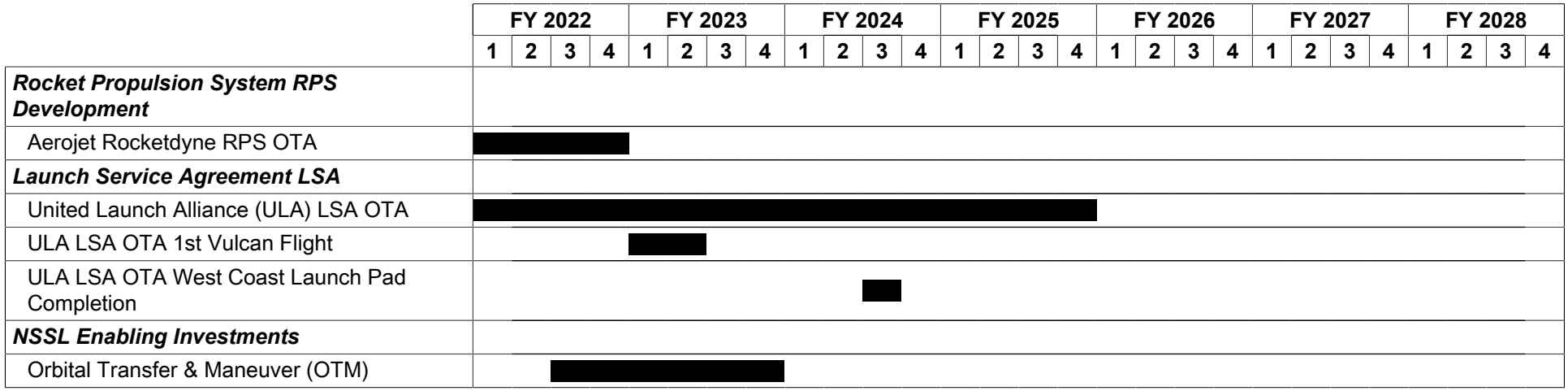

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206853SF / *National Security Space Launch Program (SPACE) - EMD*	**Project (Number/Name)** 650006 / *Next Generation Launch System Investment*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Rocket Propulsion System RPS Development				
Aerojet Rocketdyne RPS OTA	1	2022	4	2022
Launch Service Agreement LSA				
United Launch Alliance (ULA) LSA OTA	1	2022	4	2025
ULA LSA OTA 1st Vulcan Flight	1	2023	2	2023
ULA LSA OTA West Coast Launch Pad Completion	3	2024	3	2024
NSSL Enabling Investments				
Orbital Transfer & Maneuver (OTM)	3	2022	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 1203622SF *I Space Warfighting Analysis*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	0.000	3.568	0.000	3.568	4.970	5.074	5.075	5.181	Continuing	Continuing
646021: *Space Warfighting Analysis*	-	0.000	0.000	3.568	0.000	3.568	4.970	5.074	5.075	5.181	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This effort realigns Space Warfighting Analysis Center's (SWAC) APPN 3410 funding to align USSF and SpOC force design funding under SWAC's 3620 RDT&E baseline. This is not a new start.

A. Mission Description and Budget Item Justification

This request funds increased scope towards capability area analyses and integration, modeling, wargaming, and experimentation to create operational concepts and force design guidance for existing and emerging USSF missions. These analyses efforts team with relevant stakeholders across the National Security Space enterprise from an independent perspective and will provide analytic insight to the Service to inform and/or validate solutions to operational needs and provide a basis for future capability development programs. USSF force design analyses are organized into three focus areas: Multi-Domain Sensing, Spectrum Warfare, and Force Design Integration which are aligned to USSF priorities, and follow a disciplined approach to discover, analyze, and validate concepts and the associated family of systems required to satisfy current/future mission needs while including comprehensive threat analysis. The resulting force design products will help define and inform future USSF mission requirements, capabilities/architectures, priorities and funding needs, and interface standards.

This program element includes necessary emergent/unanticipated civilian pay expenses required to manage and execute the force design mission assigned to the SWAC and/or deliver products for evolving weapon system capabilities.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1203622SF *I Space Warfighting Analysis*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	3.568	0.000	3.568
Total Adjustments	0.000	0.000	3.568	0.000	3.568
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	3.568	0.000	3.568

Change Summary Explanation

FY2024: realignment of civ pay expenses to from APPN 3410 to align USSF and SpOC force design funding under SWAC's RDT&E baseline.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: SWAC Workforce	-	0.000	3.568
Description: Provide professional government civilian acquisition workforce in support of the Space Warfighting Analysis Center. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2023 Plans:*** NA ***FY 2024 Plans:*** Provide professional government civilian acquisition workforce in support of the Space Warfighting Analysis Center. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increase is for civ pay expenses.			
Accomplishments/Planned Programs Subtotals	-	0.000	3.568

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1203622SF *I Space Warfighting Analysis*

E. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1205502SF *I Small Business Innovation Research*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	290.490	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
663005: *Small Business Innovation Research*	-	290.490	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 Small Business Innovation Research (SBIR) and Small Business Technology Transfer (STTR) program implements 15 U.S.C Section 638 to maximize the creative, innovative, and entrepreneurial spirit of small businesses to solve technological problems.

In January 2021, the Secretary of the Air Force named the AFWERX Director as the Chief Commercialization Officer and aligned the Department of the Air Force's (DAF) SBIR and STTR Programs to AFWERX. In conjunction with the establishment of the United States Space Force (USSF), AFWERX stood up SpaceWERX to execute SBIR and STTR funds for the space portfolio. SpaceWERX's mission is to identify, acquire, and integrate innovation capabilities into the USSF while cultivating partnership among the nation's Space Guardians and top problem solvers. SpaceWERX will accomplish this mission through (i) connecting diverse, innovative industry, academia, and Government entities; (ii) creating capability options and prototype opportunities for the USSF; (iii) facilitating streamlined acquisition processes; and (iv) fostering a culture of innovation.

Additionally, this Program Element (PE) has a direct tie to PE 0604317F, Technology Transfer, Project 646030, AFWERX, and PE 0604858F, Tech Transition Program, Project 640858, Prime, as this program improves Air Force and Space Force capabilities by connecting innovators, simplifying technology transfer, and accelerating results. This Program is a parallel effort to United States Air Force PE 0605502F, Small Business Innovation Research.

This document reflects actual FY 2023 3620 funds aligned to the SBIR/STTR program in accordance with the legislative authority to direct 3.65% of enacted funds anticipated for extramural awards to the program. Funding is spread across multiple focus areas and change from year to year based on known and emerging technology gaps, warfighting demand signals, and broader assessments of the military industrial base in light of its reliance on foundational commercial industries. Expected proportional execution of SBIR/STTR funds in each fiscal year's focus area, as well as a description of each of these areas, is provided below. Actuals may vary depending on allocation of actual funds received, timeliness of funds availability, or changes to strategic guidance or executive priorities.

SBIR/STTR funding is allocated into three major areas: Specific Topics, Open Topics, and the Supplemental Funding Pilot Program (SFPP). Specific topic funding is dedicated for defense-focused technologies in the near term. Open Topics are an opportunity for any qualified small-business offeror to seek product-market fit within the DAF, demonstrate value to early-adopter communities, and scale their solution to meet market demand. SFPP awards funding to small businesses for technologies previously contracted and funded through an Air Force SBIR Phase II. It can be applied to defense-specific technology, as well as technology with both military and commercial uses. The SFPP program's purpose is to bridge the capability gap between current SBIR/STTR Phase II efforts and Phase III scaling efforts, facilitating delivery of strategic capabilities for the Department of the Air Force.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1205502SF / *Small Business Innovation Research*

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	290.490	0.000	0.000	0.000	0.000
Total Adjustments	290.490	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	290.490	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

Increase in FY 2022 in SBIR/STTR Transfer is due to realignment of funds to PE 1205502SF, Small Business Innovation Research, in accordance with the authorities provided in 15 U.S.C. Section 2363.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Small Business Innovation Research & Small Business Technology Transfer	290.490	0.000	0.000	0.000	0.000
Description: FY 2022 SBIR/STTR funds were allocated in the following manner: Legacy: 5% Specific Topic: 38% Open Topic: 38% SFPP: 19% In FY 2022, SpaceWERX announced the Orbital Prime initiative under the SBIR/STTR Specific Topic program. Orbital Prime aligned a significant portion of the Specific Topic funding to the DAF's Operational Imperative #1, Space Order of Battle. Orbital Prime's objective is to seed the foundation for Assured Access to Space and Space Logistics/On-orbit servicing to enable a transition to a more resilient architecture to deliver services and maintain capabilities for all US & allied warfighters.					

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1205502SF *I Small Business Innovation Research*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
FY 2023 SBIR/STTR funds are intended to be allocated as follows: Specific Topic: 50% Open Topic: 30% SFPP: 20% FY 2024 SBIR/STTR funds are intended to be allocated as follows: Specific Topic: 50% Open Topic: 30% SFPP: 20% FY 2025 SBIR/STTR funds are intended to be allocated as follows: Specific Topic: 50% Open Topic: 30% SFPP: 20% ***FY 2023 Plans:*** Not Applicable ***FY 2024 Base Plans:*** Not Applicable ***FY 2024 OCO Plans:*** Not Applicable					
Accomplishments/Planned Programs Subtotals	290.490	0.000	0.000	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Not Applicable

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206116SF / *Space Test and Training Range Development*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	50.671	21.328	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71.999
666156: *Space Test and Training Range Development*	-	50.671	21.328	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	71.999
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2024, Project 666156, Space Test and Training Range Development efforts were transferred to PE 1206759SF, Major T&E Investment - Space, Project 664598, Air Force Test Investments, in order to consolidate and provide transparency for overall National Space Test and Training Complex (NSTTC) efforts.

A. Mission Description and Budget Item Justification

Supports the development of Space Test and Training Range (STTR) capabilities critical for developmental and operational test, training, exercises and tactics development for Space Control systems and Joint National Space Architecture. Includes development, demonstration and delivery of test assets, special test equipment, capabilities and systems required to test, validate, and verify performance of integrated space control systems. Provides a safe, secure, controllable and repeatable environment for the testing of space control mission systems and training operators in both realistic and relevant environments. Additionally, using an agile incremental development approach for range capabilities, this program develops test range assets for both the fixed node Space Range Operations Center (SROC) at Schriever Space Force Base and a deployable Signal Monitoring Unit capability to support complex Joint, AF and SF exercises. The virtual range as part of the Family of Systems (FoS), called Advanced Threat Simulation Environment (ATSE) virtual range, is being developed to accomplish the STTR mission. ATSE integrates to a Distributed Mission Architecture, tying into cyber, air, and space ranges for increased realism and complexity required to prepare space operators for real-world threats. This technology will allow for the first-ever use of a realistic signal environment to increase the realism and efficiency of space control squadron training. These risk reduction activities will include on-orbit capabilities, ground components, communication between nodes, and other required infrastructure.

The National Space Test and Training Complex (NSTTC) is the overarching complex designed to encompass all space test and training range capabilities. It includes two pillars, for Electronic Warfare (NSSTC-EW) and Cyber Warfare (NSSTC-C). STTRD provides capabilities for NSTTC-EW.

Space acquisition must respond with speed and agility to emerging adversary threats. The Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver STTR weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206116SF *I Space Test and Training Range Development*

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	69.819	21.453	21.873	0.000	21.873
Current President's Budget	50.671	21.328	0.000	0.000	0.000
Total Adjustments	-19.148	-0.125	-21.873	0.000	-21.873
• 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	-17.500	0.000			
• SBIR/STTR Transfer	-1.648	-0.125			
• Other Adjustments	0.000	0.000	-21.873	0.000	-21.873

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 666156: *Space Test and Training Range Development*		
Congressional Add: *Cyber Training Range and Advanced Threat Simulation Environment*	30.961	-
Congressional Add Subtotals for Project: 666156	30.961	-
Congressional Add Totals for all Projects	30.961	-

Change Summary Explanation

FY 2022: -17.500M; reprogrammed from PE 1206116SF to PE 0304369F, Cyber Capabilities Support Office (CCSO), to consolidate execution of funding for National Space Test and Training Complex (NSTTC) efforts.

FY 2024: -21.873M transfer of funding to PE 1206759SF, Major T&E Investment - Space, to consolidate NSTTC efforts.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Range Control	15.721	17.300	0.000
Description: Continue development of virtual range integration with cyber and air ranges hosting network emulators and other environments allowing tactics, techniques, and procedures (TTP) development, realistic operational testing, and enable more realistic exercises integrating joint air, space and cyber effects. Continue overhaul of fixed range capabilities, replacement of obsolete equipment, outdated servers, and performing software upgrades focusing on updating signal monitoring hardware with			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206116SF *I Space Test and Training Range Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
visualization tools and new monitoring capabilities and cybersecurity automation. Implement system resiliency and situational awareness necessary to operate in the contested space domain. Acquire additional system capability to enable and enhance training against new and emerging adversarial assets, to integrate mission scenarios into one graphic user interface, to develop transportable range operations center to provide flexible range control capability for multiple sites, to reduce size, weight, and power, and to replace software defined radio cards. Integrate joint DoD solutions for counterspace and space superiority effects. ***FY 2023 Plans:*** Continue development of a new range future framework capability to integrate into the JSpEA, expanding the range mission to increase/enhance capabilities and operations to keep up with current and emerging space threats. Continue range development to utilize a common sustainable baseline, common user interface (UI), and common tools needed to operate under a common system architecture. Continue to integrate joint DoD solutions for counterspace and space superiority effects. Continue risk reduction/mitigation efforts for Space Orbital Engagement Range to analyze, prototype and demonstrate potential range systems to support live testing of new advanced development space systems, space operator orbital engagement maneuvers (OEM) advanced training, and future SPACE FLAG exercises using live systems. Begin development of deployable range (DRange) capability to provide flexible range control in support of operational requirements. DRange capability will include monitoring, control and status, logging, for upgraded Deployable Signal Monitoring Units (D-SMU) operations. Development of a DRange prototype to demonstrate range control capabilities from operational locations. Additionally, FY 2023 funding will allow the program to rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of command and control (C2), resiliency measures and mission partner interfaces, space test/combat range events, and office support etc. ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to transfer of STTRD effort to PE 1206759SF, Major T&E Investment, Project 664598, Air Force Test Investments.			
Title: Management Services ***Description:*** A&AS, FFRDC, and other Program Office Support	3.989	4.028	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206116SF *I Space Test and Training Range Development*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: Management Services ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to transfer of STTRD effort to PE 1206759SF, Major T&E Investment, Project 664598, Air Force Test Investments.			
Accomplishments/Planned Programs Subtotals	19.710	21.328	0.000

	FY 2022	FY 2023
Congressional Add: Cyber Training Range and Advanced Threat Simulation Environment	30.961	-
FY 2022 Accomplishments: Support development of the National Space Test and Training Complex - Electronic Warfare (NSTTC - EW) which will provide a next-gen over-the-air and closed-loop environment to support the future EW systems and integrated warfighter training; Integrating both environments under the Joint Space Enterprise Architecture (JSpEA). Develop realistic threat-informed environments with cyber defense capabilities in partnership with Air Force Cyber Command (AFCYBER) and Defensive Cyber Ops-Space (DCO-Space) to support mission defense teams, cyber aggressors, and cyber test and evaluation units, and enable realistic exercises at Space Flag and other events with cyber operators. Seed prototype space test and evaluation lab for cyber resiliency testing of space mission systems.		
Congressional Adds Subtotals	30.961	-

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206392SF *I ACQ Workforce - Space & Missile Systems*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	214.050	253.716	258.969	0.000	258.969	265.259	271.842	278.714	285.631	Continuing	Continuing
664280: *SMC Civilian Pay*	-	214.050	253.716	258.969	0.000	258.969	265.259	271.842	278.714	285.631	Continuing	Continuing

A. Mission Description and Budget Item Justification

Space Systems Command (SSC) equips US and allied forces with operational space and missile systems, launch systems, and command and control infrastructure in support of global military and national security operations. SSC operates with over 6,300 people and an annual budget exceeding 6.4B providing joint warfighters navigation, communication, weather, warning, force application, and space control capabilities.

SSC is authorized to employ approximately 1,897 civilian acquisition professionals providing the management, tools, and technical capabilities needed to oversee acquisition programs to include materiel solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel supporting the Los Angeles Garrison at Los Angeles AFB. Funding SSC civilian payroll from the RDT&E appropriation provides program managers the flexibility to hire additional civilian personnel with program dollars versus additional contractors in concert with initiatives in response to the Defense Acquisition Workforce Improvement Act. This program element supports both civilian pay and non-pay support requirements.

In FY 2024 $258.969M was expended for civilian pay expenses in this program element.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206392SF *I ACQ Workforce - Space & Missile Systems*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	214.051	253.716	276.500	0.000	276.500
Current President's Budget	214.050	253.716	258.969	0.000	258.969
Total Adjustments	-0.001	0.000	-17.531	0.000	-17.531
• 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	-0.001	0.000	-17.531	0.000	-17.531

Change Summary Explanation

FY 2023: increase of 39.665 due to positions transferred from AFLCMC, NAVY MUOS, DISA as well as Civ Pay reprice, and AcqDEMO conversions.
FY 2024: increase of 5.253 Civ Pay reprice.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 6	R-1 Program Element (Number/Name) PE 1206392SF / *ACQ Workforce - Space & Missile Systems*	Project (Number/Name) 664280 / *SMC Civilian Pay*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
664280: *SMC Civilian Pay*	-	214.050	253.716	258.969	0.000	258.969	265.259	271.842	278.714	285.631	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Space Systems Command (SSC) equips US and allied forces with operational space and missile systems, launch systems, and command and control infrastructure in support of global military and national security operations. SSC operates with over 6,300 people and an annual budget exceeding 6.4B providing joint warfighters navigation, communication, weather, warning, force application, and space control capabilities.

SSC is authorized to employ approximately 1,897 civilian acquisition professionals providing the management, tools, and technical capabilities needed to oversee acquisition programs to include materiel solution analysis, technology development, engineering and manufacturing development, production and deployment, and operations and support. This funding does not include costs for base operating support civilian personnel supporting the Los Angeles Garrison at Los Angeles AFB. Funding SSC civilian payroll from the RDT&E appropriation provides program managers the flexibility to hire additional civilian personnel with program dollars versus additional contractors in concert with initiatives in response to the Defense Acquisition Workforce Improvement Act. This program element supports both civilian pay and non-pay support requirements.

In FY 2024 $258.969M was expended for civilian pay expenses in this program element.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: SSC Acquisition Workforce	214.050	253.716	258.969
Description: Provide professional government civilian acquisition workforce in support of all Space Systems Command programs. 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 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 6	**R-1 Program Element (Number/Name)** PE 1206392SF / *ACQ Workforce - Space & Missile Systems*	**Project (Number/Name)** 664280 / *SMC Civilian Pay*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Provide professional government civilian acquisition workforce in support of all Space Systems Command programs. 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 2024 Plans:*** Provide professional government civilian acquisition workforce in support of all Space Systems Command programs. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increase compared to FY 2023 due to reprice.			
Accomplishments/Planned Programs Subtotals	214.050	253.716	258.969

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206398SF *I Space & Missile Systems Center - MHA*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	12.119	13.962	13.694	0.000	13.694	14.075	14.422	14.775	15.138	Continuing	Continuing
664280: *SMC Civilian Pay*	-	12.119	13.962	13.694	0.000	13.694	14.075	14.422	14.775	15.138	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Systems Command (SSC) equips US and allied forces with operational space and missile systems, launch systems, and command and control infrastructure in support of global military and national security operations. SSC operates with over 6,300 people and an annual budget exceeding 6.4B providing joint warfighters navigation, communication, weather, warning, force application, and space control capabilities.

Program Element 1206398SF, Project: 664281 Space Systems Command - Major Headquarters Activities (MHA) was established to improve overall performance, strengthen business operations, and achieve efficiencies, effectives and cost savings that can be transferred to higher priority needs. PE adds approximately 83 acquisition professionals.

In FY 2024 $13.694M was expended for civilian pay expenses in this program element.

Space acquisition must respond with speed and agility to emerging adversary threats. SSC has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206398SF *I Space & Missile Systems Center - MHA*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	12.119	13.962	15.053	0.000	15.053
Current President's Budget	12.119	13.962	13.694	0.000	13.694
Total Adjustments	0.000	0.000	-1.359	0.000	-1.359
• 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	-1.359	0.000	-1.359

Change Summary Explanation

FY 2023: increase of $1.349 for FYDP adjustments between Commands OAC 83 to ET and reprice.
FY 2024: increase of $0.226 for Civ Pay reprice.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: SSC - Major Headquarters Activities	12.119	13.962	13.694
Description: Provide professional government civilian acquisition workforce in support of all Space Systems Command Headquarters Activities. Implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to SSC Staff support, studies, technical analysis, prototyping, etc.			
FY 2023 Plans: Provide professional government civilian acquisition workforce in support of all Space Systems Command Management Headquarters Activities.			
FY 2024 Plans: Provide professional government civilian acquisition workforce in support of all Space Systems Command Management Headquarters Activities.			
FY 2023 to FY 2024 Increase/Decrease Statement: FY 2024 increase compared to FY2023 due to repricing.			
Accomplishments/Planned Programs Subtotals	12.119	13.962	13.694

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206398SF *I Space & Missile Systems Center - MHA*

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	91.778	0.000	91.778	94.341	96.676	99.077	101.529	0.000	483.401
C6601Z: *Civilian Pay Adjustment*	-	0.000	0.000	91.778	0.000	91.778	94.341	96.676	99.077	101.529	0.000	483.401
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This Budget Line Item incurred multiple database errors, and follow-up technical adjustments will be requested.

This Budget Line was assigned an incorrect Project code that aligned it in Budget Activity (BA) 06 (RDT&E Management Support). The correct Program Element (PE) is 1206601SF, Space Technology, BA 02 (Applied Research) and will be transferred in the next cycle.

An additional database error resulted in the improper realignment of funding from 1206392SF, ACQ Workforce - Space & Missile Systems, BA 06 / 1206398SF, Space & Missile Systems Center - MHA, BA 06 and will be transferred in the next cycle.

This is not a new start. While a new BA 06 (RDT&E Management Support) Project was created in FY 2024 due to the incorrect Project code assignment, this effort does not contain new work.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	91.778	0.000	91.778
Total Adjustments	0.000	0.000	91.778	0.000	91.778
• 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	91.778	0.000	91.778

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206601SF / *Space Technology*

Change Summary Explanation

FY24 PB to PB change of +91.778 result of:
0.000M - Baseline
+72.888M - Database Error, realignment from BA02 1206601SF
+17.531M - Database Error, realignment from BA06 1206392SF
+1.359M - Database Error, realignment from BA06 1206398SF
=91.778M - Final

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Civilian Pay Adjustment	-	0.000	91.778	0.000	91.778
Description: This Budget Line Item incurred multiple database errors, and follow-up technical adjustments will be requested. This Budget Line was assigned an incorrect Project code that aligned it in Budget Activity (BA) 06 (RDT&E Management Support). The correct Program Element (PE) is 1206601SF, Space Technology, BA 02 (Applied Research) and will be transferred in the next cycle. An additional database error resulted in the improper realignment of funding from 1206392SF, ACQ Workforce - Space & Missile Systems, BA 06 / 1206398SF, Space & Missile Systems Center - MHA, BA 06 and will be transferred in the next cycle. ***FY 2023 Plans:*** N/A ***FY 2024 Base Plans:*** This Budget Line Item incurred multiple database errors, and follow-up technical adjustments will be requested. This Budget Line was assigned an incorrect Project code that aligned it in Budget Activity (BA) 06 (RDT&E Management Support). The correct Program Element (PE) is 1206601SF, Space Technology, BA 02 (Applied Research) and will be transferred in the next cycle. An additional database error resulted in the improper realignment of funding from 1206392SF, ACQ Workforce - Space & Missile Systems, BA 06 / 1206398SF, Space & Missile Systems Center - MHA, BA 06 and will be transferred in the next cycle. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	-	0.000	91.778	0.000	91.778

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206601SF *I Space Technology*

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 1206759SF / *Major T&E Investment - Space*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	83.336	173.974	146.797	0.000	146.797	167.087	177.362	183.983	184.458	0.000	1,116.997
660191: *Initial Operational Test and Eval*	-	1.442	1.512	9.565	0.000	9.565	9.774	9.961	10.167	10.387	0.000	52.808
664597: *Air Force Test Investments*	-	81.894	172.462	115.405	0.000	115.405	135.049	144.648	150.598	150.015	0.000	950.071
664598: *NSTTC-E*	-	0.000	0.000	21.827	0.000	21.827	22.264	22.753	23.218	24.056	0.000	114.118

A. Mission Description and Budget Item Justification

This program provides funds for the United States Space Force (USSF) Test Enterprise. Funds support enterprise-level, threat-relevant, and fully-integrated developmental and operational Space Test & Evaluation (T&E) activities and capabilities; the development of a professional space T&E workforce; and the organization, acquisitions, and operations of the National Space Test and Training Complex (NSTTC).

Space T&E activities and capabilities include the USSF Integrated Test Force (ITF) structures, USSF Operational Test Agency (OTA) test execution campaigns, and the workforce and activities required to conduct T&E to adequately assess the performance and survivability of Department of Defense (DoD) space systems, tactics, and technologies in contested environments.

Workforce development refers to the organizations, training, and activities required to develop a professional space T&E workforce including the development and operation of the Space Test Course at the United States Air Force (USAF) Test Pilot School (TPS).

Space T&E infrastructure encompasses the organization, acquisitions, operations, and associated activities as part of the NSTTC to develop, integrate, operate, and sustain the minimum technical capabilities required to test and evaluate the performance and survivability of critical DoD space systems in contested environments. The NSTTC delivers realistic test and training environments to support capability development by incorporating a mix of live and virtual capabilities to conduct threat emulation, advanced training, tactics development, and integrated testing.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206759SF *I Major T&E Investment - Space*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	86.503	89.751	98.694	0.000	98.694
Current President's Budget	83.336	173.974	146.797	0.000	146.797
Total Adjustments	-3.167	84.223	48.103	0.000	48.103
• Congressional General Reductions	0.000	-1.477			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	85.700			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-3.167	0.000			
• Other Adjustments	0.000	0.000	48.103	0.000	48.103

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 664597: *Air Force Test Investments*		
Congressional Add: *Lab and test range upgrades for space*	14.451	-
Congressional Add: *Operational test and training infrastructure - Cyber Test/Evaluation and Aggressor Force Capabilities*	-	50.200
Congressional Add: *Operational test and training infrastructure - Ground-based radar in support of NSTTC*	-	35.500
Congressional Add Subtotals for Project: 664597	14.451	85.700
Congressional Add Totals for all Projects	14.451	85.700

Change Summary Explanation

FY 2024 increased due to added requirements for Weapon System Evaluation Program activities for systems under test, conducting integrated and operational test and evaluation activities, GBR-K (Ground Based Radar-Kwajalein) refurbishment (additional details classified), establishing a 1-year Space Test Course by CY26, and transfer of funding from PE 1206116SF, Space Test and Training Range Development, to consolidate all NSTTC development efforts.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 6	R-1 Program Element (Number/Name) PE 1206759SF / *Major T&E Investment - Space*	Project (Number/Name) 660191 / *Initial Operational Test and Eval*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
660191: *Initial Operational Test and Eval*	-	1.442	1.512	9.565	0.000	9.565	9.774	9.961	10.167	10.387	0.000	52.808
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Space Operational Test and Evaluation refers to Congressionally mandated Space Initial Operational Test and Evaluation (IOT&E) to support major weapon system acquisition decisions beyond Low-Rate Initial Production (LRIP), Milestone C, full rate production, fielding, and declaration of Initial Operational Capability (IOC). For Major Defense Acquisition Programs (MDAP), the law requires IOT&E be completed under realistic operating conditions before proceeding beyond LRIP. IOT&E will be planned to answer all critical operational issues (COI) as thoroughly as possible. IOT&E is conducted to determine the operational effectiveness and suitability and resolve overall mission capability of systems undergoing research and development (R&D) efforts. It is an evaluation of a system's performance when the complete system is tested and evaluated against operational criteria by personnel with the same qualifications as those who will operate, maintain and support the system when deployed. In general, IOT&E is performed on new systems in development, major modifications, and other systems as directed.

This funds the USSF Operational Test Agency's participation in Integrated Test and Evaluation (IT&E). Additionally, it funds the Multiservice Operational Test and Evaluation (MOT&E) and Follow-on Operational Test and Evaluation (FOT&E) when it is the continuation of IOT&E activities past the full rate production decision. FOT&E answers specific questions about unresolved COIs and test issues or completes areas not finished during the IOT&E. This effort also funds related operational test and evaluation (OT&E) activities such as Early Influence, Operational Utility Evaluations (OUE), Early Operational Assessments (EOA), and Operational Assessments (OA) which are independent OT&Es supporting major milestones and decision points, full rate production, fielding, or declaration of IOC for USSF programs. USSF schedules and executes tests according to the forecasted test readiness of the MDAP program offices.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Systems Operational Test and Evaluation (OT&E)	1.442	1.512	9.565
Description: Plan, execute and report OT&E for Space Systems			
FY 2023 Plans: Continue FY22 activities namely: - Advanced Extremely High Frequency Satellite Communications (Advanced EHF): Conduct FOT&E - Evolved Strategic SATCOM (ESS): Conduct OA - Military GPS User Equipment (GPS MGUE): Conduct OUE 3, 4 - GPS Next Generation Control Segment (GPS OCX): Plan/conduct MOT&E - Long-Range Discrimination Radar (LRDR): Conduct IOT&E - Next-Generation Overhead Persistent Infrared (Next-Gen OPIR): Conduct OA/plan OUE			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 6	**R-1 Program Element (Number/Name)** PE 1206759SF / *Major T&E Investment - Space*	**Project (Number/Name)** 660191 / *Initial Operational Test and Eval*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- Protected Tactical Enterprise Service (PTES): Conduct MOT&E - Protected Tactical SATCOM (PTS): Conduct EOA - Space Based Infrared System (SBIRS): Plan FOT&E - Space C2 (formerly JMS): Conduct periodic app T&E/plan integrated IOT&E - Weather System Follow-On Microwave (WSF-M): Plan MOT&E - Conduct other planning and operational testing for new space system programs as the requirement becomes known to USSF. ***FY 2024 Plans:*** Continue FY23 activities namely: - Advanced Extremely High Frequency Satellite Communications (Advanced EHF): Conduct FOT&E - Evolved Strategic SATCOM (ESS): Conduct early influence - Military GPS User Equipment (GPS MGUE): Conduct IOT&E - GPS Next Generation Control Segment (GPS OCX): Conduct MOT&E - Long-Range Discrimination Radar (LRDR): Conduct FOT&E - Next-Generation Overhead Persistent Infrared (Next-Gen OPIR): Conduct OUE - Protected Tactical Enterprise Service (PTES): Complete MOT&E - Protected Tactical SATCOM (PTS): Conduct OUE - Space Based Infrared System (SBIRS): Conduct OUE - SBIRS Survivable Endurable Evolution (S2E2): Conduct IOT&E - Space C2 (formerly JMS): Complete FOT&E - Tranche 1 Transport Layer (and accompanying Tranche 1 Tracking Layer): Conduct IOT&E - Conduct other planning and operational testing for new space system programs as the requirement becomes known to USSF. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to rising number of STARCOM test program requirements; survivability testing; integrated system end-to-end and tactics and training system testing; increased test rigor required for all programs, including heightened cyber testing activities; and expanded management requirements to support these programs at the Delta and HQ levels.			
Accomplishments/Planned Programs Subtotals	1.442	1.512	9.565

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

This project title will be renamed in a future cycle to reflect current scope and direction of the project.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 6	**R-1 Program Element (Number/Name)** PE 1206759SF / *Major T&E Investment - Space*	**Project (Number/Name)** 660191 / *Initial Operational Test and Eval*

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 6	R-1 Program Element (Number/Name) PE 1206759SF / *Major T&E Investment - Space*	Project (Number/Name) 664597 / *Air Force Test Investments*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
664597: *Air Force Test Investments*	-	81.894	172.462	115.405	0.000	115.405	135.049	144.648	150.598	150.015	0.000	950.071
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Space Force Test Investments refers to the space T&E activities, workforce development, and space T&E infrastructure required for the development, operation, and sustainment of the USSF Test Enterprise required to conduct threat emulation, advanced training, tactics development, and integrated testing.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Force Test Investments	67.443	86.762	115.405
Description: Develop, operate, and sustain the USSF Test Enterprise. ***FY 2023 Plans:*** - Invest in previously identified technical capabilities to include survivability infrastructure, on-orbit range development, physics-based modeling, data infrastructure, facility upgrades and contractor support. - Continue previous USSF Test Enterprise efforts under this PE including development and operation of the NSTTC. - Develop digital NSTTC and Space T&E capabilities based on an MBSE baseline. - Continue software development for NSTTC on-orbit capabilities and begin development and acquisition of terrestrial and on-orbit sensor capabilities. - Begin to fund the Space Force Foreign Materiel Program in accordance with the prioritized Space Force Foreign Materiel List. - Progress the technical baseline for the NSTTC's on-orbit, digital, electromagnetic spectrum, and cyber infrastructure and develop more robust test and training capabilities. - Continue to develop and conduct the Space Test Course (STC) at the USAF TPS. ***FY 2024 Plans:*** - Continue to develop and conduct the STC at the USAF TPS. Prepare transition of STC to a 1-year curriculum. - Continue previous Space T&E Infrastructure investments in NSTTC On-Orbit, Digital, Cyber, and Electromagnetic pillars including development of foundational infrastructure as well as modernization and improvement (I&M) of existing capabilities to keep current with military priorities, evolving threats, and Space T&E and advanced training involving USSF and joint systems and operations. - Integrate on-orbit and digital NSTTC elements to facilitate live, virtual, and constructive systems-of-systems Space T&E and advanced training activities.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 6	**R-1 Program Element (Number/Name)** PE 1206759SF / *Major T&E Investment - Space*	**Project (Number/Name)** 664597 / *Air Force Test Investments*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- Develop dedicated USSF cyber infrastructure and environments to support enduring training of USSF Mission Defense Teams (MDTs) and operators as well as support cybersecurity and resilience objectives in Space T&E. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to increased Weapon System Evaluation Program requirements, Ground Based Radar-Kwajalein (GBR-K) refurbishment to support integration testing, training and data validation (additional details classified), and to establish the 1-year Space Test Course by CY26.			
Accomplishments/Planned Programs Subtotals	67.443	86.762	115.405

	FY 2022	FY 2023
Congressional Add: Lab and test range upgrades for space ***FY 2022 Accomplishments:*** Accelerated development activities and acquisitions of the NSTTC's On-Orbit, Digital, and Cyber T&E infrastructure.	14.451	-
Congressional Add: Operational test and training infrastructure - Cyber Test/Evaluation and Aggressor Force Capabilities ***FY 2023 Plans:*** Funds will be used to build cyber range and lab capability for T&E of space systems, defensive cyber tools, cyber aggressors, and cyber test training in secure environments. The cyber range(s) will be built as operationally representative environments to conduct T&E and training and can include blue and red models	-	50.200
Congressional Add: Operational test and training infrastructure - Ground-based radar in support of NSTTC ***FY 2023 Plans:*** Funds will be leveraged to upgrade the existing backend of the Ground Based Radar-Kwajalein as well as invest in long lead parts to replace the Radome so that the Ground Based Radar-Kwajalein can become an effective NSTTC Range Asset.	-	35.500
Congressional Adds Subtotals	14.451	85.700

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 6	R-1 Program Element (Number/Name) PE 1206759SF / *Major T&E Investment - Space*	Project (Number/Name) 664598 / *NSTTC-E*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
664598: *NSTTC-E*	-	0.000	0.000	21.827	0.000	21.827	22.264	22.753	23.218	24.056	0.000	114.118
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2024, PE 1206116SF, (Space Test and Training Range Development), Project 666156, (Space Test and Training Range Development) efforts were transferred to PE 1206759SF, (Major T&E Investment - Space), Project 664598, (NSTTC-E), in order to consolidate and provide transparency for overall National Space Test and Training Complex (NSTTC) efforts. It is not a New Start.

A. Mission Description and Budget Item Justification

Supports the development of National Space Test and Training Complex Electromagnetic (NSTTC-E) test environments that are critical for developmental and operational test, training, exercises and tactics development for space systems. Includes development, demonstration and delivery of test assets, special test equipment, capabilities and systems required to test, validate, and verify performance of integrated space systems. Provides a safe, secure, controllable and repeatable environment for the testing of space systems and training operators in both realistic and relevant electromagnetic environments.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: NSTTC-E	0.000	0.000	21.827
Description: Development of virtual range integration with cyber and air ranges hosting network emulators and other environments allowing tactics, techniques, and procedures (TTP) development, realistic operational testing, and enable more realistic exercises integrating joint air, space and cyber effects. Continue overhaul of fixed range capabilities, replacement of obsolete equipment, outdated servers, and performing software upgrades focusing on updating signal monitoring hardware with visualization tools and new monitoring capabilities and cybersecurity automation. Implement system resiliency and situational awareness necessary to operate in the contested space domain. Acquire additional system capability to enable and enhance training against new and emerging adversarial assets, to integrate mission scenarios into one graphic user interface, to develop transportable range operations center to provide flexible range control capability for multiple sites, to reduce size, weight, and power, and to replace software defined radio cards. Integrate joint DoD solutions for counterspace and space superiority effects.			
FY 2023 Plans: N/A			
FY 2024 Plans: - Continue development of test and evaluation electronic spectrum environment command and control. - Continue support to warfighting community of electronic warfare advanced training environment.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 6	**R-1 Program Element (Number/Name)** PE 1206759SF / *Major T&E Investment - Space*	**Project (Number/Name)** 664598 / *NSTTC-E*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
- Develop integrated data transport architecture with NSTTC. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to transfer of STTRD effort from PE 1206116SF, Space Test and Training Range Development, Project 666156, Space Test and Training Range Development.			
Accomplishments/Planned Programs Subtotals	0.000	0.000	21.827

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206860SF *I Rocket Systems Launch Program (SPACE)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	17.489	34.872	18.023	0.000	18.023	20.099	20.089	20.499	21.240	Continuing	Continuing
661023: *Rocket System Launch Program (RSLP)*	-	17.489	34.872	18.023	0.000	18.023	20.099	20.089	20.499	21.240	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Rocket Systems Launch Program (RSLP) provides responsive space and Research, Development, Test and Evaluation (RDT&E) launch vehicle support to DoD and other government agencies using commercial launch systems and excess ballistic missile assets. The RSLP mission was established by the Secretary of Defense in 1972. The small launch program complements the National Security Space Launch (NSSL) program with multiple options to acquire dedicated spacelift and rideshare services for developmental, demonstration, and small operational space vehicles. It provides mission planning, payload integration, vehicle acquisition, processing, launch operations, booster storage and disposition, aging surveillance, maintenance and logistics support for selected DoD responsive space and RDT&E launches. Costs directly attributable to a specific launch or program (e.g., reliability of flight testing, maintenance of launch vehicle processing infrastructure) are paid by the user (Space Force, Navy, Army, Missile Defense Agency (MDA), Defense Advanced Research Project Agency (DARPA), National Reconnaissance Office (NRO), etc.). RSLP maintains exclusive control of decommissioned Minuteman and Peacekeeper assets used in testing to include refurbishment, transportation and handling, storage, aging surveillance, and launch services. RSLP also funds general research, development, prototyping, integration, and supplemental reliability of flight testing efforts for launch to enhance the reliability of the Minotaur and other fleet vehicles (e.g., updates to the Modular Mechanical Ordnance Destruct System).

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) is transforming the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver RSLP weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

The FY 2024 funding request was reduced by $2.011 million to account for the availability of prior year execution balances.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206860SF *I Rocket Systems Launch Program (SPACE)*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	17.769	17.922	20.076	0.000	20.076
Current President's Budget	17.489	34.872	18.023	0.000	18.023
Total Adjustments	-0.280	16.950	-2.053	0.000	-2.053
• Congressional General Reductions	0.000	-0.050			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	17.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.280	0.000			
• Other Adjustments	0.000	0.000	-2.053	0.000	-2.053

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 661023: *Rocket System Launch Program (RSLP)*		
Congressional Add: *State Launched Range Services*	-	17.000
Congressional Add Subtotals for Project: 661023	-	17.000
Congressional Add Totals for all Projects	-	17.000

Change Summary Explanation

FY 2023: +17.0M program increase-state launched range services and capabilities.
FY 2024: -0.131M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office for integrated cybersecurity
FY 2024: +0.089M inflation adjustment for Non-Pay and Non-Fuel Purchases
FY 2024: -2.011M to account for the availability of prior year execution balances.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Storage/Refurbishment/Flight Readiness/Demil	14.547	14.930	14.930
Description: Storage, refurbishment, inventory control, and demil/disposal of decommissioned Minuteman, Peacekeeper and other missile flight test assets			
FY 2023 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206860SF *I Rocket Systems Launch Program (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue storage, refurbishment, inventory control, and demil/disposal of decommissioned Minuteman, Peacekeeper and other missile flight test assets and perform research and development support operations as required. Investigate and develop shipping throughput capacity to maximize opportunity for motor disposal. Continue support activities to include but not limited to sustainment replacement and refurbishment of support equipment, mission support, special studies etc. ***FY 2024 Plans:*** Continue storage, refurbishment, inventory control, and demil/disposal of decommissioned Minuteman, Peacekeeper and other missile flight test assets and perform research and development support operations as required. Investigate and develop shipping throughput capacity to maximize opportunity for motor disposal. Continue support activities to include but not limited to sustainment replacement and refurbishment of support equipment, mission support, special studies etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A			
Title: Aging Surveillance ***Description:*** Perform aging surveillance-related activities on stored motors ***FY 2023 Plans:*** Continue performing aging surveillance-related activities on stored motors; continue performing analysis/studies to identify and evaluate potential safety-related issues affecting stored motors; continue program office support and related support activities such as, but not limited to mission support, special studies, etc. ***FY 2024 Plans:*** Continue performing aging surveillance-related activities on stored motors; continue performing analysis/studies to identify and evaluate potential safety-related issues affecting stored motors; continue program office support and related support activities such as, but not limited to mission support, special studies, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 due to an adjustment for inflation increased labor/material costs.	2.142	2.142	2.193
Title: Other Launch Support Services ***Description:*** Perform Launch Services Activities ***FY 2023 Plans:*** Continue launch vehicle acquisition, processing, launch services support including responsive launch, mission assurance, reliability of flight and operations to launch RDT&E payloads.	0.800	0.800	0.900

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206860SF *I Rocket Systems Launch Program (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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 2024 Plans:*** Continue launch vehicle acquisition, processing, launch services support including responsive launch, mission assurance, reliability of flight and operations to launch RDT&E payloads. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 due to an adjustment for inflation increased labor/material costs.			
Accomplishments/Planned Programs Subtotals	17.489	17.872	18.023

	FY 2022	FY 2023
Congressional Add: State Launched Range Services	-	17.000
FY 2023 Plans: Improved spaceports that are commercially licensed by the Federal Aviation Administration and receive funding from the local or State government. Enhanced capacity to provide mid-to-low inclination orbits and polar-to-high inclination orbits in support of national security space programs.		
Congressional Adds Subtotals	-	17.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 6: *RDT&E Management Support*					R-1 Program Element (Number/Name) PE 1206862SF / *Tactically Response Space*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	48.334	50.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.334
664235: *Tactically Responsive Launch*	-	48.334	50.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	98.334
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2024, PE 1206862SF, Tactically Responsive Launch (TacRL), Project 664235, Tactically Responsive Launch changed to Tactically Responsive Space (TacRS), Project 643835, Tactically Responsive Space and moved to Budget Activity 04 to encompass the full range of responsive space.

Tactically Responsive Space will fund proof-of concept tactically responsive space demonstrations including launch, satellites, control systems, and concept of operations using emerging and extant commercial launch and satellite providers with the goal to place or replace military capability on orbit within 24 hours.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) is transforming the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Tactically Responsive Space weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206862SF / *Tactically Response Space*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	50.000	0.000	0.000	0.000	0.000
Current President's Budget	48.334	50.000	0.000	0.000	0.000
Total Adjustments	-1.666	50.000	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	50.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-1.666	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 664235: *Tactically Responsive Launch*		
Congressional Add: *Tactically Responsive Space*	48.334	-
Congressional Add: *Tactically Responsive Space Additional Demo*	-	50.000
Congressional Add Subtotals for Project: 664235	48.334	50.000
Congressional Add Totals for all Projects	48.334	50.000

Change Summary Explanation

FY 2023: +$50M congressional add for program increase.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
Congressional Add: Tactically Responsive Space	48.334	-
FY 2022 Accomplishments: Demonstrated proof-of-concept tactically responsive space capabilities, including satellites, launch vehicles, control systems, and concept of operations using emerging and extant launch providers. Activities included concept design, studies of commercial capabilities and operations, technical analysis, launch service acquisition, prototyping, rideshare service acquisition, processing, launch services support, mission assurance, operations; and tactics, techniques, and procedures, program office support, etc. for demonstration of responsive space and launch.		
Congressional Add: Tactically Responsive Space Additional Demo	-	50.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206862SF *I Tactically Response Space*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023
FY 2023 Plans: Demonstrates proof-of-concept tactically responsive space capabilities, including satellites, launch vehicles, control systems, and concept of operations using emerging and extant launch providers. Activities included concept design, studies of commercial capabilities and operations, technical analysis, launch service acquisition, prototyping, rideshare service acquisition, processing, launch services support, mission assurance, operations; and tactics, techniques, and procedures, program office support, etc. for demonstration of responsive space and launch.		
Congressional Adds Subtotals	48.334	50.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The Space Force is utilizing new and existing open competitive launch service, space vehicle, and ground contracts, Small Business Innovative Research contracts, Other Transaction Authority (OTA) Agreements, and other contract vehicles to take advantage of evolving commercial capabilities for tactically responsive space.

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206864SF / *Space Test Program (STP)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	20.185	25.291	30.192	0.000	30.192	30.226	29.781	30.390	31.487	Continuing	Continuing
662617: *C6601Z*	-	20.185	25.291	30.192	0.000	30.192	30.226	29.781	30.390	31.487	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Test Program (STP) executes the annual DoD Space Experiments Review Board (SERB) process and consolidates requirements from Science and Technology (S&T) community in order to optimize space system missions and achieve maximum benefit of available resources. STP designs and executes missions to maximize launch mass to orbit, combines multiple flight experiments on suitable spacecraft, multiple spacecraft on available launch vehicles, and facilitates launch packages for government, commercial, and international partnerships. STP provides a cost-effective way to evaluate militarily relevant space flight experiments that:

- Demonstrate on orbit performance of new technologies to increase technology readiness level and validate research hypotheses for the S&T community
- Develop and mature future operational capabilities
- Advance operational tactics, techniques and procedures for future space and test capabilities
- Enable on-orbit experiments to support S&T
- Leverage national (e.g. DoD, commercial, and NASA) and international launch opportunities to increase space access for S&T efforts.

STP supports the Space Force efforts to define future system architectures that address emerging threats, enable resilient space capabilities, and employ tactical space operations to ensure freedom of operations in the space domain.

STP adheres to Executive Orders 10521 and 13185, and the requirement from the Office of the Under Secretary of Defense Research and Engineering (OUSD R&E) to support research per DoD Instruction 3210.1, Administration and Support of Basic Research. In addition, the Deputy Secretary of Defense Space Test Program Management & Funding Policy, issued in July 2002, reaffirmed STP as the primary provider of spaceflight for the DoD space research community. The July 2002 policy statement also reaffirmed STP's role as the single manager for all DoD payloads on the International Space Station (ISS).

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver STP weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206864SF / *Space Test Program (STP)*

This program is in Budget Activity 6, RDT&E Management Support because this budget activity includes research, development, test and evaluation efforts and funds to sustain and/or modernize the installations or operations required for general research, development, test and evaluation.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	20.881	25.366	30.256	0.000	30.256
Current President's Budget	20.185	25.291	30.192	0.000	30.192
Total Adjustments	-0.696	-0.075	-0.064	0.000	-0.064
• 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	-0.696	-0.075			
• Other Adjustments	0.000	0.000	-0.064	0.000	-0.064

Change Summary Explanation

FY 2022: -0.696 SBIR reduction

FY 2024: -0.199 to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Payload Integration	14.895	19.271	21.028
Description: Integrate payloads onto spaceflight missions on the full spectrum of DoD on-orbit R&D (e.g. space vehicle, free-flyer payloads, hosted payloads, etc.). Includes acquisition of associated spacecraft and integration hardware. ***FY 2023 Plans:*** Begin STP-5 planning, integration and design activities. Begin design for STPSat-8 acquisition (STEP 2.0 (Space Test Experiment Platform)). Conduct payload integration of STP-H9, STP-H10, STP-S27AD3, STP-S27VPC, STP-S28C, STP-28AR1, STPSat-7 and Queen's Jubilee. Begin design for future ISS missions. Conduct satellite acquisition and integration of STPSat-7 and its ground systems. Begin STP-H11 integration and design activities. Conduct STP-S29 technical analysis and payload integration rideshare. Initiate STP Small Launch STP-S30 (every 2 yrs) Mission Unique and Integration Costs. Collaborate on technical analysis and other future missions as required. Rapidly respond to implement system resiliency and situational awareness			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206864SF *I Space Test Program (STP)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
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 2024 Plans:*** Continue STP-5 planning, integration and design activities (Strontium Iodide Radiation Instrumentation III (SIRI-III), PNTOC, and SCO-1 payloads). Continue STPSat-8 integration and design activities (STEP 2.0 (Space Test Experiment Platform)). Conduct payload integration of STP-H9, STP-H10, and STP-28AR1. Begin design for future ISS missions. Complete satellite acquisition and integration of STPSat-7 and its ground systems. Complete STP-H11 design activities and begin integration activities. Conduct STP-S29 technical analysis and payload integration rideshare. Initiate STP Small Launch STP-S30 (every 2 yrs) Mission Unique and Integration Costs. Collaborate on technical analysis and other future missions as required. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to initiating several activities. Program accomplishments transition from payload integration to launch to on-orbit ops. Each year, these requirements expand and contract within the overall budget as a function of the lifecycle of the programs.			
Title: Launch Vehicle and Launch Services ***Description:*** Purchase launch services, launch vehicles, and launch vehicle support for the full spectrum of DoD on-orbit R&D (e.g. space vehicle, free-flyer payloads, hosted payloads, etc.), enabling spaceflight worthiness and "Do No Harm" certification for Space Systems Command (SSC) and US Space Force (USSF) HQ. ***FY 2023 Plans:*** Continue to Support spaceflight worthiness and "Do No Harm" Certification. Execute STP-S28C, STP-28AR1, STP-H9, STP-S27AD3, STP-S27VPC and Queen's Jubilee small launch initiatives. Execute STP-5 medium launch initiative. Plan and complete technical analysis for commercial rideshare launch of DoD SERB experiments and International Space Access Review Board (ISARB) approved experiments. Continue STPSat-7 launch integration activities and conduct other launch integration activities as required. ***FY 2024 Plans:*** Continue to Support spaceflight worthiness and "Do No Harm" Certification. Execute STP-S29A, S29B, STP S28B, S28C, and other small launch initiatives as required. Continue STP-5 medium launch initiative. Plan and complete technical analysis for	3.632	5.244	7.164

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206864SF *I Space Test Program (STP)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
commercial rideshare launch of DoD SERB experiments and International Space Access Review Board (ISARB) approved experiments. Conduct STPSat-7 and STP-H10 launch activities, and conduct other launch activities as required. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to executing several initiatives. Program accomplishments transition from payload integration to launch to on-orbit ops. Each year, these requirements expand and contract within the overall budget as a function of the lifecycle of the programs.			
Title: On Orbit Satellite Operations ***Description:*** Execute first-year operations and operations support for STP-sponsored missions. ***FY 2023 Plans:*** Continue on-orbit operations for STP-H7, GARI (Gadolinium Aluminum Gallium Garnet Radiation Instrument), and SPIRRAL (Space Power InfraRed Regulation and Analysis of Lifetime). Continue on-going operations for ISS payloads and DoD SERB payloads as requested. Complete Mission Operations for STP-S28A, STP-S28B, STPSat-6, STP-H7, STP-H8, STP-27AD2. Prepare on-orbit operations for STP-H9, STP-S28C, STP-28AR1, STP-S27AD3, STP-S27VPC and Queen's Jubilee. ***FY 2024 Plans:*** Continue on-orbit operations for SPIRRAL (Space Power InfraRed Regulation and Analysis of Lifetime). Continue on-going operations for ISS payloads and DoD SERB payloads as requested. Complete Mission Operations for STP-H9, STP-S28A (RECURVE payload), STP-S28B (XVI payload), STP-S28C (EPIC Athena payload), STP-S28AR1, STP-27VPD (Coordinated Ionospheric Reconstruction Cubesat Experiment (CIRCE) and Experiment for Characterizing the Lower Ionosphere and Prediction of Sporadic-E (ECLIPSE) payloads)). Prepare on-orbit operations for STP-H10, STP-S29A, W/V-band Satellite Communications Experiment-Transponder (WSCE-T), and STPSat-7. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to support on-orbit missions. Program accomplishments transition from payload integration to launch to on-orbit ops. Each year, these requirements expand and contract within the overall budget as a function of the lifecycle of the programs.	1.658	0.776	2.000
Accomplishments/Planned Programs Subtotals	20.185	25.291	30.192

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 6: *RDT&E Management Support*	**R-1 Program Element (Number/Name)** PE 1206864SF *I Space Test Program (STP)*

E. Acquisition Strategy

N/A

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1201017SF / *Global Sensor Integrated on Network (GSIN)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	4.574	5.321	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.895
675368: *GSIN (Global Integrated Sensor Network)*	-	4.574	5.321	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	9.895
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Beginning in FY 2024 this program will be captured under PE 0101318F / Service Support to STRATCOM - Global Strike.

A. Mission Description and Budget Item Justification

The missions of US Space Command (USSPACECOM) and US Strategic Command (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), nuclear enterprise, and specialized planning expertise.

The Nation's strategic Command and Control (C2) sensors and mission planning programs cannot rapidly exchange information across multiple missions, creating ambiguity that delays time critical national C2 decision making processes. Global Sensor Integrated on Network (GSIN) developed and established a unified schema that integrates disparate Missile Warning (MW), Missile Defense (MD), Technical Intelligence (TI), Measurement and signature intelligence (MASINT), and a variety of non-traditional data into a single, exposed data set, providing resilient 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.

Global Data Integration (GDI) is the new project name previously known as Global Sensor Integration on Networks (GSIN). GDI supports the DoD Data Strategy, by exposing, transporting, and fusing previously stove-piped data and making it available, exploitable, and able to be analyzed for a variety of mission perspectives, agnostic of the Information Technology (IT) platform. GDI directly supports USSPACECOM, USSTRATCOM and other Combatant Commands and Major Commands, and Nuclear Enterprise Center (NEC) mission sets.

As a leading Data as a Service (DaaS) and Analytics as a Service (AaaS) provider, GDI provides access to over 1,300+ diverse data sources; meshing selected systems and sensors, from tactical to strategic, including the nation's most modern and capable assets, improved algorithms, mobility, and forward deployment to provide earlier cross-cueing and expanded decision space when every second counts. GDI 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1201017SF *I Global Sensor Integrated on Network (GSIN)*

GDI also improves Space Domain Awareness (SDA) by accessing additional sensor capability and provides this data for the larger space order of battle capabilities. GDI dramatically improves the ingestion of non-traditional, but readily available, non-US government and commercial data to the Space Force satellite catalog. GDI addresses US Northern Command (USNORTHCOM) and USSTRATCOM's signed Joint Emergent Operational Need (JEON) ST-0010 request for uninterrupted traditional and non-traditional sensor data integration, and is an enabling capability supporting the Global Threat Characterization Assessment (GTCA) Operational Planning Team report. GDI provides critical and unique data to USSPACECOM SDA data repositories to facilitate the large Space Battle Management Command and Control (BMC2) suite of capabilities/programs. Finally, GDI provides Cross Domain Solution (CDS) access, machine learning, data analysis and correlation/fusion functions to optimize SA in the field.

The GDI Program includes two major thrusts: GDI Development; and Radar, Sensor, Technical Intelligence (TI), and Allied Systems data integration.

The GDI Development effort includes four sub-efforts: 1) DATABAHN; 2) Fusion Engine for All-Source Tracking (FEAST), 3) Analytical Collaborative Environment - Multi Intelligence (ACE-M), and 4) Data Integrity (DI) efforts.
- DATABAHN includes developing and fielding dedicated CDS Concepts of operation (CONOPS), including geographically-separated, redundant nodes, to provide greater operational resiliency.
- FEAST fuses and correlates Radio Assisted Detection and Ranging (RADAR), Overhead Persistent Infrared (OPIR) and Electronic Signals Intelligence (ELINT) data at the SECRET level, and provides high-fidelity source geolocation in support of multiple DoD and Intelligence Community (IC) organizations. This capability is being replicated on Joint Worldwide Intelligence Communications System (JWICS), greatly increasing the functionality and value to the warfighter.
- ACE-M is a cloud-based, multi enclave (Secure Internet Protocol Router (SIPR)/JWICS), battlespace awareness and tactical decision aid capability which provides agile access to authoritative and dynamic intelligence data feeds, analytics, and geospatial information layers in a single visualization environment.
-DI develops plans to use artificial intelligence (AI) and block chain technology in support of data governance, provenance and discoverability.

The Radar, Sensor, Technical Intelligence (TI), and Allied Systems data integration effort designs, develops, exposes and integrates data from radar, sensors and technical intelligence systems in regions of the world where potential GDI users currently do not have coverage.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver GDI capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 0605826SF, 605827SF, 0605828SF, 0605829SF, 0605830SF, 0605831SF, 0605832SF, and 0605898SF.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1201017SF / *Global Sensor Integrated on Network (GSIN)*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	4.731	5.321	7.545	0.000	7.545
Current President's Budget	4.574	5.321	0.000	0.000	0.000
Total Adjustments	-0.157	0.000	-7.545	0.000	-7.545
• 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	-7.545	0.000	-7.545

Change Summary Explanation

FY 2024: -7.545M transfer of funding to PE 0101318F, Service Support to STRATCOM - Global Strike in order to align with STRATCOM programs.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Global Data Integration (GDI) Development	4.074	4.821	0.000

Description: Effort title changed from "Global Data Integration (GDI)" to "Global Data Integration (GDI) Development" to differentiate major thrust from new project title. This is not a new start.

Develop common Extensible Markup Language (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 GDI data consumers and providers who require GDI sensor data. Upgrade GDI capabilities as Defense Information Systems Agency (DISA) Enterprise Services evolve. Continue modifications to data services. Support integration of GDI sensor data into appropriate registries/ catalogs. Continue development of GDI 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.

FY 2023 Plans:

-DATABAHN: Continue pursuing accreditation. Develop and field a dedicated CDS and Cloud presence, including geographically-separated, redundant nodes, providing greater operational resiliency. Provide capability to include new data consumers and providers who require GDI sensor data. Support integration of GDI sensor data into appropriate registries and catalogs. Continue development of GDI data services to enable visualization in a common operating picture.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1201017SF *I Global Sensor Integrated on Network (GSIN)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
-FEAST: Develop a test bed for block-chain efforts and finalize replication of Secret Internet Protocol Routed Network (SIPRNET)-level FEAST capability on Joint Worldwide Intelligence Communications System (JWICS). Integrate additional Top Secret/Special Compartmentalized Information (TS/SCI) data sources and algorithms. -ACE-M: Develop data fusion plans and capabilities, such as visual display of situational awareness data, analytic tools and algorithms, and historical playback of events, for new and existing GDI users -DI: Develop plans to incorporate new capabilities in AI and block-chain technology. Test and evaluate all GDI segments in support of data governance, provenance and discovery. Additionally, FY 2023 funding will allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of command and control (C2), resiliency measures and mission partner interfaces, space test/combat range events, and office support etc. ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to transfer of GSIN/GDI effort to PE 0101318F / Service Support to STRATCOM - Global Strike			
Title: Radar, Sensor, Technical Intelligence (TI), and Allied Systems	0.500	0.500	0.000
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 GDI 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 GDI user data exposure needs. Designs, develops, tests, exposes, and integrates SDA data from previously untapped systems into space production systems and the Global Information Grid (GIG). Develop implementation plans to mature data exposure capabilities. ***FY 2023 Plans:*** - Complete Integration and Testing of Radar 1 and support Initial Operational Capability (IOC) - Continue Production/Fielding of Radar 2 - Rapidly implement system resiliency and situational awareness changes required to operate in the contested space domain ***FY 2024 Plans:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1201017SF *I Global Sensor Integrated on Network (GSIN)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to transfer of GSIN/GDI effort to PE 0101318F / Service Support to STRATCOM - Global Strike			
Accomplishments/Planned Programs Subtotals	4.574	5.321	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

GDI uses existing government contract vehicles whenever available, from agencies such as Missile Defense Agency (MDA) or Air Force Life Cycle Management Center (AFLCMC) to develop and modernize the combined SDA/MW/MD/MASINT/TI data exposure architecture and solution. When appropriate contracts do not exist or not available to GDI, USSTRATCOM awards new contracts in support of responsive and consistent GDI goals. The contracts are managed by the relevant organization's contracting office.

Massachusetts Institute of Technology/Lincoln Labs (MIT/LL) will provide the Data Integrity effort based upon ongoing research as an FFRDC.

All contracts are competed whenever possible.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1201017SF / *Global Sensor Integrated on Network (GSIN)*	**Project (Number/Name)** 675368 / *GSIN (Global Integrated Sensor Network)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GDI DATABAHN	Various	Various : Various	-	2.362	May 2022	0.820	Mar 2023	-		-		-	0.000	3.182	-
GDI FEAST	Various	Various : Various	-	1.212	Dec 2021	0.498	Mar 2023	-		-		-	0.000	1.710	-
GDI ACE-M	Various	Various : Various	-	-		1.555	Jan 2023	-		-		-	0.000	1.555	-
GDI DI	Various	Various : Various	-	0.500	Jan 2022	1.948	Mar 2023	-		-		-	0.000	2.448	-
Radar, Sensor, Technical Intelligence (TI), and Allied Systems	C/CPAF	Raytheon : Colorado Springs, CO	-	0.500	Apr 2022	0.500	Apr 2023	-		-		-	0.000	1.000	-
		Subtotal	-	4.574		5.321		-		-		-	0.000	9.895	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	4.574		5.321		-		-		-	0.000	9.895	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1201017SF / *Global Sensor Integrated on Network (GSIN)*	**Project (Number/Name)** 675368 / *GSIN (Global Integrated Sensor Network)*

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1201017SF / *Global Sensor Integrated on Network (GSIN)*	**Project (Number/Name)** 675368 / *GSIN (Global Integrated Sensor Network)*

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
(RADAR 3) Initial Operational Capability																								■				

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1201017SF / *Global Sensor Integrated on Network (GSIN)*	**Project (Number/Name)** 675368 / *GSIN (Global Integrated Sensor Network)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
DATABAHN				
Production/Fielding	1	2022	3	2023
Initial Operational Capability	4	2023	4	2023
Integration and Testing	4	2023	1	2024
Full Operational Capability	2	2024	2	2024
FEAST				
Development, Integration, and Testing	1	2022	3	2023
ACE-M				
Common Operating Picture (COP) in a Cross Domain Solution (CDS) Environment	1	2022	4	2023
DATABAHN Ingestion into COP	1	2022	4	2024
Resiliency Testing of GDI's Three Pillars	3	2023	2	2027
DI				
R&D Proof of Concept	1	2022	4	2027
Radar, Sensor, Technical Intelligence (TI) and Allied Systems				
(RADAR 1) Integration and Testing	3	2022	1	2023
(RADAR 1) Initial Operational Capability	2	2023	2	2023
(RADAR 2) Design/Develop	2	2023	4	2023
(RADAR 2) Production/Fielding	4	2023	4	2025
(RADAR 2) Integration and Testing	4	2025	3	2027
(RADAR 2) Initial Operational Capability	4	2027	4	2027
(RADAR 3) Design/Develop	4	2023	4	2023
(RADAR 3) Production/Fielding	1	2024	1	2026

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1201017SF / *Global Sensor Integrated on Network (GSIN)*	**Project (Number/Name)** 675368 / *GSIN (Global Integrated Sensor Network)*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
(RADAR 3) Integration and Testing	1	2026	3	2027
(RADAR 3) Initial Operational Capability	4	2027	4	2027

Note

All RADAR timelines are notional, pending FMS actions.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203001SF *I Family of Advanced BLoS Terminals (FAB-T)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	151.967	128.243	91.369	0.000	91.369	2.603	0.306	0.312	0.005	0.000	374.805
672490: *Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)*	-	13.817	2.850	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	16.667
673035: *Presidential and National Voice Conferencing*	-	51.492	34.972	35.319	0.000	35.319	2.000	0.306	0.312	0.005	0.000	124.406
673040: *Force Element Terminal*	-	86.658	90.421	56.050	0.000	56.050	0.603	0.000	0.000	0.000	0.000	233.732

A. Mission Description and Budget Item Justification

The Family of Advanced Beyond Line-of-Sight Terminals (FAB-T) - Command Post Terminal (CPT), Force Element Terminal (FET), and Presidential and National Voice Conferencing (PNVC) Integrator programs - transitioned from AFPEO/SP to AFPEO/NC3 effective December 2018.

The FAB-T CPT project replaces legacy Milstar terminals and will provide Extremely High Frequency (EHF) protected high data rate communication for nuclear and conventional forces to include PNVC. FAB-T will provide this new, highly secure, state-of-the-art capability for Department of Defense (DoD) platforms to include strategic platforms and airborne/ground command posts via Milstar and Advanced EHF (AEHF) satellites. FAB-T CPTs will also support the critical command and control (C2) of the Milstar and AEHF satellite constellations.

The Family of Advanced Beyond Line-of-Sight Terminals Force Element Terminal (FAB-T FET) program replaces the Ultra High Frequency (UHF) Milstar terminals and provides secure, protected, and survivable communications for the strategic warfighter through airborne-based Military Satellite Communication (MILSATCOM) terminals. The FAB-T FET will provide worldwide nuclear and non-nuclear, survivable, anti-jam Low Probability of Detect (LPD)/ Low Probability of Intercept (LPI) data and voice communications. The FAB-T FET will be interoperable with Advanced Extremely High Frequency (AEHF), Enhanced Polar Systems - Recapitalization (EPS-R), and Evolved Strategic SATCOM (ESS) satellite constellations utilizing Extended Data Rate (XDR) waveforms and will be installed on the B-52 aircraft (threshold). FAB-T FET was designated as a Middle Tier of Acquisition (MTA) in February 2019.

The total cost of the FAB-T FET Middle Tier of Acquisition effort is $454.2 million. The program is fully funded across the Future Years Defense Program. FAB-T FET is planned to transition to the Major Capability Acquisition (MCA) Pathway at Milestone C in FY2024.

The PNVC Integrator project 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 enduring 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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203001SF *I Family of Advanced BLoS Terminals (FAB-T)*

capability, enterprise, and life cycle support for PNVC components. The AFPEO/SP approved entry into the acquisition lifecycle as a post MS-A Acquisition Category (ACAT) III Program of Record in January 2016. Starting in December 2018, PNVC Integrator became responsible for the funding requests of all program elements 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. In March 2019, the AFPEO/NC3 declared the PNVC Integrator an ACAT II Program based on the inclusion of DISA funding in the program budget.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In PY 0.735M was expended for civilian pay expenses in this program element, and in CY 0.752M is forecasted for civilian pay expenses in this program element.

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	156.788	128.243	80.750	0.000	80.750
Current President's Budget	151.967	128.243	91.369	0.000	91.369
Total Adjustments	-4.821	0.000	10.619	0.000	10.619
• 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	-4.821	0.000			
• Other Adjustments	0.000	0.000	10.619	0.000	10.619

Change Summary Explanation

FY 2022 ($4.821M) for SBIR reduction

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203001SF / *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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
672490: *Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)*	-	13.817	2.850	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	16.667
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The FAB-T Command Post Terminal (CPT) 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 CPT will provide this new, highly secure, state-of-the-art capability for Department of Defense (DoD) platforms to include strategic platforms and airborne/ground command posts via Milstar and Advanced EHF (AEHF) satellites. FAB-T CPTs will also support the critical command and control (C2) of the Milstar and AEHF satellite constellations. The Department of the Air Force (DAF) will continue development of the FAB-T CPT, performing systems engineering, architecture studies, development and operational test efforts, 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 2022	FY 2023	FY 2024
Title: FAB-T CPT Development	13.817	2.850	0.000
Description: The FAB-T CPT program will provide EHF voice and data Military Satellite Communication (MILSATCOM) for nuclear and conventional forces as well as airborne and ground command posts with connectivity to Milstar and AEHF satellites. ***FY 2023 Plans:*** The FAB-T CPT program continues to provide EHF voice and data MILSATCOM for nuclear and conventional forces as well as airborne and ground command posts with connectivity to Milstar and AEHF satellites. FAB-T CPT development efforts are required for NSA AEHF terminal certification. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. Activities funded in this program continue to pay for AN/USQ-225 integration into multiple legacy systems, other ongoing NC3 acquisition programs, and future capabilities for the overall AF NC3 WS. ***FY 2024 Plans:*** The FAB-T CPT program continues to provide EHF voice and data MILSATCOM for nuclear and conventional forces as well as airborne and ground command posts with connectivity to Milstar and AEHF satellites. FAB-T CPT is scheduled to complete development of efforts required for NSA AEHF terminal certification, specifically an update to the software encryption station.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *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 2022	FY 2023	FY 2024
Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Project extended into FY 2024 using funding within the program element as required for completion.			
Accomplishments/Planned Programs Subtotals	13.817	2.850	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 FBLOST FAB-T: *FAB-T*	30.745	13.078	21.749	-	21.749	15.563	14.402	5.055	5.161	Continuing	Continuing
• SPSF 01 FBLOST PNVC: *FAB-T*	5.799	3.066	3.308	-	3.308	1.672	1.708	1.754	0.000	Continuing	Continuing
• SPSF 01 SPAF FET: *FAB-T*	0.000	0.000	121.634	-	121.634	234.255	212.400	23.447	23.939	Continuing	Continuing
• RDTE 07 FET: *FAB-T*	86.658	90.421	56.050	-	56.050	0.603	0.000	0.000	0.000	0.000	233.732
• RDTE 07 PNVC: *FAB-T*	51.492	34.972	35.319	-	35.319	2.000	0.306	0.312	0.005	Continuing	Continuing

Remarks

D. Acquisition Strategy

FAB-T CPT Acquisition Strategy: In FY 2012, the government restructured the FAB-T CPT 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 DAF 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 DAF down-selected to Raytheon. Development and production of FAB-T CPTs continued with Raytheon. The first Production contract options to produce FAB-T CPTs were exercised after a successful Milestone C decision was approved September 1, 2015.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 672490 / *Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FAB-T CPT Prime Contract	Various	Raytheon : Marlboro, MA	-	12.862	Nov 2021	1.996	Dec 2022	-		-		-	Continuing	Continuing	-
FAB-T CPT Technical Mission Analysis	Various	Various : Various	-	0.397	Dec 2021	0.390	Dec 2022	-		-		-	Continuing	Continuing	-
		Subtotal	-	13.259		2.386		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FAB-T CPT Other Support	Various	Various : Various	-	0.142	Oct 2021	0.064	Nov 2022	-		-		-	Continuing	Continuing	-
FAB-T CPT A&AS	Various	Various : Various	-	0.416	Feb 2022	0.400	Jan 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	0.558		0.464		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	13.817		2.850		-		-		-	Continuing	Continuing	N/A

Remarks

Prior Years funding, FY 2016/FY 2017 $95.229M was executed in Program Element (PE) 0303001F. Prior to FY 2016, $180.602M was executed in PE 0303601F.

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 672490 / *Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)*

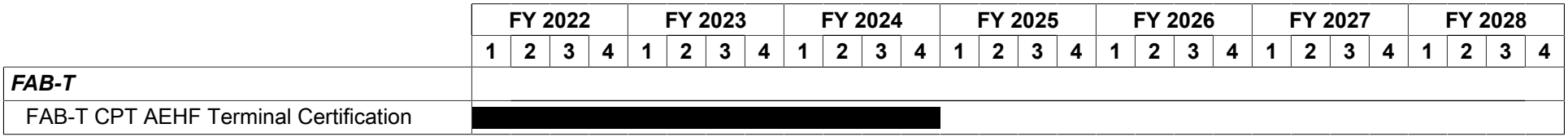

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 672490 / *Family of Advanced Beyond Line-of-Sight Terminals (FAB-T)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
FAB-T				
FAB-T CPT AEHF Terminal Certification	1	2022	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	Project (Number/Name) 673035 / *Presidential and National Voice Conferencing*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
673035: *Presidential and National Voice Conferencing*	-	51.492	34.972	35.319	0.000	35.319	2.000	0.306	0.312	0.005	0.000	124.406
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The PNVC project 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 Advanced Extremely High Frequency (AEHF) satellite system for national and strategic users. There are several components being developed, procured and updated 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 life-cycle as a post MS-A Acquisition Category (ACAT) III Program of Record in January 2016. In March 2019 the AFPEO/NC3 declared the PNVC Integrator an ACAT II Program based on updated approved budget request.

Starting in December 2018 PNVC Integrator became responsible for the funding requests of all program elements 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. In October 2021, PNVC completed Milestone B/C.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: PNVC Integrator	51.492	34.972	35.319
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 2023 Plans:*** PNVC Integrator undergoes Multi-Service Operational Test and Evaluation (MOT&E), led by the Air Force Operational Test and Evaluation Center (AFOTEC), and overseen by the Director, Operational Test & Evaluation (DOT&E). This end-to-end system test assesses all node types in the PNVC system in its operational environment to determine PNVC's overall capability to support mission accomplishment, as determined by effectiveness, suitability, and other applicable operational considerations such as survivability.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 673035 / *Presidential and National Voice Conferencing*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
PNVC Integrator also conducts integration and checkout activities and training at remaining operational sites world-wide, conducts cyber-security testing, and continues to work closely with the applicable sustainment organizations, as they make their preparations for becoming responsible for PNVC sustainment, engineering, and maintenance. PNVC Integrator activities include, but are not limited, to program office support, prototyping, test planning and execution, deficiency resolution, logistics and sustainment support planning, component product support, risk reduction activities, technical analysis and studies, platform integration and support, and integration of laboratory support. Activities funded in this program continue to pay for AN/USQ-225 integration into multiple legacy systems, other ongoing NC3 acquisition programs, and future capabilities for the overall AF NC3 WS. ***FY 2024 Plans:*** The PNVC Integrator will continue to conduct integration and checkout activities and training at remaining operational sites world-wide, conduct cyber-security testing, and continue to work closely with the applicable sustainment organizations, as they make their preparations for becoming responsible for PNVC sustainment, engineering, and maintenance. PNVC Integrator activities will include, but are not limited, to program office support, prototyping, test planning and execution, deficiency resolution, logistics and sustainment support planning, component product support, risk reduction activities, technical analysis and studies, platform integration and support, and integration of laboratory support. PNVC will continue to support component fielding, conduct site integration and checkout, finish integrated developmental activities and prepare for initial operational capability. Activities funded in this program continue to pay for AN/USQ-225 integration into multiple legacy systems, other ongoing NC3 acquisition programs, and future capabilities for the overall AF NC3 WS. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Level of program activity is relatively consistent from FY 2023 to FY 2024. Testing will be concluded in FY 2023 and deficiencies will be corrected, however the 7th Node will require integration activities into FY 2024.			
Accomplishments/Planned Programs Subtotals	51.492	34.972	35.319

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 673035 / *Presidential and National Voice Conferencing*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 FBLOST FAB-T: *FAB-T*	30.745	13.078	21.749	-	21.749	15.563	14.402	5.055	5.161	Continuing	Continuing
• SPSF 01 FBLOST PNVC: *FAB-T*	5.799	3.066	3.308	-	3.308	1.672	1.708	1.754	0.000	Continuing	Continuing
• SPSF 01 SPAF FET: *FAB-T*	0.000	0.000	121.634	-	121.634	234.255	212.400	23.447	23.939	Continuing	Continuing
• RDTE 07 FET: *FAB-T*	86.658	90.421	56.050	-	56.050	0.603	0.000	0.000	0.000	0.000	233.732
• RDTE 07 FAB-T CPT: *FAB-T*	13.817	2.850	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.667

Remarks

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 DAF; effective May 16, 2015, SAF/AQ designated the AFPEO/SP. In March 2019 the AFPEO/NC3 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.

PNVC will continue to support component fielding, conduct site integration and checkout, and prepare for and execute integrated developmental test activities in advance of the PNVC system Initial Operating Capability.

Beginning in FY2020, all PNVC funds were transferred from DISA to Project 673035, for execution.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 673035 / *Presidential and National Voice Conferencing*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PNVC Prime Contract	Various	Raytheon : Largo, FL	-	36.980	Oct 2021	20.672	Oct 2022	22.569	Oct 2023	-		22.569	Continuing	Continuing	-
PNVC Technical Mission Analysis	Various	Various : Various	-	3.089	Oct 2021	3.075	Oct 2022	3.000	Oct 2023	-		3.000	Continuing	Continuing	-
PNVC Enterprise SE&I	Various	Various : Various	-	3.305	Oct 2021	3.205	Oct 2022	3.100	Oct 2023	-		3.100	Continuing	Continuing	-
		Subtotal	-	43.374		26.952		28.669		-		28.669	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PNVC Government Test and LDTO Support	Various	Various : Various	-	0.687	Oct 2021	0.605	Oct 2022	0.500	Oct 2023	-		0.500	Continuing	Continuing	-
		Subtotal	-	0.687		0.605		0.500		-		0.500	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
PNVC FFRDC	Various	Various : Various	-	3.680	Oct 2021	3.675	Nov 2022	2.900	Nov 2023	-		2.900	Continuing	Continuing	-
PNVC A&AS	Various	Various : Various	-	2.162	Nov 2021	2.160	Nov 2022	2.000	Nov 2023	-		2.000	Continuing	Continuing	-
PNVC Other Support	Various	Various : Various	-	1.589	Oct 2021	1.580	Nov 2022	1.250	Nov 2023	-		1.250	Continuing	Continuing	-
		Subtotal	-	7.431		7.415		6.150		-		6.150	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	51.492		34.972		35.319		-		35.319	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 673035 / *Presidential and National Voice Conferencing*

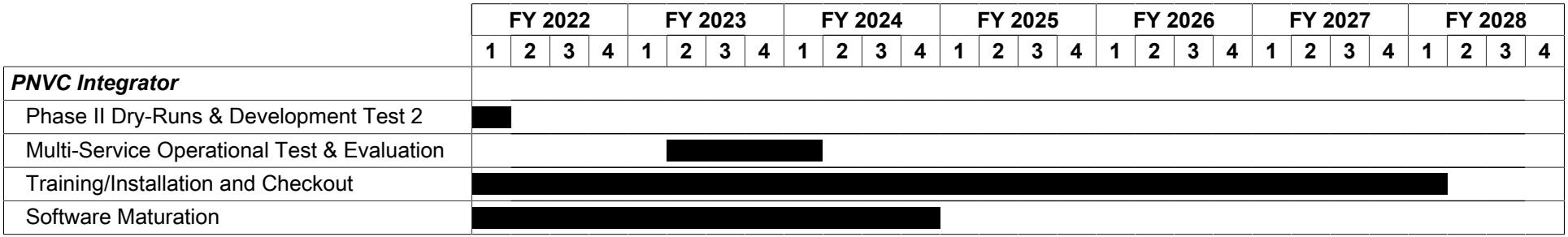

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 673035 / *Presidential and National Voice Conferencing*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
PNVC Integrator				
Phase II Dry-Runs & Development Test 2	1	2022	1	2022
Multi-Service Operational Test & Evaluation	2	2023	1	2024
Training/Installation and Checkout	1	2022	1	2028
Software Maturation	1	2022	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	Project (Number/Name) 673040 / *Force Element Terminal*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
673040: *Force Element Terminal*	-	86.658	90.421	56.050	0.000	56.050	0.603	0.000	0.000	0.000	0.000	233.732
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Family of Advanced Beyond Line-of-Sight Terminals Force Element Terminal (FAB-T FET) program replaces the Ultra High Frequency (UHF) Milstar terminal and provides secure, protected, and survivable communications for the strategic warfighter through airborne-based Military Satellite Communication (MILSATCOM) terminals. The FAB-T FET will provide worldwide nuclear and non-nuclear, survivable, anti-jam Low Probability of Detect (LPD)/ Low Probability of Intercept (LPI) data and voice communications. The FAB-T FET will be interoperable with Advanced Extremely High Frequency (AEHF), Enhanced Polar Systems - Recapitalization (EPS-R), and Evolved Strategic SATCOM (ESS) satellite constellations utilizing Extended Data Rate (XDR) waveforms and will be installed on the B-52 aircraft. FAB-T FET was designated as a Middle Tier of Acquisition (MTA) in February 2019.

The total cost of the FAB-T FET Middle Tier of Acquisition effort is $454.2 million. The program is fully funded across the Future Years Defense Program. FAB-T FET activities are expected to be designated as Major Capability Acquisition at Milestone C in FY2024.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: FAB-T FET	86.658	90.421	56.050
Description: Continue development of FETs. Development activities include, but are not limited to, FAB-T FET design, development, and qualification testing.			
FY 2023 Plans: Funding is for the continued development of Force Element Terminals. FAB-T FET integration and testing activities include reliability growth testing and fabrication of test assets. Prototypes will support terminal environmental and functional testing to include flight testing, and early integration efforts. Planning and support activities include continued qualification test planning, logistics support planning, risk reduction activities for development and follow-on production, technical analysis and studies, platform integration support, program office support, and mitigations for Diminishing Manufacturing Sources and Material Shortages in preparation for terminal production decision. Activities funded in this program continue to pay for AN/USQ-225 integration into multiple legacy systems, other ongoing NC3 acquisition programs, and future capabilities for the overall AF NC3 WS.			
FY 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 673040 / *Force Element Terminal*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding is for the continued development of FETs. FAB-T FET integration and testing activities will include reliability growth testing and fabrication of test assets; prototype and test terminals will support terminal security, environmental, and functional testing, to include flight testing, and early integration efforts. Planning and support activities will continue, including qualification test planning, logistics support planning, risk reduction activities for development and follow-on production, technical analysis and studies, platform integration support, program office support, and mitigations for Diminishing Manufacturing Sources and Material Shortages in preparation for terminal production. Activities funded in this program continue to pay for AN/USQ-225 integration into multiple legacy systems, other ongoing NC3 acquisition programs, and future capabilities for the overall AF NC3 WS. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Funding decrease is based upon the planned reduction of the initial prototype configuration material purchases, integration, and testing FET continues the development, material purchasing, integration, and test of the test asset configuration.			
Accomplishments/Planned Programs Subtotals	86.658	90.421	56.050

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 FBLOST FAB-T: *FAB-T*	30.745	13.078	21.749	-	21.749	15.563	14.402	5.055	5.161	Continuing	Continuing
• SPSF 01 FBLOST PNVC: *FAB-T*	5.799	3.066	3.308	-	3.308	1.672	1.708	1.754	0.000	Continuing	Continuing
• SPSF 01 SPAF FET: *FAB-T*	0.000	0.000	121.634	-	121.634	234.255	212.400	23.447	23.939	Continuing	Continuing
• RDTE 07 PNVC: *FAB-T*	51.492	34.972	35.319	-	35.319	2.000	0.306	0.312	0.005	Continuing	Continuing
• RDTE 07 FAB-T CPT: *FAB-T*	13.817	2.850	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	16.667

Remarks

D. Acquisition Strategy

FAB-T FET Acquisition Strategy: Per the Acquisition Strategy Panel briefed to SAF/AQ on February 7, 2019, FAB-T FET pursued a Rapid Prototyping development Middle Tier Acquisition approach of the National Defense Authorization Act for FY 2016. This Rapid Prototyping program enabled FAB-T FET to accelerate the nominal program development timeline in support of the accelerated USSTRATCOM-requested Initial Operating Capability. FAB-T FET awarded a development effort on January 16, 2020 to develop, build, and test prototypes and test terminals. This Rapid Prototyping effort enabled FAB-T FET to develop, install, and obtain test data from early B-52 FAB-T FET prototypes which will also have residual operations capability. The overall development effort includes system design and build of sufficient test assets to allow for expeditious development, testing, qualification and integration support of the FAB-T FET capability. FAB-T FET will meet B-52 platform requirements to support USSTRATCOM's Strategic Nuclear Command Control and Communication (NC3) mission. On January 4, 2023, SAF/SQ approved the FAB-T FET Milestone

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 673040 / *Force Element Terminal*

C Acquisition Strategy which establishes the plan for the program to transition to the Major Capability Acquisition Pathway at Milestone C. Additionally, the program will begin Low-Rate Initial Production at Milestone C.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 673040 / *Force Element Terminal*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FAB-T FET Development Contracts	Various	Raytheon : Marlborough, MA	-	61.392	Nov 2021	66.507	Dec 2022	38.199	Dec 2023	-		38.199	Continuing	Continuing	-
FAB-T FET Technical Mission Analysis	Various	Various : Various	-	1.625	Nov 2021	1.615	Dec 2022	1.000	Dec 2023	-		1.000	Continuing	Continuing	-
FAB-T FET Enterprise SE&I	Various	Various : Various	-	0.200	Mar 2022	0.150	Mar 2023	0.100	Mar 2024	-		0.100	Continuing	Continuing	-
		Subtotal	-	63.217		68.272		39.299		-		39.299	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FAB-T FET Test & Evaluation and Assets	Various	Various : Various	-	6.882	Nov 2021	6.800	Dec 2022	6.500	Dec 2023	-		6.500	Continuing	Continuing	-
		Subtotal	-	6.882		6.800		6.500		-		6.500	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FAB-T FET FFRDC	Various	Various : Various	-	6.005	Nov 2021	6.000	Dec 2022	4.250	Dec 2023	-		4.250	Continuing	Continuing	-
FAB-T FET Other Support	Various	Various : Various	-	7.324	Nov 2021	6.199	Dec 2022	3.501	Dec 2023	-		3.501	Continuing	Continuing	-
FAB-T FET A&AS	Various	Various : Various	-	3.230	Dec 2021	3.150	Jan 2023	2.500	Jan 2024	-		2.500	Continuing	Continuing	-
		Subtotal	-	16.559		15.349		10.251		-		10.251	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	86.658		90.421		56.050		-		56.050	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 673040 / *Force Element Terminal*

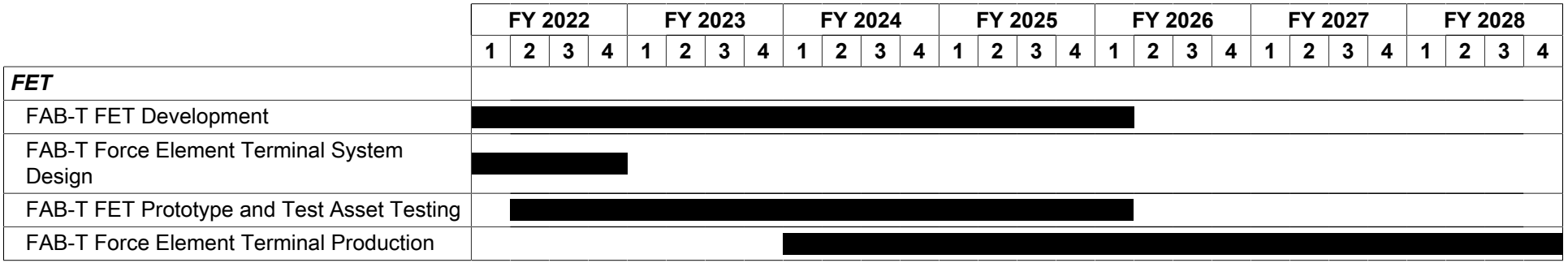

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203001SF / *Family of Advanced BLoS Terminals (FAB-T)*	**Project (Number/Name)** 673040 / *Force Element Terminal*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
FET				
FAB-T FET Development	1	2022	1	2026
FAB-T Force Element Terminal System Design	1	2022	4	2022
FAB-T FET Prototype and Test Asset Testing	2	2022	1	2026
FAB-T Force Element Terminal Production	1	2024	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203040SF / *DCO-Space*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	6.156	28.087	76.003	0.000	76.003	68.796	62.979	67.608	51.320	Continuing	Continuing
673070: *Defensive Cyber Ops - Space*	-	6.156	28.087	76.003	0.000	76.003	68.796	62.979	67.608	51.320	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Defensive Cyberspace Operations (DCO-S) provides defensive cyber capabilities that protect USSF mission systems, to include their associated computer systems, software applications and sensitive operational information against unauthorized intrusion, corruption, and/or destruction. The emphasis of the program is directed toward defensive cyberspace capabilities, computer and network systems security, damage assessment and recovery, cyber threat recognition, attribution, and mitigation, and active response methodologies in response to evolving threats and changes to cyber environment. These areas of emphasis are realized through research and development, test and acquisition in the areas of proactive defense, defensive counter cyberspace, cyberspace intelligence, surveillance and reconnaissance, command and control situational awareness, persistent network operations, as well as decision support, recovery, and digital forensics.

The development of DCO-S tools for the ground segment 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 primarily institutes two product lines: Manticore (Detect & Identify) and Kraken (Protect & Respond). It will endeavor to identify shared/common platform, infrastructure, and data layer solutions to support open frameworks and architectures across the enterprise ground portfolio. Manticore and Kraken make use of open source and commercial tools to create the platform used to defend space mission systems, but much of the content used by that platform is bespoke and includes a large amount of custom software and hardware. There are no commercial off-the-shelf solutions that address the threat to individual USSF systems, so tailored content is required to support the DCO-S mission. The DCO-S capabilities are developed, produced, and deployed as an agile program, leveraging a DEVSECOPS framework to facilitate rapid and timely fielding to operations.

DCO-S enables Space Delta 6 and the mission Deltas to perform cyber integrated space operations that identify, detect, protect against, respond to, and recover from malicious threats to space mission systems. These developments deploy both out-of-band (Manticore) and in-band (Kraken) cyber defense tool suites for the ground mission systems to Space Delta 6 (Cyber Ops) protecting the following mission sets: Protected Communications, Missile Warning, Military Strategic Communications (MILSATCOM), Position Navigation and Timing (PNT), Ballistic Missile Command and Control, Space Domain Awareness (SDA), Nuclear Command Control and Communications (NC3), and Command and Control Satellite Operations (C2 Sat Ops).

The FY 2024 request increased significantly to support the urgent need of cyber defense tools to be fielded to USSF Mission Defense Teams that are to be activated in Delta 6 in FY23. In previous cycles, primarily mission partner funding supported fielding efforts. Software development must also increase and adapt to support software development to on-board classified mission systems and new data types not in the baseline software to keep pace with the cyber threat. Systems engineering and integration support must also expand to deploy Manticore systems to additional mission sites in a timely manner. Furthermore, the DCO-S Wide Area Network

development must evolve to meet security, sustainment, and reach-back requirements for the USSF Cybersecurity Service Provider and Mission Defense Teams. Finally, initial transition of space segment DCO-S tools into mission systems and integration with Manticore and Kraken is required to provide a total solution to DEL 6 cyber units and provide comprehensive protection of USSF mission systems, necessary to outpace the threat.

The USSF Strategic Cyber Vision, 20 Nov 20, provides guidance in implementing the DCO-S program, including responses to the DoD Strategic Cybersecurity Program. Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F.

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	2.150	28.162	28.249	0.000	28.249
Current President's Budget	6.156	28.087	76.003	0.000	76.003
Total Adjustments	4.006	-0.075	47.754	0.000	47.754
• Congressional General Reductions	0.000	-0.075			
• 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	4.006	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	47.754	0.000	47.754

Change Summary Explanation

FY 2022: +4.006M Above Threshold Reprogramming for DCO-S Development and Integration activities

FY 2023: -0.075M FY 2023 mark, Undistributed FFRDC Reduction - Sec 8026(e)

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203040SF / *DCO-Space*

FY 2024: -0.186M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +0.340M inflation increase for non-pay and non-fuel purchases.

FY 2024: +47.600 increase to DCO-S to mitigate cyber risk and continue to protect the network enclaves of USSF mission systems against unauthorized intrusion, corruption, and/or destruction. Funding increased to offset reduction in mission partner funding, grow software factory pipeline, systems engineering and integration, and onboard additional legacy and new USSF mission systems in support of the Strategic Cybersecurity Program DCO requirements.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Defensive Cyberspace Operations - Space (DCO-S)	6.156	28.087	76.003

Description: 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.

FY 2023 Plans:
Develop and integrate Manticore (Identify & Detect) and Kraken (Protect & Respond) DCO-S capabilities to new mission areas; build, test and deliver new features to keep pace with growing threat demands. Deploy both out-of-band (Manticore) and in-band (Kraken) cyber defense tool suites to Space Delta 6 (Cyber Ops). Additional DCO-S mission systems will be on-boarded to protect the following mission sets: Protected Communications, Missile Warning, Military Strategic Communications (MILSATCOM), Position Navigation and Timing (PNT), Ballistic Missile Command and Control, Space Domain Awareness (SDA), Nuclear Command Control and Communications (NC3), and Command and Control Satellite Operations (C2 Sat Ops).

Increase systems engineering and accreditation support to develop cyber technology risk reduction, test and accreditation plans and perform modeling and analysis for common platform, infrastructure and data layers that ground and communication systems can build upon. Perform Security Test and Evaluation (ST&E) and issue fact-based risk assessments for developed DCO-S capabilities to promote the fielding of interoperable systems with optimum security features, countermeasures and safeguards in place. Explore using existing state-of-the-art commercial defensive applications to inform and drive improvements to military cyber defense capabilities that will protect infused sensor and artificially intelligent systems, as part of the Joint All Domain Command Control initiative.

Employ modern testing methodologies based on industry best practices; embed the 47th Test Squadron into the Continuous Integration / Continuous Deployment framework and provide persistent cybersecurity test support and cybersecurity assessments

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203040SF / *DCO-Space*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
of applications and environments. FFRDC and other management services provide mission assurance oversight to ensure capabilities meet operational need. ***FY 2024 Plans:*** Enhance the development, deployment, tuning and continued expansion of Manticore (Identify & Detect) and Kraken (Protect & Respond) to additional mission areas; build, test and deliver valuable features at a faster pace to meet growing demands of cyber defenders. Scale development teams to increase emphasis on cyber threat recognition, information sharing and active response methodologies to combat evolving threats and prepare for inevitable changes to the cyber domain. Augment platform, Continuous Integration/Continuous Deployment (CI/CD) and test teams to provision, manage, optimize and secure infrastructure on premise and cloud environments (servers, networking to databases, etc.), carry out software deployments, validate the reliability of features, manage CI/CD pipelines and ensure all tools and platforms are available for the development teams. Upgrade databases for all product-line documentation, grow infrastructure support of existing codebase and stand-up the cloud environment for Manticore. Deploy both out-of-band (Manticore) and in-band (Kraken) cyber defense tool suites to Space Delta 6 (Cyber Ops). Additional DCO-S mission systems will be on-boarded to protect the following mission sets: Protected Communications, Missile Warning, Military Strategic Communications (MILSATCOM), Position Navigation and Timing (PNT), Ballistic Missile Command and Control, Space Domain Awareness (SDA), Nuclear Command Control and Communications (NC3), and Command and Control Satellite Operations (C2 Sat Ops). Increase Systems Engineering & Integration (SE&I) support to ensure seamless data stream integration with each new on-boarded mission system. Through AFRL Cyber Research & Development, increase efforts to develop technical documentation, perform integration activities as well as tuning support, and develop plans for product support and sustainment. Establish baseline for global space cybersecurity competition to help reduce vulnerabilities within existing product lines. Fund efforts to allow independent security researchers to report security exploits, issues, and hardware flaws which increases the chances that bugs are found and reported before malicious attacks occur. Leverage other agencies lessons learned and capability as it pertains to defending space systems. Expand systems engineering and accreditation support to provide internal test and accreditation plans for security hardening and risk assessments to ensure product line software has optimum security features, countermeasures and safeguards in place. Maintain modern testing methodologies based on industry best practices; embed the 47th Test Squadron into the development workflow, tool-chain and CI/CD framework and provide cybersecurity test support and assessments of applications and environments. FFRDCs and other management services provide mission assurance oversight to identify Tactics, Techniques and Procedures (TTPs) and provide users with space-based training while future proofing systems with the latest technology.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203040SF / *DCO-Space*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue to rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. Investigate space segment DCO-S tools for USSF mission systems with focus of integrating with Manticore and Kraken. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 funding increased to offset reduction in mission partner funding and to expand DCO-S objectives to include the protection of additional space mission systems, advance future development of product lines and expand cybersecurity to meet both ground and space segment.			
Accomplishments/Planned Programs Subtotals	6.156	28.087	76.003

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

Currently, DCO-S is being acquired as an enterprise architecture prototype. The latest DCO-S acquisition strategy is committed to using a modular contracting strategy for fast, agile and adaptable approaches in order to successfully develop defensive cyber applications and deploy them to the space enterprise and next generation systems. These efforts implement 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. USSF plans to leverage new prototyping techniques, previous Government investments in Federally Funded Research and Development Center (FFRDC) and efforts from Government labs as part of those development activities.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203040SF / *DCO-Space*	Project (Number/Name) 673070 / *Defensive Cyber Ops - Space*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
DCO-S Suite Development	Various	Various : Various	-	4.083	Apr 2022	6.416	Nov 2022	22.181	Oct 2023	-		22.181	Continuing	Continuing	-
SBIR/STTR	Various	Various : Various	-	-		0.986	May 2023	2.263	May 2024	-		2.263	Continuing	Continuing	-
Product Line Integration	Various	Various : Various	-	0.717	Jul 2022	5.732	Nov 2022	31.351	Nov 2023	-		31.351	Continuing	Continuing	-
Systems Engineering/ Accreditation	Various	Various : Various	-	-		2.386	Nov 2022	1.926	Oct 2023	-		1.926	Continuing	Continuing	-
Technical Mission Analysis	MIPR	Analysis/Tech Guidance : Various	-	-		0.580	Oct 2022	0.654	Oct 2023	-		0.654	Continuing	Continuing	-
		Subtotal	-	4.800		16.100		58.375		-		58.375	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Developmental Test	PO	Test and Eval : San Antonio, TX	-	0.000		0.994	Nov 2022	1.019	Oct 2023	-		1.019	Continuing	Continuing	-
		Subtotal	-	0.000		0.994		1.019		-		1.019	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	MIPR	Various : El Segundo, CA	-	1.356		6.810	Nov 2022	9.532	Nov 2023	-		9.532	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		3.816	Nov 2022	6.827	Nov 2023	-		6.827	Continuing	Continuing	-
Other	Various	Various : Various	-	-		0.367	Oct 2022	0.250	Oct 2023	-		0.250	Continuing	Continuing	-
		Subtotal	-	1.356		10.993		16.609		-		16.609	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	6.156		28.087		76.003		-		76.003	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203040SF / *DCO-Space*	Project (Number/Name) 673070 / *Defensive Cyber Ops - Space*	

	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203040SF / *DCO-Space*	**Project (Number/Name)** 673070 / *Defensive Cyber Ops - Space*

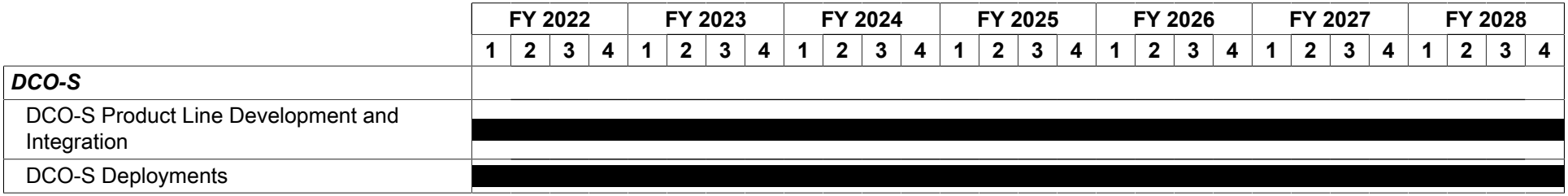

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203040SF / *DCO-Space*	**Project (Number/Name)** 673070 / *Defensive Cyber Ops - Space*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
DCO-S				
DCO-S Product Line Development and Integration	1	2022	4	2028
DCO-S Deployments	1	2022	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203109SF *I Narrowband Satellite Communications*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	0.000	110.493	110.142	230.785	0.000	230.785	435.486	595.552	676.140	604.844	Continuing	Continuing
673109: *SATCOM MUOS*	0.000	110.493	110.142	230.785	0.000	230.785	435.486	595.552	676.140	604.844	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Program MDAP/MAIS Code: 345

A. Mission Description and Budget Item Justification

Mobile User Objective System (MUOS) provides a worldwide, multi-service population of mobile and fixed-site terminal users with Ultra High Frequency (UHF) Narrowband, beyond line of sight satellite communications (SATCOM). MUOS significantly increases performance and capacity in support of critical Combatant Command SATCOM priorities. MUOS is the replacement system for the UHF Follow-on (UFO) system, which is currently beyond its design life.

MUOS is comprised of Space, Ground, and User Entry Segments. The Space Segment consists of five geosynchronous satellites, which includes an on-orbit spare. Each satellite provides both a legacy UHF payload backward compatible with UFO and a Wideband Code Division Multiple Access (WCDMA) payload, which provides 3G cellular-like capability. MUOS reached full operational capability in October 2019.

The Ground Segment consists of four world-wide Radio Access Facilities (RAFs) and two satellite control facilities. Each RAF includes three 60 ft. antennas and numerous equipment racks. The RAFs in Hawaii and Virginia each include a Switching Facility (SF), and the RAF in Hawaii includes a Network Management Facility (NMF). The User Entry Segment consists of the MUOS waveform that is ultimately integrated into MUOS-capable terminals which are fielded by the services. In addition to providing UHF SATCOM for the Department of Defense, the USSF has the overall responsibility to deliver the End-to-End (E2E) MUOS capability to the warfighter. This responsibility involves systems engineering, integration, network management, and test management of all MUOS system-of-system components.

In accordance with a Department of Defense Chief of Information Office assessment, anticipated narrowband satellite communication losses led to the recommendation by Office of Under Secretary of Defense (OUSD) Acquisitions & Sustainment and OUSD Cost Assessment and Program Evaluation (CAPE) direction for Navy to initiate MUOS Service Life Extension (SLE) to acquire and launch two additional MUOS satellites (without legacy payloads). The SLE is projected to extend the 70% constellation availability for the WCDMA capability to at least 2034 and extend the ground segment service life to support satellites to at least 2039.

This PE funds systems optimization and modernization to address the dynamic, worldwide electromagnetic and cybersecurity environment in which MUOS operates. Efforts also include Service Life Extension early design and risk reduction for MUOS 6 and 7, as well as MUOS ground modernization. The PE includes a MUOS Baseline effort, a Service Life Extension effort, and an Analysis of Alternatives (AoA) effort led by USSF in FY 2022-2023.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203109SF *I Narrowband Satellite Communications*

authorities and contract mechanisms to deliver capability sooner, SSC 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 the MUOS system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	110.012	165.892	277.713	0.000	277.713
Current President's Budget	110.493	110.142	230.785	0.000	230.785
Total Adjustments	0.481	-55.750	-46.928	0.000	-46.928
• Congressional General Reductions	0.000	-55.750			
• 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	0.481	0.000	-46.928	0.000	-46.928

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 673109: *SATCOM MUOS*		
Congressional Add: *L-Band Communications*	3.000	-
Congressional Add Subtotals for Project: 673109	3.000	-
Congressional Add Totals for all Projects	3.000	-

Change Summary Explanation

FY 2024 : -109.500M; transferred to Space Procurement, Space Force BA01 MUOS00, to address hardware and software obsolescence and cybersecurity vulnerabilities.
FY 2024: -1.825M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.
FY 2024: +8.000M: Adjustment to demonstrate an alternative waveform to support Legacy Integrated Broadcast Service users.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203109SF *I Narrowband Satellite Communications*

FY 2024: +55.500M: transferred from Space Procurement, Space Force BA01 MUOS00, to conduct design review campaign with two vendors towards Final Design approval
FY 2024: +0.857M; inflation

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Mobile User Objective System (MUOS) Baseline Upgrade	75.088	59.812	43.110
Description: System optimization and modernization to address the dynamic, worldwide electromagnetic and cybersecurity environment in which MUOS operates. ***FY 2023 Plans:*** Complete migration of MUOS ground infrastructure from Enhanced Firefly communication security to Advanced Cryptographic Capability (ACC), which includes changes to MUOS waveform software and artifacts, software updates to existing KG-175 devices, and updates to MIL-STD-188-187A and associated terminal certification program. Continue system optimization and electro-magnetic interference mitigation efforts to ensure capacity is available to the end user. Continue E2E MUOS Usability Enhancements. Continue to investigate alternatives to mitigate Legacy UHF communications shortfalls. Rapidly respond to increase system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to studies, technical analysis, experimentation, and interoperability and integration efforts with other DoD systems (Integrated Broadcast Service (IBS), Combat Survivor Evader Locator (CSEL), etc.). ***FY 2024 Plans:*** Continue systems engineering, system optimization, cybersecurity updates, and electro-magnetic interference (EMI) mitigation efforts to ensure capacity is available to the end user, including the development and fielding of EMI mitigation solutions and inclination control and eclipse contingency studies for the space segment. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Continue E2E MUOS usability enhancements including terminal certification, integration, and test. Continue to investigate and begin development of alternatives to mitigate Legacy UHF communications shortfalls. Activities may include, but are not limited to studies, technical analysis, experimentation, and interoperability and integration efforts with other DoD systems (Integrated Broadcast Service (IBS), Combat Survivor Evader Locator (CSEL), etc.). ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to completion and delivery of MUOS ground and waveform changes to support ACC in early FY 2023. Remaining activities include system optimization efforts, electro-magnetic interference mitigation, and IBS development efforts.			
Title: Mobile User Objective System (MUOS) Service Life Extension (SLE)	26.435	50.330	187.675
Description: MUOS Service Life Extension SLE to acquire and launch two additional MUOS satellites without legacy payloads and extend the ground segment service life.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203109SF / *Narrowband Satellite Communications*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: FY 2023 is the second year of a ramp-up in SLE effort across the MUOS Space and Ground segments. Continue ramp-up in SLE effort across the MUOS Space and Ground segments. Funding request required to award two fixed-price satellite early design and risk reduction contracts. Conduct system requirements review, prototyping, modelling, and simulation. Conduct ground SLE studies and further migration efforts to a digital processing that is more resilient and responsive to mitigating emerging threats. 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 2024 Plans:*** Continue systems engineering to support space, ground, and waveform segments. Continue satellite design and risk reduction activities for up to two vendors. Activities include spacecraft design, interface control document development, and preparing and conducting systems requirements and tailored design reviews. Initiate ground system modernization across all four radio access facilities, with associated laboratory equipment and associated program office support, through migration to an extensible digital processing architecture. Ground activities include interface testing & verification, and architecture updates. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to conduct design review campaign with two vendors towards Final Design approval and production activities to start in FY 2025.			
Title: Narrowband Analysis of Alternatives ***Description:*** Conduct analysis of alternatives for narrowband communications beyond MUOS. ***FY 2023 Plans:*** Narrowband AoA is a FY 2022-funded activity expected to extend into FY 2023 ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A	5.970	0.000	0.000
Accomplishments/Planned Programs Subtotals	107.493	110.142	230.785

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203109SF *I Narrowband Satellite Communications*

	FY 2022	FY 2023
Congressional Add: L-Band Communications	3.000	-
FY 2022 Accomplishments: Complete directed L-band communications study or work.		
Congressional Adds Subtotals	3.000	-

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 BA01 MUOS00: *Mobile User Objective System*	45.371	46.833	100.484	-	100.484	48.578	49.485	50.692	51.706	0.000	393.149

Remarks

FY 2024 figure does not include +109.500M ZBT transferred from RDT&E, SF, PE 1203109SF, to address hardware and software obsolescence and cybersecurity vulnerabilities.
FY 2024: -55.500M: transferred to RDT&E, SF, PE 1203109SF, to conduct design review campaign with two vendors towards Final Design approval.

E. Acquisition Strategy

The program previously awarded the Ground and User Entry Segment contracts. The Space Force will use existing requirements in order to develop two operationally-similar SLE satellites. The program awarded competitive technical and trade studies contracts in FY 2022 to determine required non-recurring engineering design changes. The Service Acquisition Executive approved the program's acquisition strategy in 14 Sep 2022 as a Major Capability Acquisition pathway, post-Milestone C program, and the program is executing to plan. Up to two vendors will be awarded competitive contracts in FY 2023 to conduct design and risk reduction activities for MUOS SVs 6 and 7. One contractor will be selected in FY 2025 for the final design and production contract.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203109SF / *Narrowband Satellite Communications*	**Project (Number/Name)** 673109 / *SATCOM MUOS*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SLE Ground Engineering Contract	SS/ Various	General Dynamics : Scottsdale, AZ	0.000	7.842	Nov 2021	16.643	Nov 2022	43.382	Nov 2023	-		43.382	Continuing	Continuing	-
SLE Technical and Trade Studies	C/FP	Various : Various	0.000	13.273	Oct 2021	-		-		-		-	Continuing	Continuing	-
SLE Satellite Design and Risk Reduction Activities	C/FP	TBD : TBD	0.000	-		23.000	Aug 2023	109.000	Nov 2023	-		109.000	Continuing	Continuing	-
SLE Crypto Replacement Plans and Interfaces	MIPR	NSA : Fort Meade, MD	0.000	0.553	Nov 2021	-		-		-		-	Continuing	Continuing	-
SLE Technical Mission Analysis	RO	Aerospace : El Segundo, CA	0.000	-		1.335	Oct 2022	2.968	Nov 2023	-		2.968	Continuing	Continuing	-
Baseline Ground Engineering Contracts	SS/ Various	Various : Various	0.000	65.685	Nov 2021	36.287	Nov 2022	35.841	Nov 2023	-		35.841	Continuing	Continuing	-
Baseline Space Engineering Contract	SS/ Various	Lockheed Martin : Sunnyvale, CA	0.000	-		4.403	Nov 2022	0.970	Nov 2023	-		0.970	Continuing	Continuing	-
Baseline Electromagnetic Interference	SS/CPFF	Adaptive Dynamics Inc : San Diego, CA	0.000	4.284	Nov 2021	0.600	Nov 2022	0.800	Nov 2023	-		0.800	Continuing	Continuing	-
L-Band Communications	C/FFP	CesiumAstro : Austin, TX	0.000	3.000	Apr 2022	-		-		-		-	Continuing	Continuing	-
SBIR/STTR	Various	Not specified. : TBD	0.000	-		-		8.045		-		8.045	Continuing	Continuing	-
Narrowband Analysis of Alternatives (AoA)	TBD	Various : Various	0.000	5.970	Feb 2022	-		-		-		-	Continuing	Continuing	-
		Subtotal	0.000	100.607		82.268		201.006		-		201.006	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SLE FFRDC	RO	Aerospace : El Segundo, CA	0.000	3.252	Oct 2021	3.200	Oct 2022	4.988	Oct 2023	-		4.988	Continuing	Continuing	-
SLE A&AS	C/CPFF	Various : Various	0.000	4.207	Jan 2022	14.591	Mar 2023	15.854	Nov 2023	-		15.854	Continuing	Continuing	-
SLE Other Support	Various	Various : Various	0.000	0.752	Oct 2021	4.671	Oct 2022	6.666	Oct 2023	-		6.666	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203109SF / *Narrowband Satellite Communications*	**Project (Number/Name)** 673109 / *SATCOM MUOS*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Baseline A&AS	C/CPFF	Various : Various	0.000	0.693	Jan 2022	1.297	Mar 2023	1.548	Nov 2023	-		1.548	Continuing	Continuing	-
Baseline Other Support	Various	Not specified. : TBD	0.000	0.982	Oct 2021	4.115	Oct 2022	0.723	Oct 2023	-		0.723	Continuing	Continuing	-
		Subtotal	0.000	9.886		27.874		29.779		-		29.779	Continuing	Continuing	N/A

Remarks

Increase from FY23 to FY24 is to support design and risk reduction activities for two vendors, ground system modernization, and Final Design and Production contract preparation including supporting draft and final request for proposals.

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	110.493		110.142		230.785		-		230.785	Continuing	Continuing	N/A

Remarks

Cost to Complete and Total Cost columns show continuing due to the Service Cost Position (SCP) estimated completion date of 4QFY2023.

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203109SF / *Narrowband Satellite Communications*	**Project (Number/Name)** 673109 / *SATCOM MUOS*

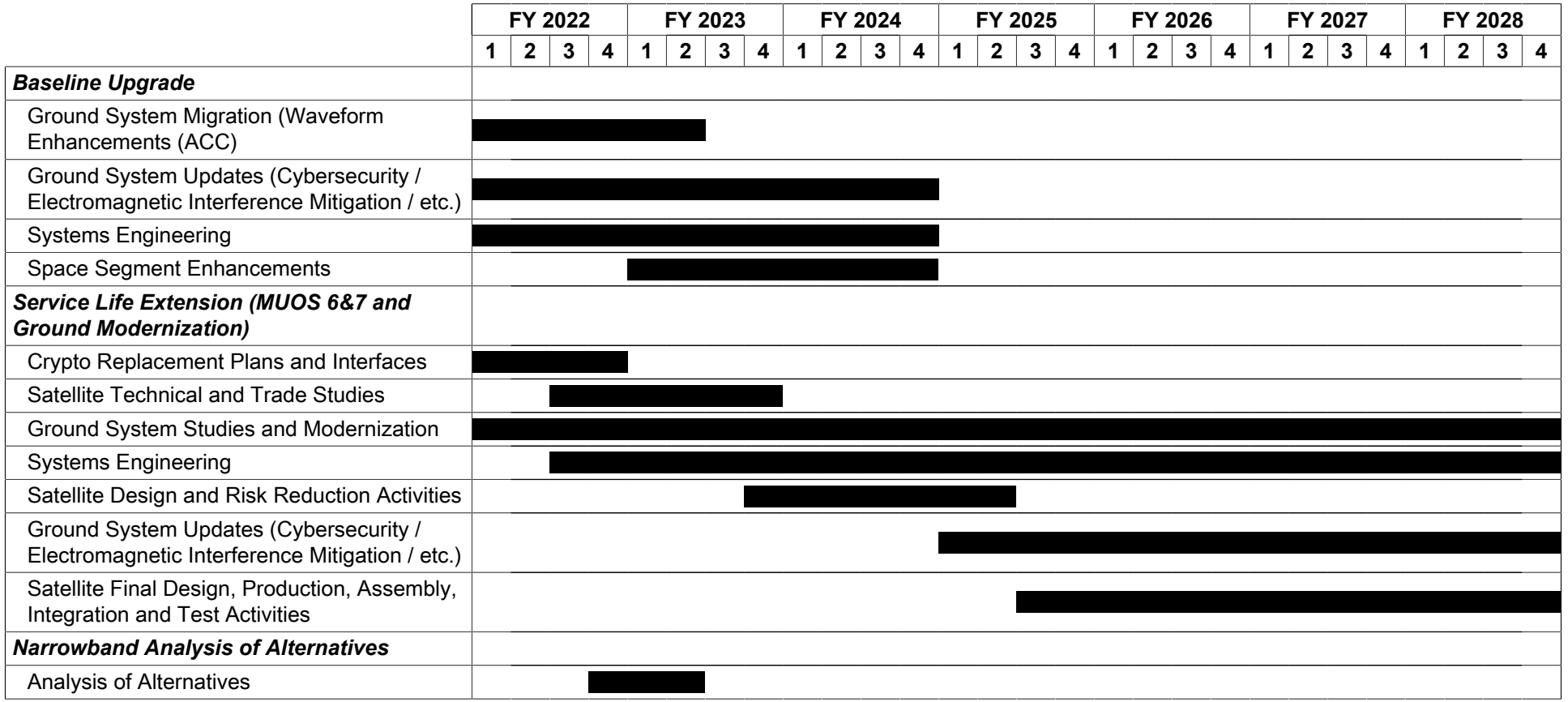

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203109SF / *Narrowband Satellite Communications*	**Project (Number/Name)** 673109 / *SATCOM MUOS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Baseline Upgrade				
Ground System Migration (Waveform Enhancements (ACC)	1	2022	2	2023
Ground System Updates (Cybersecurity / Electromagnetic Interference Mitigation / etc.)	1	2022	4	2024
Systems Engineering	1	2022	4	2024
Space Segment Enhancements	1	2023	4	2024
Service Life Extension (MUOS 6&7 and Ground Modernization)				
Crypto Replacement Plans and Interfaces	1	2022	4	2022
Satellite Technical and Trade Studies	3	2022	4	2023
Ground System Studies and Modernization	1	2022	4	2028
Systems Engineering	3	2022	4	2028
Satellite Design and Risk Reduction Activities	4	2023	2	2025
Ground System Updates (Cybersecurity / Electromagnetic Interference Mitigation / etc.)	1	2025	4	2028
Satellite Final Design, Production, Assembly, Integration and Test Activities	3	2025	4	2028
Narrowband Analysis of Alternatives				
Analysis of Alternatives	4	2022	2	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF / *Satellite Control Network (SPACE)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	35.543	42.024	86.465	0.000	86.465	98.398	97.488	96.652	99.590	0.000	556.160
673276: *Satellite Control Network*	-	35.543	42.024	86.465	0.000	86.465	98.398	97.488	96.652	99.590	0.000	556.160
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 1203110SF, project 673276, Cyber-secure Mission Data Transport, is a new start.

A. Mission Description and Budget Item Justification

The Satellite Control Network (SCN) is a satellite ground terminal network comprised of two communication nodes (Schriever SFB & Vandenberg SFB) 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 operating in a congested and contested environment. The SCN conducts an average of 450+ satellite contacts per day supporting Positioning, Navigation and Timing (PNT), Intelligence, Surveillance and Reconnaissance (ISR), Missile Warning and Missile Defense, Communications, Weather, Launch Vehicle Support, and Research and Development (R&D) for Department of Defense (DoD), Intelligence Community (IC), and National Aeronautics and Space Administration (NASA) operations. While most of the 450+ daily satellite contacts are routine command and control (C2) activities, the SCN is also used during satellite emergencies (e.g. a tumbling satellite) because its high-power antennas are often the only terrestrial assets that can re-establish contact with a non-responsive satellite. During each Fiscal Year, the SCN typically supports multiple space vehicle emergencies, resulting in the preservation of over $4B worth of satellites. In addition to routine and emergency satellite operations C2, the SCN provides support to launch and early orbit operations, ensuring worldwide telemetry during launch vehicle ascent, staging, and orbital insertion, and data transmit and receive for new satellites completing early orbit checkout. During each Fiscal Year, the SCN supports multiple launches delivering an average of $14B worth of satellites to their operational orbits. Finally, the SCN provides Factory Compatibility Testing (FCT) to ensure satellites and launch vehicles can communicate via the SCN before the satellite is launched.

New for FY 2024 is an increase in funding in two major thrusts. The first is for Cyber-secure Mission Data Transport—a new start—to develop the objective meshONE-Terrestrial (meshONE-T) data transport network. The second is for Satellite C2 Augmentation Services, to support initial operations of Federal Augmentation Services capabilities, providing additional contact capacity for satellite operations.

The meshONE-T system, like the SCN ground terminal network, provides an enterprise capability for USSF and other customers. meshONE-T nodes, located at USSF and other mission partner military installations (e.g., USSF and USAF bases), remote sensor, operational, and system development locations, utilize diversified long-haul communication circuits to provide high speed, scalable, resilient, cyber-secure transport services for mission data producers and consumers. These services are operated and managed via geographically dispersed Enterprise Service Desk (ESD) / Network Operation Center (NOC) sites. The multi-tenant, mission-agnostic system uses Commercial Off The Shelf (COTS)-based solutions and industry standard (Institute of Electrical and Electronics Engineers (IEEE) and Internet Engineering Task Force (IETF)) protocols to move data traffic quickly, efficiently, and securely across the Internet Protocol (IP)-based network architecture. The pathfinder, comprised

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
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of 20 nodes, long-haul communications links, classified-cloud-services connections, and an ESD/NOC, provides data transport capabilities for Next-Gen and Future Operationally Resilient Ground Evolution (FORGE) Overhead Persistent Infrared (OPIR) and Advanced Battle Management System (ABMS) mission partners. The objective meshONE-T effort proliferates this modern service to additional mission partners and locations—anticipated to include all principal USSF sites—in accordance with warfighter priorities. Supplementary CONUS and OCONUS NOCs, communication links, bandwidth upgrades, and system improvements increase global operational reach, resiliency, and responsiveness to support warfighter operations through all phases of conflict. Software defined networking capabilities accelerate onboarding of new mission partners and the delivery of transport services, providing the agility necessary to counter emerging threats. meshONE-T resolves current space mission network shortfalls including antiquated protocols, bandwidth constraints, lack of resiliency, cyber vulnerability, and excessive fielding times. All mission partners on meshONE-T become part of the USSF ground network enterprise, with access to every node and network-provided cyber-secure services.

These funds are utilized to meet evolving future space demands for Ground Enterprise Next (GEN), to include transmit, receive and data transport to ensure capabilities are available to support DoD, IC, and civil users. This includes efforts to provide more capable ground-based antennas, augment the existing SCN with Federal and commercial antennas to both diversify space-ground link resources and increase capacity for spacecraft communication, modernize satellite scheduling, and develop infrastructure network solutions for long-haul terrestrial communications compatible with Air Force and Space Force missions. Other activities include identifying shared/ common platform, infrastructure and data layer solutions to support open frameworks and architectures across the enterprise ground portfolio. Funds are also used for requirements management, system planning, enterprise analysis and architecture support, Systems Engineering and Integration (SE&I), cyber security, test, system enhancement and deficiency resolution, and system resiliency.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities, and will continue to plan and develop solutions based upon established, industry standards and open architectures to support both the SDA & BMC3 missions to meet dynamic emerging threats.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver SCN weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF / *Satellite Control Network (SPACE)*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	36.810	42.199	49.499	0.000	49.499
Current President's Budget	35.543	42.024	86.465	0.000	86.465
Total Adjustments	-1.267	-0.175	36.966	0.000	36.966
• Congressional General Reductions	0.000	-0.175			
• 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	-1.267	0.000			
• Other Adjustments	0.000	0.000	36.966	0.000	36.966

Change Summary Explanation

FY 2022: -1.267M for SBIR/STTR Transfer

FY 2023: -0.175M for Congressional General Reductions

FY 2024: +26.700M; to initiate post-prototype meshONE-Terrestrial system.

FY 2024: +13.253M; to initiate support initial operations of the Federal Augmentation capability.

FY 2024: -3.063M; the FY 2024 funding request was reduced by $3.063M to account for the availability of prior year execution balances.

FY 2024: -0.325M; to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: SCN Enhancements and Deficiency Resolution	6.485	4.459	5.705
Description: Provides system enhancements, deficiency resolution, test, cyber security, requirements management, and system architecture support to the SCN utilizing enterprise developed technologies or capabilities, when applicable. Additionally, the SCN is investigating multiple cyber defense tools for integration onto the SCN baseline.			
FY 2023 Plans: Continue to deliver enhancements and deficiency resolution in fielded SCN systems. Address user priorities to support mission needs. Facilitate automation, efficiency and resiliency improvements for SCN and related ground resources. Activities may include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc.			
FY 2024 Plans: Continue to deliver enhancements and deficiency resolution in fielded SCN systems, to include newly-delivered capabilities such as AFSCN Scheduling Tool (AST) and Federal Augmentation. Address user priorities to support mission needs. Facilitate			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF *I Satellite Control Network (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
automation, efficiency and resiliency improvements for SCN and related ground resources. Activities may include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 to support the delivery of AST and Federal Augmentation.			
Title: Satellite Operations Transmit and Receive ***Description:*** Provides enterprise transmit, receive and resource management solutions to enable continuous satellite operations (SATOPS) from benign to contested, degraded and operationally-denied environments as part of GEN efforts. Provides updates to SCN legacy system capability shortfalls. These updates include modernization of current scheduling, resource management, and development execution for future integrated and automated resource management and scheduling services. Additionally, the SCN will integrate with multiple enterprise cyber defense tools for as part of the baseline. ***FY 2023 Plans:*** Continue the phased modernization of capabilities supporting data transmit, receive and transport for both the current and evolving future demand. Adaptably address user priorities to responsively support mission needs. Award initial Enterprise Resource Management (ERM) contract and begin development of ERM ground resource integration, management, and automation capabilities. Complete AST phased deployments and finish transitioning SCN Scheduling onto AST. Implement necessary studies to identify shared platform, infrastructure, and data layer solutions that will inform future concepts and activities in support of enterprise open frameworks and architectures as well as risk reduction activities, technical analysis for common platform, infrastructure and data layers for ground and communication systems to build upon. Activities may include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2024 Plans:*** Continue the phased modernization of capabilities supporting satellite operations transmit and receive for both the current and evolving future demand. Adapt as necessary to address user priorities to responsively support mission needs. Advance the Enterprise Resource Management (ERM) contract beyond initial capability demonstration to full system development for ground resource integration, management, and automation. Provide pre-operations support for AST. Implement necessary studies to identify shared platform, infrastructure, and data layer solutions that will inform future concepts and activities in support of enterprise open frameworks and architectures as well as risk reduction activities, technical analysis for common platform, infrastructure and data layers for ground and communication systems to build upon. Activities may include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:***	12.444	18.303	19.503

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF *I Satellite Control Network (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 increased compared to FY 2023 due to ERM transitioning to full system development.			
Title: Satellite C2 Augmentation Services ***Description:*** Provides both Federal and commercial satellite C2 services to augment SCN capabilities. Augmented services are planned to be deployed in a phased approach to address early integration and security concerns while providing increased C2 diversity and capacity to reduce the risk of congestion on the SCN. ***FY 2023 Plans:*** Continue Federal Augmentation and Commercial Augmentation Services activities. Implement Operational Test and Operational Acceptance for initial Federal missions. Continue on-boarding and support to missions utilizing CAS. Continue development work for integration of augmentation services into ERM. Continue 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 2024 Plans:*** Continue augmentation services activities. Support initial operations of the Federal Augmentation capability. Continue pursuit of commercial augmentation solutions. Continue on-boarding and support to missions utilizing commercial C2 services. Continue development work for integration of augmentation services into ERM. Continue 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 to fund interim contractor support activities for the Federal Augmentation capability.	10.418	13.481	27.276
Title: Cyber-secure Mission Data Transport ***Description:*** Provides a scalable, resilient, cyber-secure network communications architecture and infrastructure delivering intelligent, enterprise data and information transport for execution of warfighting functions. Supports worldwide ground communications transport for USSF, other DoD Services, Intelligence Community, and Joint All-Domain Command and Control by fielding an industry-standards-based mission data network featuring interoperability, cyber-security (to include Zero Trust networking), cloud connectivity and multidomain facilitation. Addresses validated adversarial threats, legacy system obsolescence, bandwidth constraints, stovepipes and cost inefficiency. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:***	-	0.000	26.700

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF *I Satellite Control Network (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Initiate development of the post-prototype meshONE-Terrestrial (meshONE-T) system to deliver a modern, scalable, resilient, cyber-secure network communications architecture for mission data transport. Release the request for proposal and award the contract for post-prototype network development, integration, and fielding. Commence deployment of new network nodes to support warfighter-prioritized mission partners and locations. Initiate system enhancements to improve timely, secure movement of data between USSF systems and downstream warfighting service elements, improve resiliency and extensibility, efficiently connect data producers and consumers, and close capability gaps. Perform pre-operations support for existing meshONE-T network mission partners and users. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 to initiate the development and deployment of the post-prototype meshONE-T system.			
Title: Enterprise Systems Engineering and Integration (SE&I) ***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 SCN operating well beyond the Future Years Defense Plan. ***FY 2023 Plans:*** Continue Program Office support and SE&I efforts as required to integrate development and modernization across the SCN. Provide systems and subsystem level definition, baseline, architecture, integration planning, test, and support for the SCN and augmentation services. Additionally, SE&I will provide support to SSC initiatives supporting GEN activities. Continue to support implementation of 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 2024 Plans:*** Continue Program Office support and SE&I efforts as required for integration, development and modernization across data transmit, receive and transport capabilities. Provide systems and subsystem level definition, baseline, architecture, integration planning, test, and support for the SCN and augmentation services. Additionally, SE&I will provide support to SSC initiatives supporting GEN activities. Continue to support implementation of 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 2023 to FY 2024 Increase/Decrease Statement:***	6.196	5.781	7.281

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF *I Satellite Control Network (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 increased compared to FY 2023 to support the development of ERM and development & deployment of the post-prototype meshONE-T system.			
Accomplishments/Planned Programs Subtotals	35.543	42.024	86.465

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPAF 01 1203110F: *Satellite Control Network (SPACE)*	39.655	45.963	64.345	-	64.345	68.240	69.493	54.929	56.080	0.000	398.705

Remarks

N/A

E. Acquisition Strategy

DT&E efforts focus on completing upgrades as well as future architectures and studies to ensure the best use of investment funding.

SCN acquisition strategy is evolving from completing obsolescence, resiliency, and cyber security upgrades for existing satellite C2 network assets to future planning for the evolution of the SCN, Ground Enterprise Next (GEN), and data transmit, receive and transport architectures to increase efficiency and resiliency of SATOPS operations. This evolution will integrate the commercial and federal augmentation services with the SCN to create a comprehensive system for automated resource management known as Enterprise Resource Management (ERM). ERM plans to award initial contracts in FY 2023 and down-select to a single vendor in FY2024. Changes in policy, guidance, cyber-risk concerns, and requirements for use of commercial services to augment satellite C2 prompted the release of a competitive request for proposal for a Commercial SATOPS Network (CSN) capability in FY 2024. MeshONE-Terrestrial plans to release a request for proposal and award a contract for development, integration, and fielding in FY 2024.

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 SCN 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 SCN modernization efforts are compatible with mission rules and do not pose a risk to safe and cost-effective satellite contacts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203110SF / *Satellite Control Network (SPACE)*	**Project (Number/Name)** 673276 / *Satellite Control Network*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SCN Enhancements and Deficiency Resolution	Various	TBD : Colorado Springs, CO	-	6.485	May 2022	4.459	May 2023	4.482	May 2024	-		4.482	Continuing	Continuing	-
Satellite Ops Transmit and Receive - Scheduling	Various	Various : Colorado Springs, CO	-	6.221	Jan 2022	4.709	Jan 2023	0.420	Jan 2024	-		0.420	Continuing	Continuing	-
Satellite Ops Transmit and Receive - Enterprise Resource Management	C/TBD	TBD; TBD : TBD	-	-		5.400	Jan 2023	12.300	Jan 2024	-		12.300	Continuing	Continuing	-
C2 Augmentation	Various	TBD; TBD : TBD	-	10.418	Mar 2022	13.481	Oct 2022	25.819	Oct 2023	-		25.819	Continuing	Continuing	-
Cyber-secure Mission Data Transport	TBD	Not specified. : TBD	-	-		-		22.218	Jun 2024	-		22.218	Continuing	Continuing	-
Enterprise Systems Engineering and Integration (SE&I)	SS/CPIF	ENSCO : Colorado Springs, CO : TBD	-	6.196	Nov 2021	5.781	Nov 2022	7.281	Nov 2023	-		7.281	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA : TBD	-	1.804	Jan 2022	2.331	Jan 2023	2.356	Jan 2024	-		2.356	Continuing	Continuing	-
SBIR/STTR	TBD	TBD : TBD	-	-		-		3.012	May 2024	-		3.012	Continuing	Continuing	-
		Subtotal	-	31.124		36.161		77.888		-		77.888	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Aerospace Corp, : El Segundo, CA : TBD	-	1.808	Jan 2022	1.848	Jan 2023	2.943	Jan 2024	-		2.943	Continuing	Continuing	-
A&AS	Various	TBD:TBD : TBD	-	2.461	Jan 2022	3.715	Jan 2023	5.334	Jan 2024	-		5.334	Continuing	Continuing	-
Other	Various	Various : TBD	-	0.150	Jan 2022	0.300	Jan 2023	0.300	Jan 2024	-		0.300	Continuing	Continuing	-
		Subtotal	-	4.419		5.863		8.577		-		8.577	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	35.543		42.024		86.465		-		86.465	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203110SF / *Satellite Control Network (SPACE)*	Project (Number/Name) 673276 / *Satellite Control Network*	

	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203110SF / *Satellite Control Network (SPACE)*	**Project (Number/Name)** 673276 / *Satellite Control Network*

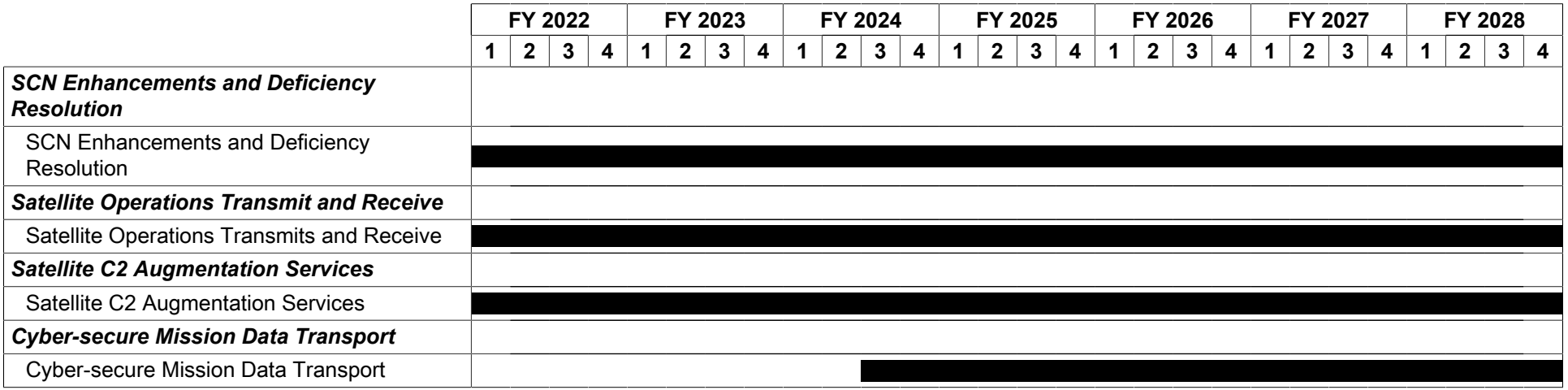

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203110SF / *Satellite Control Network (SPACE)*	**Project (Number/Name)** 673276 / *Satellite Control Network*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SCN Enhancements and Deficiency Resolution				
SCN Enhancements and Deficiency Resolution	1	2022	4	2028
Satellite Operations Transmit and Receive				
Satellite Operations Transmits and Receive	1	2022	4	2028
Satellite C2 Augmentation Services				
Satellite C2 Augmentation Services	1	2022	4	2028
Cyber-secure Mission Data Transport				
Cyber-secure Mission Data Transport	3	2024	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203154SF / *Long Range Kill Chains*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	0.000	0.000	243.036	0.000	243.036	243.693	249.053	252.065	252.070	Continuing	Continuing
671112: *Moving Target Indicator*	-	0.000	0.000	0.450	0.000	0.450	0.837	5.958	8.733	8.502	Continuing	Continuing
671113: *Auxiliary Payloads*	-	0.000	0.000	242.586	0.000	242.586	242.856	243.095	243.332	243.568	Continuing	Continuing

Note

This program, BA 7, PE 1203154SF, project 671112, Moving Target Indicator, is a new start.
This program, BA 7, PE 1203154SF, project , Auxiliary Payloads, is a new start.

A. Mission Description and Budget Item Justification

Space-based Ground Moving Target Indicator (GMTI) system is a new start in FY24 and is an integral part of the DAF's Operational Imperative 3: Achieving Moving Target Engagement at Scale in a Highly Contested Environment. Space-based GMTI system will provide actionable information on adversary surface targets to the warfighter through the Advanced Battle Management System (ABMS) as an integral part of Joint All-Domain Command and Control (JADC2)concept. The USSF is working with the Air Force and the Intelligence Community (IC) in a complementary way to design, develop, and deploy space-based GMTI systems.

The GMTI Program (1203154SF) consists of the Moving Target Indicator Project 671112 and the Auxiliary Payloads Project 671113.

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	243.036	0.000	243.036
Total Adjustments	0.000	0.000	243.036	0.000	243.036
• 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	243.036	0.000	243.036

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203154SF / *Long Range Kill Chains*	Project (Number/Name) 671112 / *Moving Target Indicator*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
671112: *Moving Target Indicator*	-	0.000	0.000	0.450	0.000	0.450	0.837	5.958	8.733	8.502	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 1203154SF, project 671112, Moving Target Indicator, is a new start.

A. Mission Description and Budget Item Justification

The space-based GMTI system will replace a portion of the aging E-8C JSTARS sensing capability, based upon the Space Warfighting Analysis Center's (SWAC's) analysis of alternatives assessment completed in September 2022. Proper funding is critical to ensure this system is in place to support the warfighter before all of the JSTARS aircraft retire. GMTI is not a one-for-one swap for the aging E-8 JSTARS that is about to retire, but rather an evolved weapon system that serves as the next generation moving target indicator for the warfighter. GMTI will be critical to tracking surface targets in Competition, Crisis, and Conflict environments. This will be accomplished from space, instead of from JSTARS aircraft which will not be capable of operating in a contested/non-permissive environment. Space-based GMTI will provide another way to harness data from the space domain and incorporate it into the secure cloud environment underpinning the ABMS to sense, make sense, and act faster than our adversaries. The Department of the Air Force will maximize use of mature commercial technologies in order to accelerate the acquisition timeline and meet the GMTI needs of the warfighter.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Moving Target Indicator	-	0.000	0.450	0.000	0.450
Description: Moving Target Indicator ***FY 2023 Plans:*** N/A ***FY 2024 Base Plans:*** New start for FY24. In FY24, the Moving Target Indicator project will leverage relationship with NRO partner to develop and field GMTI system. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	-	0.000	0.450	0.000	0.450

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203154SF / *Long Range Kill Chains*	**Project (Number/Name)** 671112 / *Moving Target Indicator*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

USSF, partnered with NRO will define roles and responsibilities within Title 10 and Title 50 constraints. USSF will be working with the other services and IC to understand the Joint tactical-level ISR and warfighting/targeting requirements and the best way to meet those requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203154SF / *Long Range Kill Chains*	Project (Number/Name) 671112 / *Moving Target Indicator*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
MTI	TBD	Various : Various	-	-		-		0.300		-		0.300	Continuing	Continuing	-
		Subtotal	-	-		-		0.300		-		0.300	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	TBD	Various : Various	-	-		-		0.050		-		0.050	Continuing	Continuing	-
A&AS	TBD	Various : Various	-	-		-		0.050		-		0.050	Continuing	Continuing	-
Other Support	TBD	Various : Various	-	-		-		0.050		-		0.050	Continuing	Continuing	-
		Subtotal	-	-		-		0.150		-		0.150	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		0.450		-		0.450	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203154SF / *Long Range Kill Chains*	**Project (Number/Name)** 671112 / *Moving Target Indicator*

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
Moving Target Indicator																												
Dev & Field MTI																												

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203154SF / *Long Range Kill Chains*	**Project (Number/Name)** 671112 / *Moving Target Indicator*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Moving Target Indicator				
Dev & Field MTI	1	2024	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203154SF / *Long Range Kill Chains*	Project (Number/Name) 671113 / *Auxiliary Payloads*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
671113: *Auxiliary Payloads*	-	0.000	0.000	242.586	0.000	242.586	242.856	243.095	243.332	243.568	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 1203154SF, project , Auxiliary Payloads, is a new start.

A. Mission Description and Budget Item Justification

The space-based GMTI system will replace a portion of the aging E-8C JSTARS sensing capability, based upon the Space Warfighting Analysis Center's (SWAC's) analysis of alternatives assessment completed in September 2022. Proper funding is critical to ensure this system is in place to support the warfighter before all of the JSTARS aircraft retire. GMTI is not a one-for-one swap for the aging E-8 JSTARS that is about to retire, but rather an evolved weapon system that serves as the next generation moving target indicator for the warfighter. GMTI will be critical to tracking surface targets in Competition, Crisis, and Conflict environments. This will be accomplished from space, instead of from JSTARS aircraft which will not be capable of operating in a contested/non-permissive environment. Space-based GMTI will provide another way to harness data from the space domain and incorporate it into the secure cloud environment underpinning the ABMS to sense, make sense, and act faster than our adversaries. The Department of the Air Force will maximize use of mature commercial technologies in order to accelerate the acquisition timeline and meet the GMTI needs of the warfighter.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Auxiliary Payloads	-	0.000	242.586	0.000	242.586
Description: Auxiliary Payloads ***FY 2023 Plans:*** N/A ***FY 2024 Base Plans:*** New start for FY24. In FY24, the Auxiliary Payloads project will leverage relationship with NRO partner to develop and field GMTI system. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	-	0.000	242.586	0.000	242.586

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203154SF / *Long Range Kill Chains*	**Project (Number/Name)** 671113 / *Auxiliary Payloads*

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

USSF, partnered with NRO will define roles and responsibilities within Title 10 and Title 50 constraints. USSF will be working with the other services and IC to understand the Joint tactical-level ISR and warfighting/targeting requirements and the best way to meet those requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203154SF / *Long Range Kill Chains*	Project (Number/Name) 671113 / *Auxiliary Payloads*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Aux Payload	TBD	Various : Various	-	-		-		239.586		-		239.586	Continuing	Continuing	-
		Subtotal	-	-		-		239.586		-		239.586	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	TBD	Various : Various	-	-		-		1.000		-		1.000	Continuing	Continuing	-
A&AS	TBD	Various : Various	-	-		-		1.000		-		1.000	Continuing	Continuing	-
Other Support	TBD	Various : Various	-	-		-		1.000		-		1.000	Continuing	Continuing	-
		Subtotal	-	-		-		3.000		-		3.000	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		242.586		-		242.586	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203154SF / *Long Range Kill Chains*	**Project (Number/Name)** 671113 / *Auxiliary Payloads*

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
Auxiliary Payload																												
Dev & field Aux PL									[redacted]																			

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203154SF / *Long Range Kill Chains*	**Project (Number/Name)** 671113 / *Auxiliary Payloads*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Auxiliary Payload				
Dev & field Aux PL	1	2024	4	2024

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203165SF *I NAVSTAR Global Positioning System (Space and Control Segments)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	1.900	1.062	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.962
67A025: *GPS Enterprise Integrator*	-	1.900	1.062	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	2.962
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2023, Project Number: 67A025, Project Title: GPS Enterprise Integrator, will be completed.

A. Mission Description and Budget Item Justification

Detailed information on this effort remains classified and will be provided on a need-to-know basis. Effort ends in FY 2023.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. The Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program may include necessary civilian pay expenses required to manage, execute, and deliver NAVSTAR weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203165SF *I NAVSTAR Global Positioning System (Space and Control Segments)*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	1.966	2.062	0.000	0.000	0.000
Current President's Budget	1.900	1.062	0.000	0.000	0.000
Total Adjustments	-0.066	-1.000	0.000	0.000	0.000
• Congressional General Reductions	0.000	-1.000			
• 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	-0.066	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

In FY 2023, Project Number: 67A025, Project Title: GPS Enterprise Integrator, will be completed.

FY 2023: -$1.0M Congressional General Reduction FFRDC Redux Sec 8026(e)

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Classified Effort	1.900	1.062	-
Description: Implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 Plans:*** Classified effort. Effort ends in FY 2023. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2024 decreased due to completion of classified effort.			
Accomplishments/Planned Programs Subtotals	1.900	1.062	-

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203165SF *I NAVSTAR Global Positioning System (Space and Control Segments)*

E. Acquisition Strategy

N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203165SF / *NAVSTAR Global Positioning System (Space and Control Segments)*	Project (Number/Name) 67A025 / *GPS Enterprise Integrator*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Classified Effort	Various	Various : Various	-	1.900		1.062		-		-		-	0.000	2.962	-
		Subtotal	-	1.900		1.062		-		-		-	0.000	2.962	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.900		1.062		-		-		-	0.000	2.962	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203165SF / *NAVSTAR Global Positioning System (Space and Control Segments)*	**Project (Number/Name)** 67A025 / *GPS Enterprise Integrator*

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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
NAVSTAR Global Positioning System (Space and Control Segments)																												
Classified Effort	[redacted]																											

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203165SF / *NAVSTAR Global Positioning System (Space and Control Segments)*	**Project (Number/Name)** 67A025 / *GPS Enterprise Integrator*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
NAVSTAR Global Positioning System (Space and Control Segments)				
Classified Effort	1	2022	4	2023

Note

Classified effort; details will be provided on a need-to-know basis.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203173SF / *Space and Missile Test and Evaluation Center*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	1.651	4.157	22.039	0.000	22.039	22.408	22.893	23.088	23.642	Continuing	Continuing
67A014: *R&D Space & Missile Operations*	-	1.651	4.157	22.039	0.000	22.039	22.408	22.893	23.088	23.642	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Research and Development Space and Missile Operations (RDSMO) program, executed by the Acquisition Delta - Innovation and Prototyping, Space Systems Command at Kirtland Air Force Base (KAFB), NM, conducts Space Vehicle and Ground technology transition, prototype development, Developmental Test and Evaluation (DT&E) and Initial Operational Test and Evaluation (IOT&E). RDSMO develops and evaluates ground systems for prototype experimental, demonstration, and operational satellites within the RDT&E Support Complex (RSC) at KAFB, NM and at Schriever Space Force Base (SSFB), CO. Additionally, this program augments the Space Force Satellite Control Network (SCN) with the Mobile Range Flight (MRF) while prototyping new antenna systems and networking technologies worldwide. 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) for existing experimental and prototype missions. RDSMO develops, acquires, delivers integrates, tests and operates new tactical space C2 architectures from ground stations (including government, commercial, and a local Kirtland station) through their networks to the RSC. RDSMO then ensures users receive the highest quality data at the required latency in support of USSF, Department of Defense (DoD), and other government mission partners. This program also leads the transfer of approved on-orbit missions to operational command organizations such as Space Operations Command. It performs prototype and technology evaluation for multiple USSF missions to include the Enterprise Ground Services, Space Domain Awareness missions, and other mission areas as required.

The objective of the RDSMO Program is to innovate, prototype, and evaluate USSF ground systems to support USSF, DoD, and other government mission partners while speeding transition of war winning capabilities. The program is centered at the RSC in KAFB, but is developing, testing and evaluating architectures with distributed cloud based operations, integration in existing and future USSF data distribution networks as well as evaluating resiliency and availability to meet future warfighter needs. RDSMO develops and integrates new space technologies to maximize operator usability, such as refining software operator interfaces and developing and evaluating novel TTP. The RDSMO program provides beneficial ground and space vehicle technology directly to the warfighting organizations, for continued experimentation or operations. RDSMO uses a combination of standard hardware and software to:

(1) perform satellite C2 in support of launch and on-orbit requirements;
(2) develop tactics, techniques, and procedures to conduct satellite operations;
(3) provide a satellite C2 incremental or revolutionary (as required) ground resource for RDT&E of new satellite and C2 systems and concepts;
(4) deliver operational flexibility for new and legacy satellite missions designed to out-pace adversary on-orbit systems;.
(5) maximize flexible satellite operations to support multi-mission prototype operations to move to Cloud-based systems;
(6) explore and implement innovative ground automation, C2, and data dissemination in concert with experimental, demonstration and prototype space missions;

(7) ensure a stable and reliable C2 and ground baseline as necessary for experiment and prototype space missions;
(8) provide an environment to mature technology for developmental satellites and payloads; and
(9) transition and provide best practices for satellites and ground systems to operational squadrons if necessary

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC 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 RDSMO weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	1.699	4.157	4.237	0.000	4.237
Current President's Budget	1.651	4.157	22.039	0.000	22.039
Total Adjustments	-0.048	0.000	17.802	0.000	17.802
• 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	-0.048	0.000			
• Other Adjustments	0.000	0.000	17.802	0.000	17.802

Change Summary Explanation

FY2022: -0.048M SBIR reduction.

FY 2024: +17.830M for evolution of the Ground Services Architecture (GSA) toward a more cloud-based operations posture and to continue to advance experiment and prototype operations; and inflation adjustment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203173SF *I Space and Missile Test and Evaluation Center*

FY 2024: -0.028M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: MMSOC Development	1.651	4.157	4.640

Description: Evolution of the Ground Services Architecture (GSA) through the 'on-premises' hardware-based 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, on-premises cloud computing, multi-security level operations, and enhanced ground entry points for prototype-operations. This primarily includes development and evaluation of local hardware solutions as required for space experiment and prototype requirements including both security, resiliency and availability where other cloud-based solutions will not work.

FY 2023 Plans:
Develop MMSOC XPro full cybersecurity-compliance (Public Key Infrastructure (PKI), 2 Factor Authentication, out of band management) and implement a vital capability to host 30 Service, DoD, and Interagency R&D missions with a goal to host all missions at a common classification level. If necessary, develop a separate enclave that provides data separation, encryption and logical segregation, with minimal hardware separation. Designs improve the operation of existing and planned prototype missions that will inform new acquisitions and improve MMSOC's cybersecure posture.

Develop automated mission planning tools to decrease the requirement for additional manpower to fly the satellites, thereby decreasing the total cost to operate the 30 satellite missions.

Develop and deliver ground solutions and support for prototype, demonstration, and experimental missions, including but not limited to: the Long Duration Propulsive Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adaptor (ESPA) [LDPE] LDPE-1, LDPE-2, and LDPE-3A missions, subsequent ROOSTER and Tetra missions, the Air Force Vanguard Navigation Technology Satellite-3 (NTS-3), and the two Quasi-Zenith Satellite System (QZSS) payloads hosted on Japanese satellites. As part of this, develop Tactics, Techniques & Procedures (TTPs) for next generation USSF satellites.

Continue integrating the prototype operations center with EGS development, to include but not limited to developing the EGS Risk Reduction & Integration Plan for each prototype mission.

Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc.

FY 2024 Plans:

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203173SF *I Space and Missile Test and Evaluation Center*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue to evolve hardware, "on-premises" based MMSOC XPro architectures for full cybersecurity-compliance (PKI, 2 Factor Authentication, out of band management) and ensure reliable and resilient development and evaluation to meet "on-premises" requirements. Continue to investigate then develop a separate enclave that provides data separation, encryption and logical segregation, with minimal hardware separation as required by the experiment and prototype space mission needs. Continue to improve the operation of existing and planned prototype missions that will inform new acquisitions and improve USSF's ground systems transition for the most cyber-secure posture possible. Begin to develop cyber resiliency strategies and evaluate effects and trades between "on-premises" vs cloud-based architectures. Partner with AFRL and others to speed technology transition of ground system capabilities from experimental to prototype phases. Continue to develop and deliver ground solutions and support for prototype, demonstration, and experimental missions, including but not limited to the LDPE-1 and LDPE-2 missions. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 due to evaluation of "on-premises" vs cloud-based architectures and transitioning ground system capabilities from experimental to prototype phases.			
Title: Cloud-Enabled Ground System Development ***Description:*** This effort continues and expands evolution of the Ground Services Architecture (GSA) effort as captured in previous fiscal years in the MMSOC Development Major Thrust. Develop, integrate, operate, test and evaluate cloud-based space C2 capability that will transform the RSC into a more modular solution for space prototype missions, by enabling the handling and distributing mission data at multiple security levels, resolving a current capability gap on payload mission data. Primary goals of this effort will be to measure cost effectiveness, reliability, cyber resiliency, and mission effectiveness for upcoming technology transitions. Coordinating with mission partners and AFRL to ensure technology transition evaluation is performed as efficiently as possible. Fully transition existing and future space experiment and prototype missions to an off-premises architecture while ensuring minimal risk to space mission support. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:***	0.000	0.000	9.099

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203173SF / *Space and Missile Test and Evaluation Center*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Begin to develop, field, and evaluate cloud-based space mission operations using commercially available architectures to increase system reliability, data distribution, and decrease system life cycle costs for future missions consistent with the GSA. Begin to prototype and demonstrate a modernized cloud-based off-premise GSA solution and follow-on EGS capabilities, to include critical technology maturation of new mission on-boarding solutions, the stand-up of integration and test environments, enabling of data distribution at multiple security levels, transition to a cloud service provider, and stand-up of shared EGS services into a combined GSA and EGS architecture. Develop, integrate and evaluate trades and implementations between hybrid (on-premises and cloud-based solutions) to determine the most cost- and mission-effective optimization. Continue integrating the prototype operations center with EGS development, including developing the EGS Risk Reduction & Integration Plan for each prototype mission. Continue to develop and deliver ground solutions and support for prototype, demonstration, and experimental missions, including but not limited to the LDPE-3A mission and subsequent ROOSTER and Tetra (Tetra 3, 4, & 5) missions. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 due to continued evolution of the GSA with an emphasis on cloud-based space mission operations.			
Title: Prototype Baseline Support ***Description:*** This effort continues and expands development of automated mission planning tools, data distribution and dissemination, and cyber defense effort as captured in previous fiscal years in the MMSOC Development Major Thrust. Purchase hardware and software as needed to maintain and advance experiment and prototype operations including: mission planning, ground equipment configuration, real-time satellite commanding, telemetry processing, mission data & cyber-defense. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** Continue to develop automated mission planning tools to decrease the requirement for additional manpower to fly the satellites, thereby decreasing the total cost to operate the anticipated 20+ experimental and prototype satellite missions. Use Federally-Funded Research and Development Contractor (FFRDC), Systems Engineering and Technical Assistance (SETA), and/or University Affiliated Research Center support to develop and evaluate TTP procedures across on- and off-premise systems.	0.000	0.000	8.300

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203173SF *I Space and Missile Test and Evaluation Center*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Monitor, develop, and mitigate cyber risks. Ensure cyber accreditations to receive approval to operate (ATO), and coordinate cyber-defense capabilities. Develop and integrate ground antenna system capabilities for USSF mission needs. Update and include full networked integration of KAFB antenna assets, enhance needs for energy sustainability and portability of ground system support, and develop, integrate and evaluate cost-effective sustainment methodologies for hardware based systems. Continue to develop and deliver ground solutions and support for prototype, demonstration, and experimental missions, including but not limited to: the Air Force Vanguard Navigation Technology Satellite-3 (NTS-3), and the two QZSS payloads hosted on Japanese satellites. As part of this, develop TTPs for next generation USSF satellites. Provide for necessary infrastructure needs to perform system operations and continue evolution of system capabilities both for off- and on-premise architectures. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased compared to FY 2023 to advance experiment and prototype operations including: mission planning, ground equipment configuration, real-time satellite commanding, telemetry processing, mission data & cyber-defense, and ground antenna system capabilities for USSF mission needs.			
Accomplishments/Planned Programs Subtotals	1.651	4.157	22.039

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPAF 01 GNRLIT: *General Information Tech - Space*	1.938	2.046	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	3.984

Remarks

Beginning in FY 2024, RDSMO transferred funds from Procurement, Space Force (PSF), General Information Tech - Space (GNRLIT) to RDT&E PE 1203173SF, Space and Missile Test and Evaluation Center, Project R&D Space & Missile Operations (RDSMO).

E. Acquisition Strategy

RDSMO will continue to use the competitively awarded Engineering, Development, Integration, and Sustainment (EDIS) contract (awarded Feb 2020) to support MMSOC, RSC, MRF, and EGS activities. RDSMO will use the competitively awarded Prototype Operations (POPS)-I contract (awarded May 2022). RDSMO will use existing mission partner contracts to leverage cost savings or technological efficiencies, including EGS contracts, partnerships with AFRL (including UARC support), and

other mission partners. Acquisition strategies will be developed to determine the need for additional contracts to meet the full system requirements, and new contracts may be required as development plans evolve. Additionally, RDSMO uses an SSC Advisory & Assistance Support (A&AS) contract and a SSC Systems Engineering and Technical Assistance (SETA) contract, as well as Federally-Funded Research and Development Contractor (FFRDC) support through Aerospace.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203173SF / *Space and Missile Test and Evaluation Center*	**Project (Number/Name)** 67A014 / *R&D Space & Missile Operations*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Ground Services R&D Engineering, Development, Integration, and Test	C/CPAF	SAIC : Albuquerque, NM	-	0.749	Apr 2022	2.012	Nov 2022	9.316	Nov 2023	-		9.316	Continuing	Continuing	-
Naval Research Lab (NRL)	C/CPAF	Not specified. : TBD	-	0.300	Apr 2022	-		0.000		-		0.000	Continuing	Continuing	-
EGS and Mission Partner Contracts	Various	TBD : TBD	-	-		-		1.425	Feb 2024	-		1.425	Continuing	Continuing	-
UARC - Space & Nuclear Advanced Prototypes/ Experiments/Tech Contract (through AFRL)	SS/CPFF	Space Dynamics Laboratory : Logan, UT	-	-		-		3.380	Feb 2024	-		3.380	Continuing	Continuing	-
SBIR/STTR	Various	Not specified. : TBD	-	-		-		0.681	Mar 2024	-		0.681	Continuing	Continuing	-
		Subtotal	-	1.049		2.012		14.802		-		14.802	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Test and Engineering Contract (STEC)	C/CPFF	Linquest : Kirtland AFB, NM	-	0.381	Dec 2021	-		-		-		-	Continuing	Continuing	-
Prototype Operations-I (POPS-I)	C/CPFF	a.i. solutions, Inc. : Kirtland AFB, NM	-	0.187	May 2022	1.453	Oct 2022	1.007	May 2024	-		1.007	Continuing	Continuing	-
		Subtotal	-	0.568		1.453		1.007		-		1.007	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS - STS-III	C/FFP	MEI : Los Angeles, CA	-	0.034	Apr 2022	0.692	Nov 2022	0.400		-		0.400	Continuing	Continuing	-
A&AS - SAFS-II	C/FFP	Tecolote : Kirtland AFB, NM	-	-		-		1.327		-		1.327	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203173SF / *Space and Missile Test and Evaluation Center*	**Project (Number/Name)** 67A014 / *R&D Space & Missile Operations*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC - Aerospace	RO	Aerospace : Los Angeles, CA	-	0.000	Oct 2021	-		3.347	Oct 2023	-		3.347	Continuing	Continuing	-
Other	TBD	Not specified. : TBD	-	-		-		1.156	Oct 2023	-		1.156	Continuing	Continuing	-
		Subtotal	-	0.034		0.692		6.230		-		6.230	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.651		4.157		22.039		-		22.039	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203173SF / *Space and Missile Test and Evaluation Center*	**Project (Number/Name)** 67A014 / *R&D Space & Missile Operations*

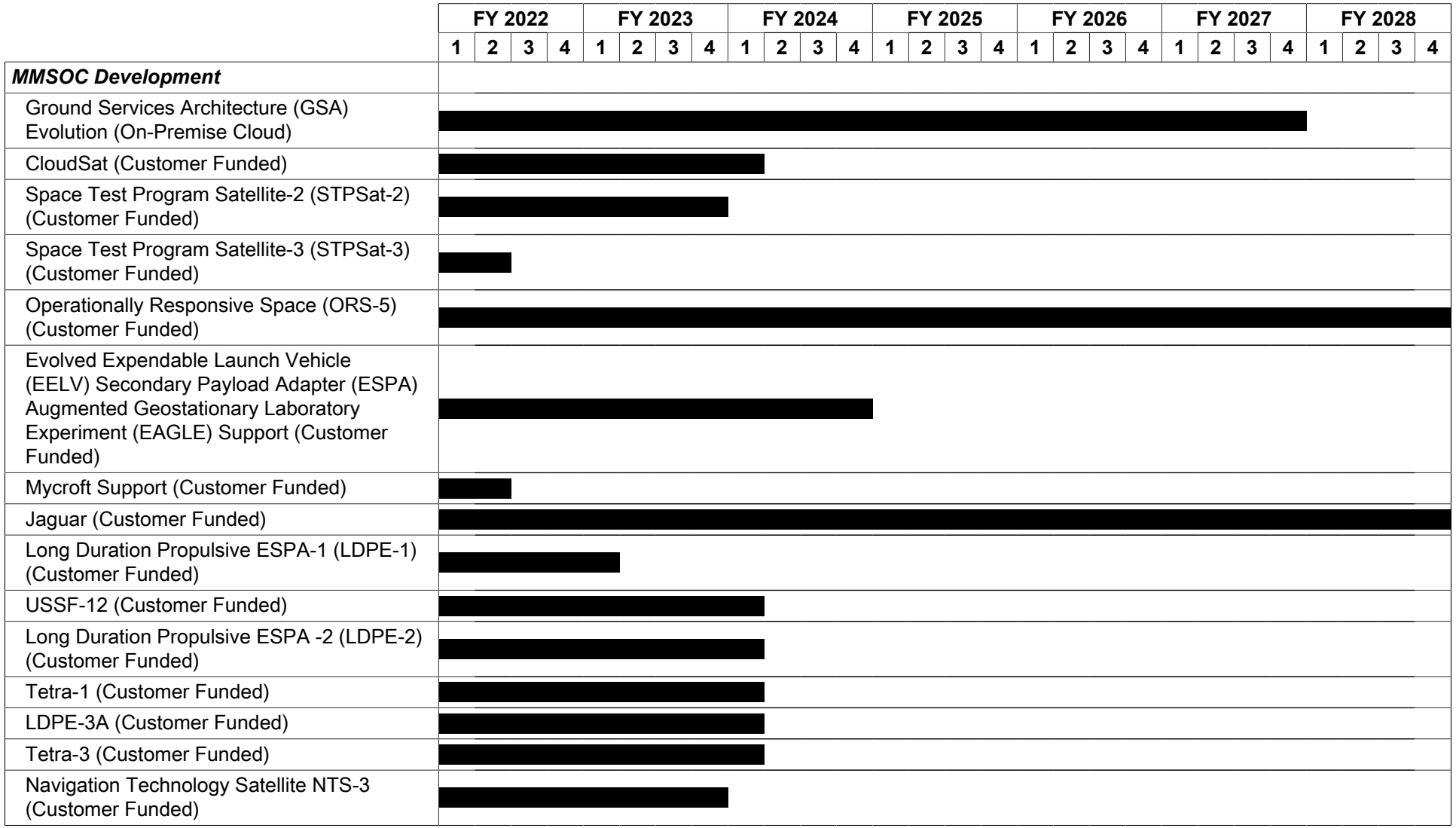

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203173SF / *Space and Missile Test and Evaluation Center*	**Project (Number/Name)** 67A014 / *R&D Space & Missile Operations*

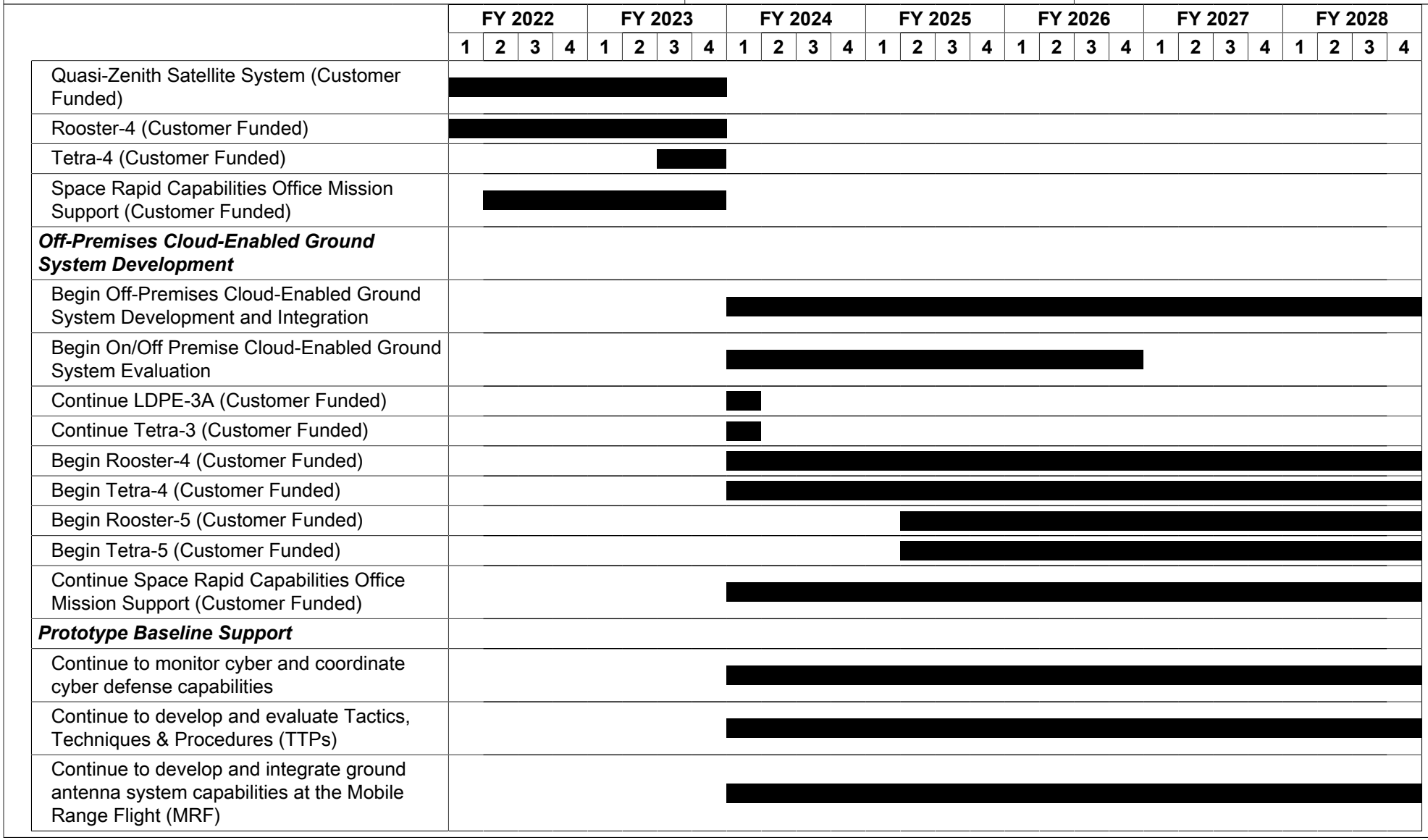

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203173SF / *Space and Missile Test and Evaluation Center*	**Project (Number/Name)** 67A014 / *R&D Space & Missile Operations*

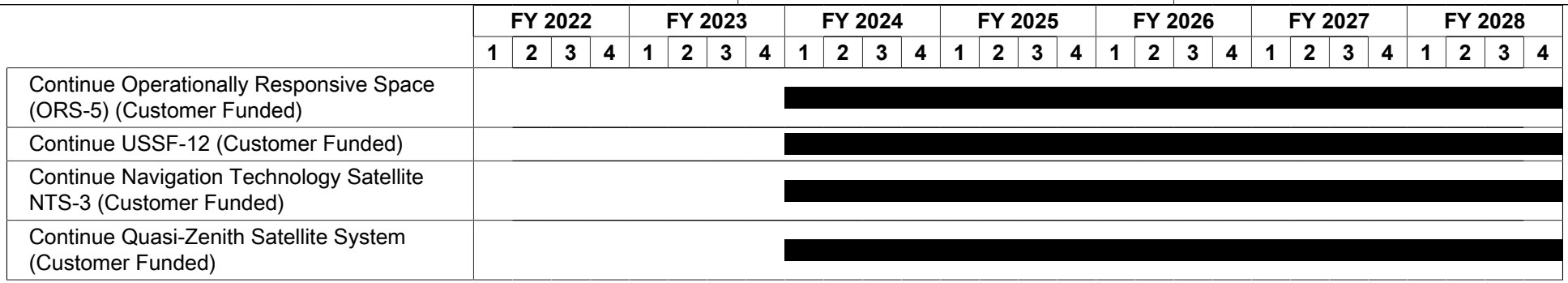

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203173SF / *Space and Missile Test and Evaluation Center*	**Project (Number/Name)** 67A014 / *R&D Space & Missile Operations*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MMSOC Development				
Ground Services Architecture (GSA) Evolution (On-Premise Cloud)	1	2022	4	2027
CloudSat (Customer Funded)	1	2022	1	2024
Space Test Program Satellite-2 (STPSat-2) (Customer Funded)	1	2022	4	2023
Space Test Program Satellite-3 (STPSat-3) (Customer Funded)	1	2022	2	2022
Operationally Responsive Space (ORS-5) (Customer Funded)	1	2022	4	2028
Evolved Expendable Launch Vehicle (EELV) Secondary Payload Adapter (ESPA) Augmented Geostationary Laboratory Experiment (EAGLE) Support (Customer Funded)	1	2022	4	2024
Mycroft Support (Customer Funded)	1	2022	2	2022
Jaguar (Customer Funded)	1	2022	4	2028
Long Duration Propulsive ESPA-1 (LDPE-1) (Customer Funded)	1	2022	1	2023
USSF-12 (Customer Funded)	1	2022	1	2024
Long Duration Propulsive ESPA -2 (LDPE-2) (Customer Funded)	1	2022	1	2024
Tetra-1 (Customer Funded)	1	2022	1	2024
LDPE-3A (Customer Funded)	1	2022	1	2024
Tetra-3 (Customer Funded)	1	2022	1	2024
Navigation Technology Satellite NTS-3 (Customer Funded)	1	2022	4	2023
Quasi-Zenith Satellite System (Customer Funded)	1	2022	4	2023
Rooster-4 (Customer Funded)	1	2022	4	2023
Tetra-4 (Customer Funded)	3	2023	4	2023
Space Rapid Capabilities Office Mission Support (Customer Funded)	2	2022	4	2023
Off-Premises Cloud-Enabled Ground System Development				

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203173SF / *Space and Missile Test and Evaluation Center*	**Project (Number/Name)** 67A014 / *R&D Space & Missile Operations*

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Begin Off-Premises Cloud-Enabled Ground System Development and Integration	1	2024	4	2028
Begin On/Off Premise Cloud-Enabled Ground System Evaluation	1	2024	4	2026
Continue LDPE-3A (Customer Funded)	1	2024	1	2024
Continue Tetra-3 (Customer Funded)	1	2024	1	2024
Begin Rooster-4 (Customer Funded)	1	2024	4	2028
Begin Tetra-4 (Customer Funded)	1	2024	4	2028
Begin Rooster-5 (Customer Funded)	2	2025	4	2028
Begin Tetra-5 (Customer Funded)	2	2025	4	2028
Continue Space Rapid Capabilities Office Mission Support (Customer Funded)	1	2024	4	2028
Prototype Baseline Support				
Continue to monitor cyber and coordinate cyber defense capabilities	1	2024	4	2028
Continue to develop and evaluate Tactics, Techniques & Procedures (TTPs)	1	2024	4	2028
Continue to develop and integrate ground antenna system capabilities at the Mobile Range Flight (MRF)	1	2024	4	2028
Continue Operationally Responsive Space (ORS-5) (Customer Funded)	1	2024	4	2028
Continue USSF-12 (Customer Funded)	1	2024	4	2028
Continue Navigation Technology Satellite NTS-3 (Customer Funded)	1	2024	4	2028
Continue Quasi-Zenith Satellite System (Customer Funded)	1	2024	4	2028

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	17.432	45.203	41.483	0.000	41.483	48.815	40.262	41.090	42.573	Continuing	Continuing
674671: *Enterprise Training Services Development*	-	0.000	0.000	31.670	0.000	31.670	38.798	30.007	30.619	31.725	Continuing	Continuing
67A011: *Space Analysis and Application Development*	-	17.432	45.203	9.813	0.000	9.813	10.017	10.255	10.471	10.848	Continuing	Continuing

Note

In FY 2024, the Enterprise Training Services Development funding and activities transferred from Project 67A011, Space Analysis and Application Development to Project 674671, Enterprise Training Services Development in order to segregate Training Services under the Space Force.

A. Mission Description and Budget Item Justification

The Space Innovation, Integration, and Rapid Technology Development (SIIRTD) delivers enterprise capabilities and solutions to maintain space domain superiority in an evolving environment. Enterprise Training Services Development delivers enterprise space training capabilities via a system-of-systems architecture. This architecture includes collaborative systems / platforms, networks, modeling and simulation tools, and training services necessary for a full spectrum of interoperable, on-demand, multi-mission training capabilities to meet USSF and mission partner requirements. Development activities include planning, designing, building, and fielding new and enhanced systems / tools into the overall architecture to ensure USSF enterprise readiness to fight in any scenario.

The SIIRTD program also develops and modifies modeling and simulation tools that USSF/Space Operations Command's Space Warfighting Analysis Center (SWAC) 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. SIIRTD projects continuously evaluate ways to increase innovation and resiliency to counter known and emerging threats through: technology risk reduction efforts; integrating new capabilities and / or repurpose existing capabilities; implementing enterprise decision-making tools/experimentation/rapid prototyping; and fielding enterprise solutions via all appropriate acquisition authorities and contract mechanisms. Its innovation, education, and training activities foster solutions to operational deficiencies and enhance the integration of space systems, enabling USSF and joint warfighters to realize the full potential of existing and planned space 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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force					Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*			R-1 Program Element (Number/Name) PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*		
B. Program Change Summary ($ in Millions)	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**
Previous President's Budget	18.054	38.103	49.222	0.000	49.222
Current President's Budget	17.432	45.203	41.483	0.000	41.483
Total Adjustments	-0.622	7.100	-7.739	0.000	-7.739
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	7.200			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.622	0.000			
• Other Adjustments	0.000	-0.100	-7.739	0.000	-7.739

Change Summary Explanation

FY 2022: -$0.622M SBIR adjustment.

FY2023: +$7.2M Congressional Add for operational test and training infrastructure - fully fund standard space training for current and emerging missions. -$0.100M FFRDC reduction.

FY 2024: -$0.259M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity. The FY 2024 funding request was reduced by $7.701M to account for the availability of prior year execution balances.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	Project (Number/Name) 674671 / *Enterprise Training Services Development*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
674671: *Enterprise Training Services Development*	-	0.000	0.000	31.670	0.000	31.670	38.798	30.007	30.619	31.725	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2024, the Enterprise Training Services Development funding and activities transferred from Project 67A011, Space Analysis and Application Development to Project 673671, Enterprise Training Services Development in order to segregate Training Services under the Space Force. Enterprise Training Services Development (ETSD) delivers essential warfighting readiness and Guardian space education capabilities across Deltas 1 (Training), 2 (Space Domain Awareness), 3 (Space Electronic Warfare), 4 (Missile Warning), 5 (Command and Control), 8 (Satellite Communications & Navigational Warfare), 9 (Orbital Warfare), and 13 (Education); Missile Defense Agency (MDA); US Strategic Command (STRATCOM); National Space Defense Center (NSDC); US Air Force Academy (USAFA); and National Security Space Institute (NSSI). Capabilities meet USSF Operation Test & Training Infrastructure (OTTI) requirements and include: Unit-level Training (UT) for mission operator qualification; Advanced Training (AT) for threat-driven tactics development; interoperable exercise services, including connectivity to Distributed Mission Operations - Space (DMO-S) training networks and Modeling and Simulation (M&S) tools integration; and Guardian space education. ETSD provides interoperable, evolvable, scalable, resilient, 24/7 on-demand, cost-effective platforms and environments to ensure warfighter readiness to operate in a Contested, Degraded, and Operationally limited (CDO) domain.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Enterprise Training Services Development	-	-	31.670	0.000	31.670
Description: Enterprise Training Services Development (ETSD) delivers essential warfighting readiness and Guardian space education capabilities to operational Deltas and USSF mission partners. ETSD will continue to deliver realistic, high-fidelity space training platforms and architectures to enable UT and AT capabilities; threat-driven simulations for AT and wargaming; and virtual environments and tools for interoperable, multi-mission training, exercises, and wargaming in realistic, contested conditions. ***FY 2024 Base Plans:*** Continue to develop and deliver UT/AT systems and capabilities for Space Domain Awareness (Delta 4, Upgraded Early Warning Radar); Electronic Warfare (Delta 2, Space Fence and Eglin Radar); and Orbital Warfare (Delta 9, 1st Space Operations Squadron); required to assure operational readiness and integrate these missions for interoperable, virtual warfighting exercises. Continue transition from DMO-S to Virtual Space Training and Exercise Environment (VSTEE). Continue efforts to develop and integrate UT/AT systems and capabilities and M&S tools into VSTEE; required for enterprise-wide, interoperable, threat-based training,					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	**Project (Number/Name)** 674671 / *Enterprise Training Services Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
exercises, and tactics development to 'train like you fight' in a CDO space domain. Modernize UT/AT system hardware; required for the Virtual Space Training Exercise Environment (VSTEE) integration and capability availability. Continue implementing training system resiliency and situational awareness; required to assure training and exercise continuity in a CDO environment. Efforts may include, but are not limited to, program office support, studies, technical analyses, experimentation, prototyping, etc. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY24 increase driven by planned VSTEE maturation and integration tasks, which include transition from DMO-S, M&S tool development and integration, and mission UT/AT capabilities integration.					
Accomplishments/Planned Programs Subtotals	-	-	31.670	0.000	31.670

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

All contracts in this program element will be awarded using competitive procedures to the maximum extent possible, to upgrade existing capabilities as well as to acquire next generation capabilities through incremental development.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	Project (Number/Name) 674671 / *Enterprise Training Services Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Enterprise Space Training Development	C/CPAF	Various : TBD	-	-		-		30.568	Jan 2024	-		30.568	Continuing	Continuing	-
SBIR/STTR	Allot	TBD : TBD	-	-		-		1.102	Oct 2023	-		1.102	Continuing	Continuing	-
		Subtotal	-	-		-		31.670		-		31.670	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		-		31.670		-		31.670	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	**Project (Number/Name)** 674671 / *Enterprise Training Services Development*

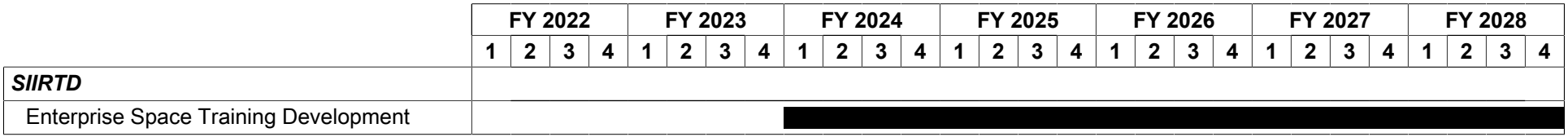

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	**Project (Number/Name)** 674671 / *Enterprise Training Services Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SIIRTD				
Enterprise Space Training Development	1	2024	4	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	Project (Number/Name) 67A011 / *Space Analysis and Application Development*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
67A011: *Space Analysis and Application Development*	-	17.432	45.203	9.813	0.000	9.813	10.017	10.255	10.471	10.848	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Located at Peterson SFB, Colorado, the Space Innovation, Integration and Rapid Technology Development (SIIRTD) program develops and modifies modeling and simulation tools that USSF/Space Operations 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. The Space Training Simulators team develops and upgrades space training emulators such as the Standard Space Trainer (SST) to meet Space Mission Force (SMF) threat-based, advanced training requirements. Finally, its innovation, education, and training activities foster solutions to operational deficiencies and enhance the integration of space systems into Space Force operations, thereby enabling service and joint warfighters to realize the full potential of existing and planned space capabilities.

Programs and projects in the space warfighting enterprise are evaluating ways to increase innovation and resiliency to known and emerging threats. Space enterprise efforts aim to execute technology risk reduction efforts, integrate new capabilities or repurpose existing capabilities, implement enterprise decision-making tools/ experimentation/rapid prototyping and fielding via all appropriate acquisition authorities and contract mechanisms.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Model/Tool Development and Capability Upgrades	5.615	9.581	9.813	-	9.813
Description: Develops, verifies, and validates models for space mission areas and modifies existing models to portray new capabilities that meet senior leader intent. Advancing Modeling & Simulation (M&S) tools to provide space linkages and impacts to the warfighter as constellations are degraded in a contested environment and 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 USSF Field Commands.					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	**Project (Number/Name)** 67A011 / *Space Analysis and Application Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
FY 2023 Plans: Continue supporting the SpOC field command to develop assessment strategies to assist with deliberate and contingency planning analyzing force structure for the USSF. Also, the funds will support space capability development and space systems delivery as well as strengthen the commander's "fight tonight" strategy with quick-turn senior leader ops assessment. Provides senior leaders with strategic and operational level analysis - converting data into decision quality information. Specifically, funds support for: • Support Commander (CC) management (mgt) Headquarters (HQ) and Space Forces Forward (SFFOR) (Operation Order (OPORD direction)) missions; force status to COMSPACEFOR and CDR USSPACECOM • Identifies Space Force "fight tonight" risk in multi-domain warfight using specific scenarios and campaign plans • Developing SpOC and delta metrics as inputs to ops assessments • Campaign modeling initiative response to VCSO "go do"; ensure DoD accurately representing space ***FY 2024 Base Plans:*** Continue supporting the SpOC field command to develop assessment strategies to assist with deliberate and contingency planning analyzing force structure for the USSF. Also, the funds will support space capability development and space systems delivery as well as strengthen the commander's "fight tonight" strategy with quick-turn senior leader ops assessment. Provides senior leaders with strategic and operational level analysis - converting data into decision quality information. Specifically, funds will support: • Support Commander (CC) management (mgt) Headquarters (HQ) and Space Forces Forward (SFFOR) (Operation Order (OPORD direction)) missions; force status to COMSPACEFOR and CDR USSPACECOM • Identifies Space Force "fight tonight" risk in multi-domain warfight using specific scenarios and campaign plans • Developing SpOC and delta metrics as inputs to ops assessments • Campaign modeling initiative response to VCSO "go do"; ensure DoD accurately representing space • Explore and develop AI/ML applications to meet space mission requirements (e.g. Conjunction assessment, satellite maneuver pattern of life) • Develop space analysis tools to improve enterprise accuracy/ efficiency • Reinforce SDA community decisions with comprehensive studies and analysis • Present digital operations to CSO ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Increase due to inflation adjustment.					
Title: Standard Space Trainer Development	11.817	35.622	0.000	-	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	**Project (Number/Name)** 67A011 / *Space Analysis and Application Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Description: In FY2024, "Standard Space Trainer Development (SST)" effort title will be changed to "Enterprise Training Services Development" to accurately capture the larger overall mission and activity set. This is not a new start. Develop, evolve, and enhance space training capabilities to meet USSF Operation Test & Training Infrastructure (OTTI) requirements, including: Unit-level Training (UT); threat-based Advanced Training (AT); and interoperable exercise services, including connectivity to Distributed Mission Operations - Space (DMO-S) training networks and Modeling and Simulation (M&S) tools integration. Plan and execute efforts in accordance with USAF Operational Training Infrastructure (OTI) Flight Plan and STRATCOM Integrated Priority List (IPL) priorities. ***FY 2023 Plans:*** Accelerate completion of SST development for Bounty Hunter SST, PARCS SST development, and SBIRS AT capabilities. Continue development of SST functionality for Space C2, IROC SSTs at Eglin AFB, Space Domain Awareness (SDA) and Orbital Warfare (OW) missions as well as SST Architecture modernization. Begin development of AT capabilities across the USSF portfolio as well as MILSATCOM SSTs to support new Delta 8 units. Continue ongoing enterprise M&S development for Blue/White/Red consoles and begin transition from the DMO-S to the Virtual Space Range (VSR). Continue developing SST into an advanced/warfighter training capability. Incorporating SSTs into VSR M&S toolset and developing additional products to support USSF and Mission Partner AT events across distributed networks including Red Console (Threat M&S), Event Visualization, and Exercise Control. VSR projects will also include upgrades to integrate M&S tools into a cloud-based training environment. Without these improvements, interoperability with Joint/Coalition partners and AT capabilities (i.e. Threat M&S) within a virtual training environment will not be possible, limiting the SST's training capability to basic (peacetime) weapon system operation and prohibit mission readiness objectives to "Train as You Fight" in a Contested, Degraded, and Operationally-limited (CDO) space domain. Implement system resiliency and situational awareness necessary to operate in a CDO environment. Activities may include, but are not limited to, program office support, studies, technical analyses, experimentation, prototyping, etc. ***FY 2024 Base Plans:***					

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	**Project (Number/Name)** 67A011 / *Space Analysis and Application Development*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to transfer of Standard Space Trainer to PE 1203174SF, Space Innovation, Integration and Rapid Technology Development, Program 674671, Enterprise Training Services Development.					
Accomplishments/Planned Programs Subtotals	17.432	45.203	9.813	-	9.813

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPAF 01 GNRLIT: *General Information Tech - Space*	-	-	-	-	-	-	-	-	-		
• SPSF 01 GNRLIT: *General Information Tech - Space*	1.378	0.427	0.434	-	0.434	0.441	0.450	0.462	0.471	Continuing	Continuing

Remarks

Funding and content procures equipment for the SIIRTD USSF Virtual Analysis Capability system. Supports space and cyber modeling & analysis using a variety of Linux and Windows based hardware and software suites. Also procures Information Technology (IT) hardware and software infrastructure for the Distributed Communications Architecture for HQ ACC.

D. Acquisition Strategy

Any new project funded in this program will be awarded using competitive procedures to the maximum extent possible.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	Project (Number/Name) 67A011 / *Space Analysis and Application Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Model/Tool Development, Verification & Validation	C/CPAF	Perduco Group : Dayton, OH	-	5.615	Nov 2021	9.581	Nov 2022	9.813	Nov 2023	-		9.813	Continuing	Continuing	-
Standard Space Trainer Development	C/CPAF	Sonalysts Inc : Waterford, CT	-	11.817	Dec 2021	35.622	Dec 2022	0.000	Dec 2023	-		0.000	Continuing	Continuing	-
		Subtotal	-	17.432		45.203		9.813		-		9.813	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	17.432		45.203		9.813		-		9.813	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	**Project (Number/Name)** 67A011 / *Space Analysis and Application Development*

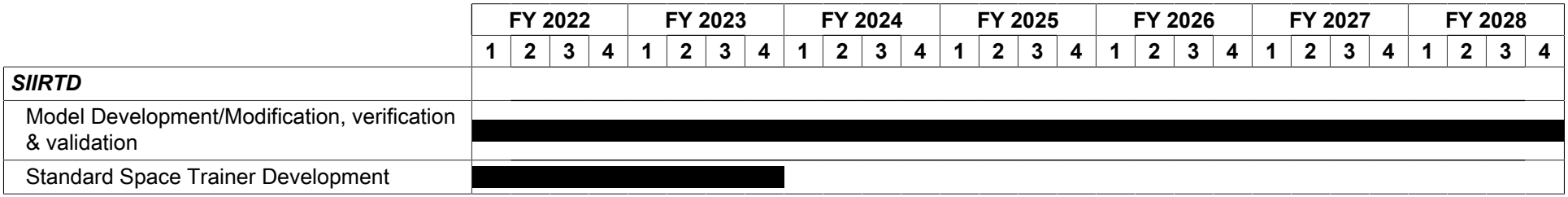

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203174SF / *Space Innovation, Integration and Rapid Technology Development*	**Project (Number/Name)** 67A011 / *Space Analysis and Application Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SIIRTD				
Model Development/Modification, verification & validation	1	2022	4	2028
Standard Space Trainer Development	1	2022	4	2023

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 1203182SF / *Spacelift Range System (SPACE)*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	30.294	11.608	11.175	0.000	11.175	10.797	11.036	11.261	11.669	Continuing	Continuing
674137: *Launch and Test Range System (LTRS) Modernization*	-	30.294	11.608	11.175	0.000	11.175	10.797	11.036	11.261	11.669	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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 SFB/Cape Canaveral SFS, FL and the Western Range (WR) at Vandenberg SFB, 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 ensures ability to meet the national launch requirement, safely supports the launch cadence of ER/WR launch requirement holders and 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 12 subsystems that together provide this capability to the ranges. The Range Safety, Command Destruct, and Positive Control 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 Space Force requires RDT&E funds to conduct LTRS Digital Transformation studies and prototype experimentation activities to meet evolving technological requirements. Funds will provide engineering analyses for insertion of promising technology, provide opportunity to test Cloud infrastructure and software development strategies to drive state-of-the-art applications into LTRS development, validate pathfinder concepts to meet an accelerating launch capacity and cadence, improve system cyber survivability and resilience, and continue to evaluate promising technology beyond current industry standards. Digital Transformation envisions a future driving configuration and reconfiguration automation and system autonomy into LTRS operations for seamless launch and return operations and accelerate capability to Range users through adoption of modern systems, infrastructure, platforms and processes.

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 1206392SF and 1206398SF.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203182SF / *Spacelift Range System (SPACE)*

acquisition authorities and contract mechanisms to deliver capability sooner, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing 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.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	31.115	11.658	11.199	0.000	11.199
Current President's Budget	30.294	11.608	11.175	0.000	11.175
Total Adjustments	-0.821	-0.050	-0.024	0.000	-0.024
• Congressional General Reductions	0.000	-0.050			
• 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	-0.821	0.000			
• Other Adjustments	0.000	0.000	-0.024	0.000	-0.024

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 674137: *Launch and Test Range System (LTRS) Modernization*		
Congressional Add: *Space Launch and Services Capability*	19.472	-
Congressional Add Subtotals for Project: 674137	19.472	-
Congressional Add Totals for all Projects	19.472	-

Change Summary Explanation

FY 2022: -0.821M for SBIR/STRR Transfer

FY 2023: -0.050M Congressional reduction for undistributed FFRDC funding

FY 2024: -0.024M net reduction includes -0.074M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity; 0.050M for inflation adjustment

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203182SF *I Spacelift Range System (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Enterprise Systems Engineering and Integration to Support Government-Controlled Baseline	2.080	2.240	2.050
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. ***FY 2023 Plans:*** Increase system resiliency and agility to meet National launch capacity and cadence requirements per Chief of Space Operations' Range of the Future (ROTF) agility to meet National launch requirements. Invest in Cloud infrastructure and software development to deliver prototype Range operations concepts focused on increasing space launch capability and sustainment of MRTFB capability. Implement system resiliency and situational awareness necessary to operate in the contested space domain. Continuing activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2024 Plans:*** Continue to explore promising technology and concepts to add resiliency and agility to the LTRS fielded baseline to meet National launch capacity and cadence requirements envisioned by ROTF. Seek pathfinding and experimentation in Cloud infrastructure and software delivery pipeline concepts to prototype Range operations approaches, which will feed Digital Transformation of LTRS and accelerate capability to Range users through space access industry standard technology and sustain MRTFB capability. Implement system resiliency, survivability, and situational awareness necessary to operate in the contested space domain and address ever-expanding cyber threats. Continuing activities including, but not limited to, program office support, studies, technical analyses, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased slightly from FY 2023 due to minor decreases in studies.			
Title: LTRS Range Technology Integration	8.742	9.368	9.125
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. ***FY 2023 Plans:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203182SF *I Spacelift Range System (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Analyze, engineer and prototype ROTF concepts to include Cloud infrastructure and software factory prototypes. Development services will prototype data-driven applications to provide agile flight vehicle situational awareness as well as automation of LTRS equipment to facilitate rapid range reconfiguration and enable conduct of simultaneous launch operations. Implement system resiliency and situational awareness necessary to operate in the contested space domain by deploying a Dev/Sec/Ops capability and supporting software Minimum Viable Product (MVP) via a continuous integration/continuous delivery strategy. Activities include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2024 Plans:*** Continue efforts to analyze, engineer, and prototype ROTF envisioned agility and resiliency through a Digital Transformation strategy via adoption of modern systems, infrastructure, platforms, and processes; includes research associated with Cloud infrastructure and software factory concepts. Development support services will facilitate prototypes and data-driven applications to accelerate capabilities to range users such as agile Range situational awareness and LTRS equipment automation to facilitate rapid range reconfiguration and continued expansion of capability to conduct simultaneous launch operations. Develop and prove Dev/Sec/Ops capability as a viable approach for deploying LTRS system applications and software in a continuous integration/continuous delivery methodology. Implement system resiliency and situational awareness necessary to operate in a contested space and cyber domain. Activities include, but are not limited to, program office support, studies, technical analyses, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased slightly from FY 2023 due to slight decrease in A&AS support.			
Accomplishments/Planned Programs Subtotals	10.822	11.608	11.175

	FY 2022	FY 2023
Congressional Add: Space Launch and Services Capability	19.472	-
FY 2022 Accomplishments: Congressional Add Funding improved commercial spaceport capability to provide mid-to-low inclination orbits or polar-to-high inclination orbits in support of the national security space at Pacific Spaceport Complex, AK and Mid-Atlantic Regional Spaceport, Wallops Island, VA.		
Congressional Adds Subtotals	19.472	-

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 1203182SF: *Spacelift Range System (Space)*	93.774	71.712	114.505	-	114.505	108.470	108.477	111.233	113.568	Continuing	Continuing

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203182SF *I Spacelift Range System (SPACE)*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost

Remarks

E. Acquisition Strategy

The Launch and Test Range System (LTRS) program acquisition strategy is system Modernization and Digital Transformation to ensure continued enabling of the accelerating National launch cadence executing on the Eastern Range (ER) and Western Range (WR). This strategy addresses the US Space Force Range of the Future (ROTF) envisioned Range instrumentation architecture, one of multiple ROTF lines of effort. The LTRS program is focused on developing a scalable system capable of responding to the demands of National Security Space objectives and DoD test and evaluation needs as well as assuring the Nation's ability to access space. Innovative development and employment of Cloud infrastructure, software factory and software development services, and cyber security strategies to facilitate data-driven Range activities, digital processing, and data distribution capability is targeted as the enabling strategy for the ROTF Architectural line of effort. Promising prototypes and technology will be accelerated into the LTRS architecture via investments aimed at inserting on-demand increased operational capacity and state-of-the-practice data formatting and transport to launch operations. Contracted engineering and integration services innovate promising technology into the system technical baseline and manage the LTRS specifications and technical requirements on behalf of the government. Additionally, engineering services acts as integrator for completed LTRS modernization projects. Federally Funded Research and Development Center (FFRDC) provides critical mission technical and cyber security analysis capability to ensure LTRS assets meet operational needs.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203182SF / *Spacelift Range System (SPACE)*	Project (Number/Name) 674137 / *Launch and Test Range System (LTRS) Modernization*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Enterprise Systems Engineering and Integration	C/FPIF	ENSCO INC : Falls Church, VA	-	2.080	Oct 2021	2.240	Oct 2022	2.050	Oct 2023	-		2.050	Continuing	Continuing	-
LTRS Range of the Future (ROTF) Technology Integration	C/Various	Various : Various	-	6.505	May 2022	7.090	May 2023	6.812	May 2024	-		6.812	Continuing	Continuing	-
SBIR/STTR	TBD	TBD : TBD	-	-		-		0.039	May 2024	-		0.039	Continuing	Continuing	-
		Subtotal	-	8.585		9.330		8.901		-		8.901	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AK Spaceport Infrastructure Support	SS/FFP	Alaska Aerospace Corp : Anchorage, AK	-	9.500	Jul 2022	-		-		-		-	0.000	9.500	-
VA Spaceport Infrastructure Support	SS/FFP	VA Comm Space Flt Auth : Norfolk, VA	-	9.500	Jul 2022	-		-		-		-	0.000	9.500	-
Spaceport Concept Analysis	SS/CPFF	AS&D, LLC : Beltsfield, MD	-	0.472	Sep 2022	-		-		-		-	0.000	0.472	-
		Subtotal	-	19.472		-		-		-		-	0.000	19.472	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace : El Segundo, CA	-	0.647	Nov 2021	0.659	Nov 2022	0.573	Nov 2023	-		0.573	Continuing	Continuing	-
OTHER SUPPORT	PO	Various : El Segundo, CA	-	1.590	Nov 2021	1.619	Nov 2022	1.701	Nov 2023	-		1.701	Continuing	Continuing	-
		Subtotal	-	2.237		2.278		2.274		-		2.274	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203182SF / *Spacelift Range System (SPACE)*	Project (Number/Name) 674137 / *Launch and Test Range System (LTRS) Modernization*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	30.294		11.608		11.175		-		11.175	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203182SF / *Spacelift Range System (SPACE)*	**Project (Number/Name)** 674137 / *Launch and Test Range System (LTRS) Modernization*

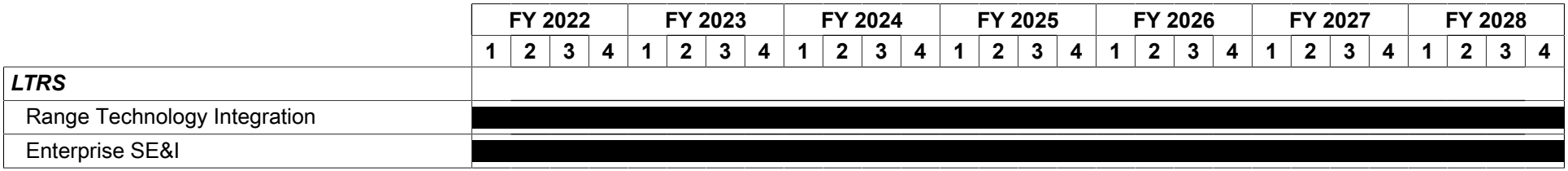

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203182SF / *Spacelift Range System (SPACE)*	**Project (Number/Name)** 674137 / *Launch and Test Range System (LTRS) Modernization*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
LTRS				
Range Technology Integration	1	2022	4	2028
Enterprise SE&I	1	2022	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 1203265SF / *GPS III Space Segment*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	10.398	6.998	1.526	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.922
67A019: *GPS III*	10.398	6.998	1.526	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	18.922
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Program MDAP/MAIS Code: 292												

A. Mission Description and Budget Item Justification

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 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.

The system is composed of three programs: User Equipment (funded under Program Element (PE) 1203164F, 1203164SF), Space (funded under PE 1203165F, 1203265F, 1203265SF, 1203269F, and 1203269SF), and a Control Network (funded under PE 1206423F, 1206423SF and 1203165F). 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 missions: Joint Operations by providing capabilities for Positioning, Navigation, and Timing (PNT); Command, Control, Communications, and Intelligence; Special Operations; Military Operations in Urban Terrain; Defense-Wide Mission Support; Air Mobility; and Space Launch Orbital Support.

GPS III is the next generation of Space Vehicles (SV) supporting the GPS constellation and is funded in PE 1203265SF. GPS III SVs deliver significant enhancements over legacy satellites, including a new international civil (L1C) Galileo-compatible signal, and enhanced anti-jam power. GPS III SVs 06-10 are in the Production and Deployment Phase, with SV 06 launching in January 2023.

The GPS III program funds 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 as a bridge capability to fly GPS III SVs until the delivery of the Next Generation Operational Control System (OCX) program.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203265SF / *GPS III Space Segment*

Mission Readiness Campaign 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 Military-Code (M-Code) to meet a Congressional mandate limiting user equipment purchases 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 Military GPS 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 U.S. Space Command Commander's mandate to provide global monitoring necessary for early M-Code operational use and verification of navigation warfare effects.
-Improved resiliency of the GPS capability.
-Confirmation that PNT 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.

This program encompasses GPS III (SVs 01-10) and MCEU.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver GPS III weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203265SF / *GPS III Space Segment*

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	7.207	1.626	0.000	0.000	0.000
Current President's Budget	6.998	1.526	0.000	0.000	0.000
Total Adjustments	-0.209	-0.100	0.000	0.000	0.000
• Congressional General Reductions	0.000	-0.100			
• 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	-0.209	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: GPS III SVs 01-02	6.998	1.526	0.000
Description: Development, test, and evaluation of GPS III SVs 01-02 and associated simulators, on-orbit engineering, engineering studies and analyses, trade studies, system development, test and evaluation efforts, and integrated logistics support products. ***FY 2023 Plans:*** Finish Space Vehicle (SV) 01/02 On-Orbit Engineering and Performance Validation. Complete final development, test and contract closeout activities. Additionally, FY 2023 funding will allow the program to 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 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Decrease due to completion of SV01/02 On-Orbit Engineering and Performance Validation and completion of final development, test and contract closeout activities.			
Accomplishments/Planned Programs Subtotals	6.998	1.526	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203265SF / *GPS III Space Segment*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 GPSIII: *GPS III Space Segment*	84.452	103.340	121.770	-	121.770	75.491	50.078	2.809	0.000	0.000	437.940

Remarks

E. Acquisition Strategy

The GPS III next generation space segment (space vehicles (SVs) 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 II Follow-on (IIF) capabilities plus up to a 3x-8x increase in anti-jam signal power, 3x 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.

On January 21, 2017, Program Executive Officer (PEO) Space approved the Acquisition Strategy for the Military-Code (M-Code) Early Use (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 supports the scheduled operational testing of MGUE. MCEU updated the GPS control segment software, Architecture Evolution Plan (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. The Air Force approved reinstatement of a previously deferred Key Support Area (KSA) on February 10, 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-Code 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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203265SF / *GPS III Space Segment*	Project (Number/Name) 67A019 / *GPS III*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS III Development	C/CPIF	Lockheed Martin : Denver, CO	1.245	3.173	Jun 2022	1.190	Dec 2022	-		-		-	0.000	5.608	-
GPS III SV01-02 On Orbit Incentive Fee	C/CPIF	Lockheed Martin : Denver, CO	0.547	-		-		-		-		-	0.000	0.547	-
GPS III Technical Mission Analysis	RO	Aerospace : El Segundo, CA	0.756	0.670	May 2022	0.000	Mar 2023	-		-		-	0.000	1.426	-
GPS III Enterprise SE&I	C/CPAF	SAIC : El Segundo, CA	0.927	0.503	Oct 2023	0.303	Oct 2022	-		-		-	0.000	1.733	-
GPS III Launch Support	RO	45th SV Processing : Cape Canaveral, FL	1.475	0.000	Dec 2022	-		-		-		-	0.000	1.475	-
MCEU Development	C/CPIF	Lockheed Martin : Denver, CO	3.305	-		-		-		-		-	0.000	3.305	-
		Subtotal	8.255	4.346		1.493		-		-		-	0.000	14.094	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS III FFRDC	RO	Aerospace : El Segundo, CA	1.044	0.548	May 2022	-		-		-		-	0.000	1.592	-
GPS III A&AS	Various	Various : Various	1.099	2.104	Jan 2023	0.033	Dec 2022	-		-		-	0.000	3.236	-
		Subtotal	2.143	2.652		0.033		-		-		-	0.000	4.828	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	10.398	6.998		1.526		-		-		-	0.000	18.922	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203265SF / *GPS III Space Segment*	**Project (Number/Name)** 67A019 / *GPS III*

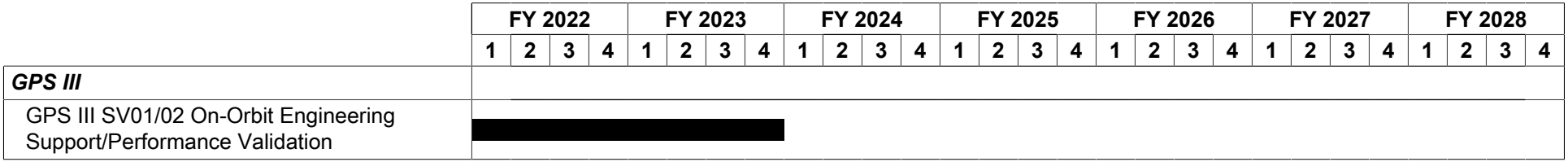

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203265SF / *GPS III Space Segment*	**Project (Number/Name)** 67A019 / *GPS III*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
GPS III				
GPS III SV01/02 On-Orbit Engineering Support/Performance Validation	1	2022	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 1203330SF / *Space Superiority ISR*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	18.109	29.128	28.730	0.000	28.730	28.777	24.626	22.045	22.839	Continuing	Continuing
67A051: *Space Superiority - Advanced Intelligence Systems*	-	18.109	29.128	28.730	0.000	28.730	28.777	24.626	22.045	22.839	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Superiority Intelligence, Surveillance and Reconnaissance (ISR) (SSI) program provides ISR for key find, fix, track, target, engage, and assess requirements supporting Space Superiority activities meeting Combatant Command (CCMD) needs for Space Operations Command (SpOC). 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 the Space Security and Defense Program (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, achievement of space superiority, and to preserve the US space advantage across all domains.

Space acquisition must respond with speed and agility to the proliferation of emerging space adversary threats and new technologies. In support of these nascent, cutting edge space acquisition capabilities, Space Superiority ISR provides exquisite, crucial cryptologic and ISR through transformational collection and production activities through the rapid development and fielding of fixed and transportable intelligence architectures capable of front-end collection and analysis of new technologies in near real time. Space Superiority and Space Control is only realized through Space Superiority ISR support on the front end of space acquisition, allowing increased innovation and resiliency in support of changing program/project priorities to respond and to operate in the contested space domain, as well as supporting lifecycle experimentation, prototyping, and risk reduction.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203330SF / *Space Superiority ISR*	

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	18.109	29.128	28.601	0.000	28.601
Current President's Budget	18.109	29.128	28.730	0.000	28.730
Total Adjustments	0.000	0.000	0.129	0.000	0.129
• 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	0.129	0.000	0.129

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Title: Advanced Intelligence Systems for Space Superiority	18.109	29.128	28.730	0.000	28.730
Description: Develops transportable and fixed PCPAD capabilities.					
FY 2023 Plans: Continues Space Superiority RDT&E through transformation of antiquated collection and production capabilities within the SpOC Space ISR Enterprise (SSI Enterprise). Begins mission management enhancements. Provides multiple antenna systems to 73 ISRS Overseas Continental United States (OCONUS) locations; includes delivery, site integration, and testing for systems. Provides ISR capabilities to 72 ISRS, Peterson SFB, CO in support of Continental United States (CONUS)-based deployable Tactical ISR Operations Cells (TISROCs)/ Deployable ISR Support Cells (DISCs) to meet USSF Service-retained and CCMD ISR requirements. Enhances Long Haul Communications Infrastructure to speed dissemination of collected intelligence to analytic elements within the SSI Enterprise. Funds enhancements to analytic exploitation, vulnerability and susceptibility tools. In addition to replacing legacy systems, enhances automation, enabling the SSI Enterprise to more quickly respond to ISR needs. FY23 funding implements system resiliency and situational awareness necessary to operate in the contested space domain. Funding also supports ISR Cell that develops and fields Data Management System to archive mission data, exploitation tool suite, and cross-domain data dissemination to CCMDs, IC and National Agencies.					
FY 2024 Base Plans:					

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203330SF *I Space Superiority ISR*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Continues transformation by completing the deliveries of the remaining large antennas to SSI Enterprise sites under the multi-year capability delivery task order. Continues development of mission management planning enhancements and robust collection automation capability. Focuses on PED of the Special Mission Enterprise via automation, artificial intelligence, high speed connectivity and digital processing through the multiple phases of the ISR mission. Delivers multiple additional antenna refurbishments and upgrades to 73 ISRS OCONUS locations; includes delivery, site integration, Requirements Management Framework (RMF) authority to operate and testing for systems. Provides ISR analytic capability updates and automated mission management to 72 ISRS, Peterson SFB, CO in support of CONUS-based deployable TISROCs/DISCs to meet USSF Service-retained and CCMD ISR requirements. Implements a Radio Frequency search and survey tool enhancement. Expands Long Haul Communications bandwidth and connects new units. Continues funding for analytic exploitation, vulnerability and susceptibility tools enhancements. Funding also supports ISR Cell and associated Space ISR Roadmap requirements, material solutions analysis and other functions for development and fielding SDA capabilities, including a Data Management System to archive mission data, exploitation tool suite, and cross-domain data dissemination to CCMDs, IC and National Agencies. ***FY 2024 OCO Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** Slight decrease is the result of multiple on-going activities to the Space ISR enterprise and completed the multi-year task order to conclude the replacement of decades old legacy collection capabilities at Space ISR sites. Emphasis in FY24 focuses on the speeding of the Processing, Exploitation, and Dissemination (PED) for terrestrial-based enterprise via automation, artificial intelligence, high speed connectivity and digital processing through the multiple phases of the ISR mission. Includes fixes and upgrades for antiquated front-end and back-end hardware and software at multiple CONUS/OCONUS fixed sites; equips multiple CONUS-based deployable TISROCs/DISCs to meet USSF Service-retained and CCMD ISR requirements, via ease of use and process speed upgrades. Enables and speeds automated operations and transport of ISR data for acquisition and operations support, including Automated Mission Management and PED systems. Incrementally continues capability development and deliveries for ISR Cell.					
Accomplishments/Planned Programs Subtotals	18.109	29.128	28.730	0.000	28.730

D. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203330SF / *Space Superiority ISR*

D. Other Program Funding Summary ($ in Millions)

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, Cost-Plus-Fixed-Fee (CPFF), advisory and assistance contractor supporting development and implementation efforts, such as engineering architectural development and planning and Requirements Management Framework (RMF) certifications to operate. Prime contractor is MacAulay-Brown.

Architecture upgrades to SDA, SSDP, and Space Superiority: Multiple Delivery, CPFF integration contract for acquiring, integration, installation and testing of ISR collection assets. Prime contractor is CACI/BITSYSTEMS Data Analysis.

Data Analysis, Production Development, Test Support for R&D: Multiple Delivery, CPFF production contract supporting vulnerabilities analysis of ISR collected material. Prime Contractor is Booz-Allen Hamilton

ISR Cell for Data Management Archiving, Exploitation and Dissemination: TBD Multiple Delivery, CPFF integration contract providing Data Management System, Exploitation Tool Suites and Cross-Domain Data Dissemination Solution new capability development. Prime contractor is Various (Tyto, AT&T, PRKK, & MITRE) in FY 2023.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203330SF / *Space Superiority ISR*	**Project (Number/Name)** 67A051 / *Space Superiority - Advanced Intelligence Systems*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space Superiority and R&D Intelligence Development	C/CPFF	Various: TBD : TBD	-	1.856	Nov 2021	1.500	Nov 2022	1.530	Nov 2023	-		1.530	Continuing	Continuing	-
Architecture Upgrades to SDA, SSDP, and Space Superiority	C/CPFF	Various: TBD : TBD	-	10.736	Jun 2022	18.359	Dec 2022	18.508	Dec 2023	-		18.508	Continuing	Continuing	-
Data Analysis, Product Development & Test Support for R&D	C/CPFF	Various: TBD : TBD	-	5.298	Nov 2021	4.601	Nov 2022	4.693	Nov 2023	-		4.693	Continuing	Continuing	-
ISR Cell for Data Management Archiving, Exploitation and Dissemination	C/CPFF	Various: TBD : TBD	-	-		4.444	Jan 2023	3.771	Jan 2024	-		3.771	Continuing	Continuing	-
		Subtotal	-	17.890		28.904		28.502		-		28.502	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Mission Support	C/Various	TBD : TBD	-	0.219	Oct 2021	0.224	Oct 2022	0.228	Oct 2023	-		0.228	Continuing	Continuing	-
		Subtotal	-	0.219		0.224		0.228		-		0.228	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	18.109		29.128		28.730		-		28.730	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203330SF / *Space Superiority ISR*	**Project (Number/Name)** 67A051 / *Space Superiority - Advanced Intelligence Systems*

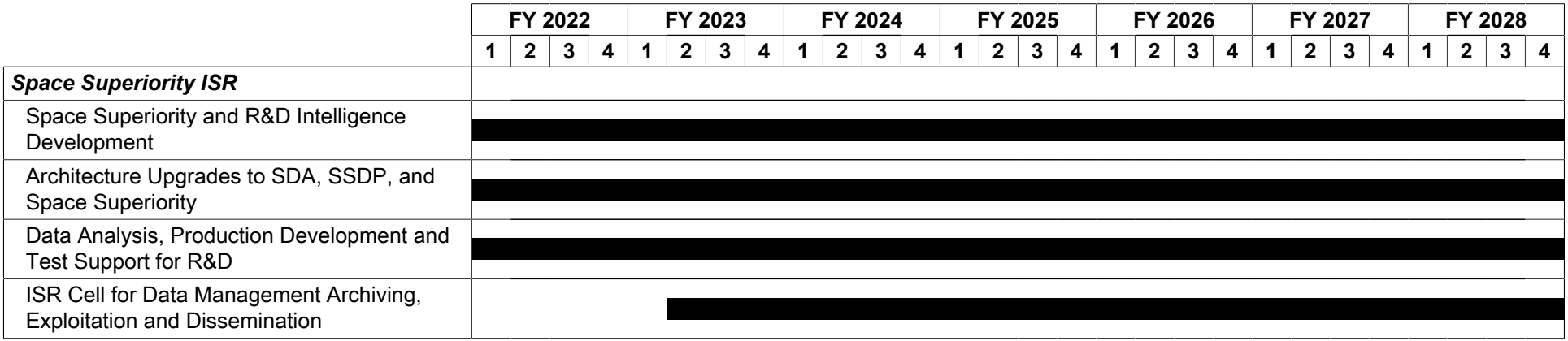

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203330SF / *Space Superiority ISR*	**Project (Number/Name)** 67A051 / *Space Superiority - Advanced Intelligence Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Superiority ISR				
Space Superiority and R&D Intelligence Development	1	2022	4	2028
Architecture Upgrades to SDA, SSDP, and Space Superiority	1	2022	4	2028
Data Analysis, Production Development and Test Support for R&D	1	2022	4	2028
ISR Cell for Data Management Archiving, Exploitation and Dissemination	2	2023	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203620SF *I National Space Defense Center*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	1.280	2.659	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.939
670004: *OTHER STRATCOM ACTIVITIES*	-	1.280	2.659	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	3.939
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This program develops and integrates Battle Management and Command and Control (BMC2) applications for the Joint Task Force - Space Defense (JTF-SD). JTF-SD is one of two subordinate commands to USSPACECOM and has the responsibility to protect and defend space assets from both terrestrial and space-based threats. The JTF-SD executes its mission through its operations center, the National Space Defense Center (NSDC) which was previously referred to as the Joint Interagency Combined Space Operations Center. NSDC efforts include integrating hardware and software prototypes to support various networks developed by mission partners and integrating applications developed by the Space C2 program to ensure relevant and accurate situational awareness to mission partners. NSDC also conducts early prototyping efforts to inform JTF-SD's ability to generate informed BMC2 and space superiority requirements for the acquisition community. The JTF-SD (and NSDC) allows the national security space community to effectively respond to 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.

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	1.280	2.856	0.000	0.000	0.000
Current President's Budget	1.280	2.659	0.000	0.000	0.000
Total Adjustments	0.000	-0.197	0.000	0.000	0.000
• Congressional General Reductions	0.000	-0.197			
• 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

Change Summary Explanation

FY 2023: -0.197M for congressionally-directed Federally Funded Research and Development Center (FFRDC) reduction.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203620SF *I National Space Defense Center*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Application Development	1.280	2.659	-
Description: Develop and field Space Battle Management Command and Control capabilities. ***FY 2023 Plans:*** FY 2023 Plans: Continue to analyze, assess, and provide operations center support for mission partner and Intelligence Community networks. Partner with test agency to perform developmental and operational test activities and shadow operations for agile DevOps environment. Increase integration efforts for Space C2 applications. Implement system resiliency and situational awareness capability necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, and prototyping. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased compared to FY 2023 due to the completion of these activities in this Program.			
Accomplishments/Planned Programs Subtotals	1.280	2.659	-

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

NSDC provides funds to Department of the Air Force, DoD, and other partner organizations to execute on their contracts in support of NSDC requirements. Additionally, NSDC funding secures contract support to develop and document the technical baseline and support major test and transition activities during each fiscal year.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203620SF / *National Space Defense Center*	Project (Number/Name) 670004 / *OTHER STRATCOM ACTIVITIES*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SHADOW OPERATIONS CENTER DEVELOPMENT	Various	Various : Colorado Springs, CO	-	-		-		-		-		-	0.000	0.000	-
BMC2 APPLICATION DEVELOPMENT AND INTEGRATION	Various	Various: : Colorado Springs, CO	-	0.600	Mar 2022	1.159	Jan 2023	-		-		-	Continuing	Continuing	-
SYSTEM ENGINEERING	Various	Various: : Colorado Springs, CO	-	0.330	May 2022	0.500	Dec 2022	-		-		-	0.000	0.830	-
		Subtotal	-	0.930		1.659		-		-		-	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various: : Colorado Springs, CO	-	0.250	Apr 2022	0.600	Jan 2023	-		-		-	Continuing	Continuing	-
FFRDC	RO	Various: : Colorado Springs, CO	-	0.100	Mar 2022	0.400	Jan 2023	-		-		-	Continuing	Continuing	-
		Subtotal	-	0.350		1.000		-		-		-	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	1.280		2.659		-		-		-	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203620SF / *National Space Defense Center*	**Project (Number/Name)** 670004 / *OTHER STRATCOM ACTIVITIES*

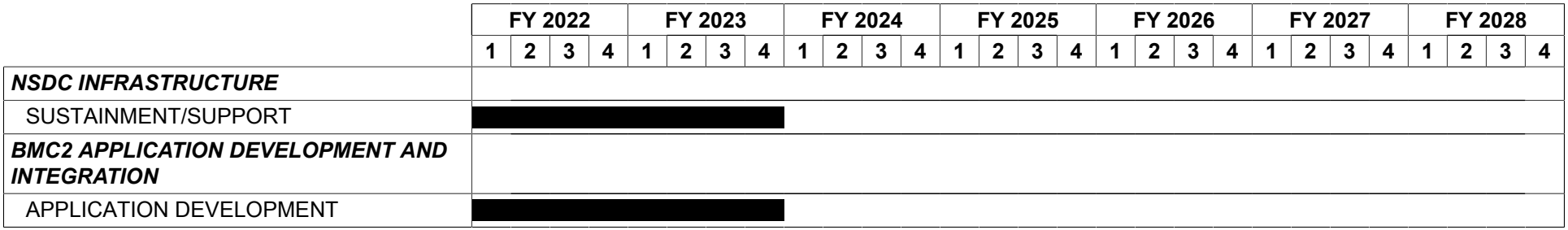

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203620SF / *National Space Defense Center*	**Project (Number/Name)** 670004 / *OTHER STRATCOM ACTIVITIES*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
NSDC INFRASTRUCTURE				
SUSTAINMENT/SUPPORT	1	2022	4	2023
BMC2 APPLICATION DEVELOPMENT AND INTEGRATION				
APPLICATION DEVELOPMENT	1	2022	4	2023

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 1203873SF / *Ballistic Missile Defense Radars*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	7.432	21.615	20.752	0.000	20.752	9.065	1.468	0.000	0.000	0.000	60.332
674820: *Sensor Development*	-	7.432	21.615	20.752	0.000	20.752	9.065	1.468	0.000	0.000	0.000	60.332
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

COBRA DANE (CD) is a 40+ year old radar located on Eareckson AS, AK (Shemya Island, AK). CD is the most powerful, sensitive, and accurate Ground-based Midcourse Defense (GMD) radar and the premier Ballistic Missile Defense (BMD) radar. At the same time, it is the most accurate and capable phased array available to the Space Surveillance Network (SSN) for cataloging hazardous and difficult-to-track satellites and space debris objects that clutter the near-earth orbital regime that cannot be detected by most other SSN tracking assets. CD detects Intercontinental Ballistic Missiles (ICBMs) and Sea-Launched Ballistic Missiles (SLBMs), classifies reentry vehicles (RVs) and other missile objects, provides real-time information to the GMD Fire Control (GFC), and provides tracking of threat ballistic missiles with sufficient accuracy to commit the launch of interceptors and to update the target tracks to the interceptor while the interceptor is in flight. CD's other primary mission is to support US Space Command (USSPACECOM)'s Space Domain Awareness (SDA) mission by detecting, tracking, correlating, and characterizing man-made resident space objects, primarily in the Low-Earth Orbit (LEO) regime, including space debris and early observation of New Foreign Launches (NFLs). It operates as part of the larger SSN and provides metric observation data to its command and control nodes: the Combined Space Operations Center (CSpOC) and the Distributed Space Command and Control - Dahlgren (DSC2-D). CD also supports USSPACECOM's Space Object Identification (SOI) mission by providing narrowband radar data of man-made resident space objects in the LEO regime. SOI information is used to ascertain the mission and operational status of various payloads and aids in forecasting maneuvers or deorbits.

CD will acquire a modern architecture through design, development, integration, and test. This architecture enhances 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. RDT&E funds were provided to the Missile Defense Agency (MDA) to accelerate the joint Department of the Air Force and MDA modernization program of the CD radar. 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.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) is transforming the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

The PARCS Radar Digitization Upgrade Study will determine the requirement to modernize the radar through a systematic re-architecture from an analog infrastructure to a digital phased array radar to keep up with modern threats.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Ballistic Missile Defense Radars weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	12.292	18.615	13.781	0.000	13.781
Current President's Budget	7.432	21.615	20.752	0.000	20.752
Total Adjustments	-4.860	3.000	6.971	0.000	6.971
• 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	-4.500	0.000			
• SBIR/STTR Transfer	-0.360	0.000			
• Other	0.000	0.000	6.971	0.000	6.971

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 674820: *Sensor Development*		
Congressional Add: *PARCS Radar Digitization Upgrade Study*	-	3.000
Congressional Add Subtotals for Project: 674820	-	3.000
Congressional Add Totals for all Projects	-	3.000

Change Summary Explanation

FY 2022: -4.50M decrease to support higher Space Force priorities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203873SF *I Ballistic Missile Defense Radars*

FY 2024: -0.091M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: ADPE Rehost Upgrade, Phase II	7.432	18.615	20.752
Description: The Automated Data Processing Equipment (ADPE) Rehost (ADPE-R) Phase II Signal Processor, Radar Controller and Receiver modernization. Mission Computer replacement will also be accomplished as soon as resources allow. The approach will modernize these systems with an innovative hardware and software-based open architecture solution supported by switching solutions and modernized development environments. ***FY 2023 Plans:*** Continue effort to upgrade the Signal Processor, Radar Controller, Receiver-Exciter (SPARC/REX) Replacement system hardware and software development. Continue Mission Computer replacement hardware and software development as resources are available. Replaces the transmitter system and associated systems, and the automated data processing equipment. This program element may include necessary civilian pay expenses required to manage, execute, and deliver CD's weapon system capability. 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 2024 Plans:*** Continue effort to upgrade the Signal Processor, Radar Controller, Receiver-Exciter (SPARC/REX) and Mission Computer. The programs will continue the development of software and hardware for the upgrade of the SPARC/REX and mission computer. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to ramp-up of SPARC/REX replacement efforts as that portion of the program moves towards system integration and test.			
Accomplishments/Planned Programs Subtotals	7.432	18.615	20.752

	FY 2022	FY 2023
Congressional Add: PARCS Radar Digitization Upgrade Study	-	3.000
FY 2023 Plans: The PARCS RADAR Digitization Study will determine the requirement to modernize the radar from an analog infrastructure to a digital phased array radar to keep up with modern threats. Activities may		

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203873SF *I Ballistic Missile Defense Radars*

	FY 2022	FY 2023
include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc.		
Congressional Adds Subtotals	-	3.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The ADPE Rehost acquisition strategy has transitioned to traditional acquisition delivery orders under a University Affiliated Research Center (UARC), sole-source, cost-plus fixed fee contract. This approach will provide a phased extension of system service life to ensure warfighter capability through at least 2030. This evolutionary migration to a modernized open system approach provides the foundation for adaptable system sustainment and addition of future capabilities.

PARCS Radar Digitization upgrade study will be accomplished using an existing indefinite delivery/indefinite quantity contract.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203873SF / *Ballistic Missile Defense Radars*	Project (Number/Name) 674820 / *Sensor Development*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ADPE Phase II, Mission Computer Replacement	SS/CPAF	Various : Colorado Springs, CO	-	1.482	Feb 2022	7.053	Feb 2023	7.713	Oct 2023	-		7.713	Continuing	Continuing	-
Signal Processor, Radar Controller, Receiver-Exciter Replacement	SS/CPAF	Various : Colorado Springs, CO	-	3.794	Feb 2022	8.228	Feb 2023	10.419	Oct 2023	-		10.419	Continuing	Continuing	-
PARCS Radar Digitization	SS/CPFF	Georgia Tech : Atlanta, GA	-	-		2.800	Jul 2023	-		-		-	0.000	2.800	-
SBIR/STTR	TBD	TBD : TBD	-	0.360	Oct 2021	0.581	Oct 2022	0.479	Oct 2023	-		0.479	Continuing	Continuing	-
		Subtotal	-	5.636		18.662		18.611		-		18.611	Continuing	Continuing	N/A

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
ADPE Integration	Various	Riverside Res Institute : Colorado Springs, CO	-	0.000	Dec 2021	0.700	Dec 2022	0.250	Dec 2023	-		0.250	Continuing	Continuing	-
		Subtotal	-	0.000		0.700		0.250		-		0.250	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test and Evaluation	Various	Space Readiness Delta : Colorado Springs, CO	-	0.000	Feb 2022	0.410	Mar 2023	0.327	Jan 2024	-		0.327	Continuing	Continuing	-
		Subtotal	-	0.000		0.410		0.327		-		0.327	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203873SF / *Ballistic Missile Defense Radars*	Project (Number/Name) 674820 / *Sensor Development*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Colorado Springs, CO	-	0.751	Jun 2022	0.800	Jun 2023	0.619	Jan 2024	-		0.619	Continuing	Continuing	-
Other Support	Various	Various : Colorado Springs, CO	-	1.045	Jun 2022	1.043	Jun 2023	0.945	Mar 2024	-		0.945	Continuing	Continuing	-
		Subtotal	-	1.796		1.843		1.564		-		1.564	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	7.432		21.615		20.752		-		20.752	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203873SF / *Ballistic Missile Defense Radars*	**Project (Number/Name)** 674820 / *Sensor Development*

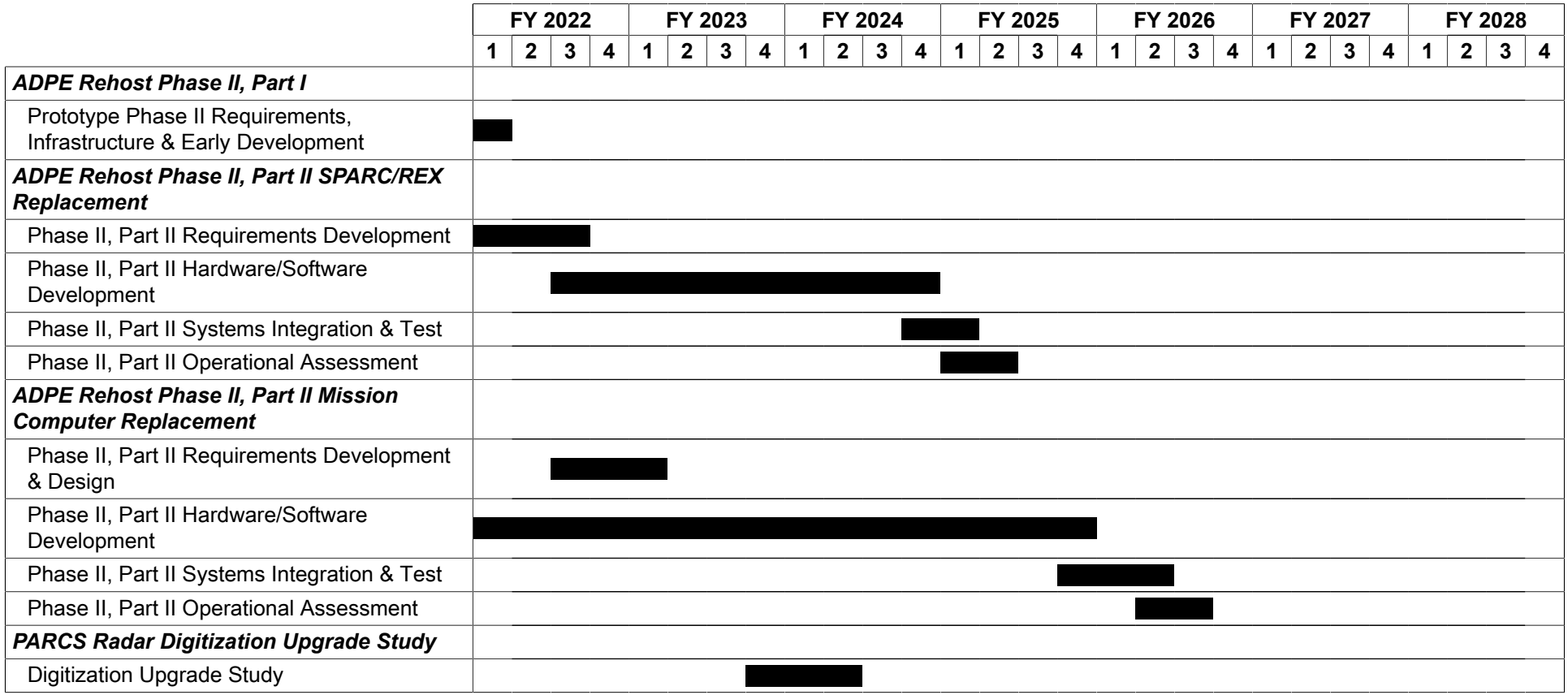

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203873SF / *Ballistic Missile Defense Radars*	**Project (Number/Name)** 674820 / *Sensor Development*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
ADPE Rehost Phase II, Part I				
Prototype Phase II Requirements, Infrastructure & Early Development	1	2022	1	2022
ADPE Rehost Phase II, Part II SPARC/REX Replacement				
Phase II, Part II Requirements Development	1	2022	3	2022
Phase II, Part II Hardware/Software Development	3	2022	4	2024
Phase II, Part II Systems Integration & Test	4	2024	1	2025
Phase II, Part II Operational Assessment	1	2025	2	2025
ADPE Rehost Phase II, Part II Mission Computer Replacement				
Phase II, Part II Requirements Development & Design	3	2022	1	2023
Phase II, Part II Hardware/Software Development	1	2022	4	2025
Phase II, Part II Systems Integration & Test	4	2025	2	2026
Phase II, Part II Operational Assessment	2	2026	3	2026
PARCS Radar Digitization Upgrade Study				
Digitization Upgrade Study	4	2023	2	2024

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 1203906SF *I NCMC - TW/AA System*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	4.369	7.249	25.545	0.000	25.545	25.611	26.731	25.763	26.269	0.000	141.537
67A051: *Space Superiority - Advanced Intelligence Systems*	-	4.369	7.249	25.545	0.000	25.545	25.611	26.731	25.763	26.269	0.000	141.537
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 1203906SF, project 67A051, ITW/AA System of Systems Integration, is a new start.
This program, BA 7, PE 1203906SF, project 67A051, Missile Warning/Missile Track Enhancement, is a new start.

A. Mission Description and Budget Item Justification

This program element supports development activities for the North American Aerospace Defense Command (NORAD) Cheyenne Mountain Complex (NCMC) - Integrated Tactical Warning Attack Assessment (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. NCMC-ITW/AA and Legacy Space Command and Control (C2) systems provide NORAD/US Northern Command (USNORTHCOM), US Strategic Command (USSTRATCOM), and US Space Command (USSPACECOM) 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 (NC2) and detonation detection.

The Combatant Commanders Integrated Command and Control System (CCIC2S) is a unique, integrated NC2 and Air and Space C2 "system of systems," providing data communication between external sensors and end users, mission processing for air and missile warning mission, and space operations functions. The system supports national strategic objectives with ITW/AA and provides missile, space, and air warning, cueing, and engagement information to strategic and theater combatant commanders. The system consists of terrestrial and space-based sensor outputs, NC2 and Air and Space C2 nodes, and communications and dissemination links, connecting the US and Canadian defense information networks.

ITW/AA C2 integration of Command and Control, Battle Management, and Communications (C2BMC) feeds is a continuation of previous efforts to address additional non-traditional sources to enhance the overall ITW/AA situational picture for the Combatant Command (CCOM). Utilizing the data from Global Data Integration (GDI) and C2BMC will provide additional situation data for the commander to address missile warning threats to the homeland and to decrease the decision time from minutes to seconds in a high threat environment that includes emerging threats from our advisories.

Missile Warning/Missile Track Enhancement is a new effort to include mission critical data from other non-traditional high fidelity sources to address current and future emerging threats that are non-traditional ballistic missile threats. In order to address the new threat to the homeland, it is necessary to expand the available sources to update the ITW/AA situational picture for the CCOM and provide the necessary data for sound decisions for the Nuclear C3 (NC3) community.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203906SF *I NCMC - TW/AA System*

The ITW/AA System of Systems Integration provides critical systems engineering support for ITW/AA interface verification, system deployment, change control management, monitoring and testing. It also supports risk reduction activities for evolving ITW/AA capabilities. This effort includes the development of an ITW/AA Assessment Management System (AMS) for planning configuration control and interoperability. It also includes development of an Emerging Threat Lab (ETL) using modern technology, agile processes, and automation to consolidate ITW/AA-related intelligence on current missile threats, integrate strategic and theater missile warning data, consolidate algorithms to identify and characterize threats. It also supports the Chief Scientist Office (CSO) in building algorithms and models which provide the capability for warfighters to determine timely and unambiguous missile warning for the National Command Authorities. This effort also includes Project Tombstone to improve the quality of test assessments and exercises, providing for a greater understanding of how our systems will respond in today's wartime environment. These System of Systems Integration efforts combine to ensure the attack assessments covering air, missile, and space threats continue to be accurate, timely, unambiguous and continuous, providing key decision makers the information and time they need to make decisions in case of attacks against the homeland.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) 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, SSC 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 NCMC-ITW/AA weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	9.858	7.274	13.520	0.000	13.520
Current President's Budget	4.369	7.249	25.545	0.000	25.545
Total Adjustments	-5.489	-0.025	12.025	0.000	12.025
• 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	-5.200	0.000			
• SBIR/STTR Transfer	-0.289	0.000			
• Other Adjustments	0.000	-0.025	12.025	0.000	12.025

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203906SF *I NCMC - TW/AA System*

Change Summary Explanation

FY 2022: -5.200M decrease to support higher Space Force priorities.

FY 2023: -0.025M decrease for FFRDC.

FY 2024: -0.089M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity. +12.000 for enhancements to the NCMC TW/AA system to incorporate/ provide data to the Overhead Persistent InfraRed Ground Enterprise.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: ITW/AA C2 Integration of C2BMC Feeds	4.369	7.249	0.000

Description: Obtain and assess non-ITW/AA (Global Data 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. Provide program office support and other related support activities, including but not limited to technical analysis, prototyping, user evaluations, and independent certification testing.

FY 2023 Plans:

Continue upgrades to add additional non-ITW/AA data for emerging threats.

Complete C2BMC connectivity effort.

Continue harmonization of displays between Strategic Missile Warning, Theater Missile Warning, and Missile Defense, and nontraditional source data integration to provide a seamless event-tracking and common operating picture.

Continue to leverage/integrate new data sources that come online and correlate with missile defense and missile warning display changes to meet emerging adversary threats.

Implement changes/enhancements to Missile Warning (MW) systems. Further details classified.

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 2024 Plans:

N/A

FY 2023 to FY 2024 Increase/Decrease Statement:

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203906SF *I NCMC - TW/AA System*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 decreased due to completion of C2 Integration of C2BMC Feeds effort.			
Title: ITW/AA System of Systems Integration	-	0.000	12.000
Description: The ITW/AA System of Systems Integration coordinates and facilitates between multiple ITW/AA System Program Offices within the USSF and USAF to ensure these systems are integrated properly and the overarching ITW/AA Weapon System is providing timely, unambiguous, accurate, and continuous warning, assessment, and characterization information on atmospheric, ballistic missile, and space attacks to the President and Secretary of Defense of the United States, Allies, Joint Staff, combatant commands, and other users through all levels of conflict. Ensure the ITW/AA requirements receive the necessary level of ITW/AA change control management related to interface analyses, integration issues, and collaboration with key stakeholders for continued mission data integrity and accuracy. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** Coordination across ITW/AA community to ramp up configuration change control, architecture management, and future initiative integration requiring additional effort to facilitate standardized review, assessment, coordination, control, planning, and baseline management of interface requirements to meet new United States Space Command Instruction 3422.01. Initiate Project Tombstone to further develop agile scenario development, specializing in creating and maintaining test/training scenarios for MW, Missile Defense (MD), Space Domain Awareness (SDA) sensors and supporting systems/infrastructure. Tombstone responsible for maintaining the existing scenarios with the most up-to-date information, building new developmental and operational test scenarios and supporting updates to scenario building tools and test analysis tools to further increase warfighter effectiveness in MD/MW/SDA domains. Testing and integration of additional data feeds into the ETL, analysis of these feeds to develop models/algorithms to increase effectiveness of multiple MW threat estimates and attack assessments. Assessment Management System development and initial fielding across USSF/USAF MW, MD, and Air Warning (AW) systems. Effort requires modernization of antiquated health system requirements alignment across multiple organizations. 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			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203906SF *I NCMC - TW/AA System*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to New Start of ITW/AA System of Systems Integration effort.			
Title: Missile Warning/Missile Track Enhancement ***Description:*** Integrate new data source to include Ballistic Missile Defense Communication Node (BCN) and Ground-Based Midcourse Defense (GMD) Communications Network (GCN) of the Missile Defense Agency (MDA) C2BMC integration element of the Ballistic Missile Defense System (BMDS). Enhance existing displays to incorporate new sensor with existing data, modernize database content with additional multi-domain meta-data to improve threat assessment and attack characterizations required to address new sensor data. Establish a highly scalable data repository and storage to develop a Data Lake to allow for easy integration and analysis of the new data types as well as be structured, prepped/tagged to enable future requirements. Improves source data accuracy for missile warning mission and translate for integration into CCIC2S that will enhance mission displays and improve impact prediction. Creates multiple display options for the operator and reduces ambiguity between missile defense and missile warning displays. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** Funds the analysis, solution, and software coding of integration, processing, and display of high-fidelity data from non-ITW/AA and non-traditional sensor sources, resolving ambiguity and improving prediction accuracy, thus increasing the time critical National Command Authorities nuclear responses decision space. Addresses emergent space based missile threats and other capability gaps identified in the Global Threat Characterization Assessment recommendations. Enhances missile defense and missile warning information supporting a common operating picture. Harmonizes the displays between strategic Missile Warning, and Missile Defense. Integrates non-traditional source data to provide a seamless event-tracking and common operating picture. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to New Start of Missile Warning/Missile Track Enhancement effort.	-	0.000	13.545
Accomplishments/Planned Programs Subtotals	4.369	7.249	25.545

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203906SF *I NCMC - TW/AA System*

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

ITW/AA C2 Integration of C2BMC Feeds initial effort was competitively awarded from an existing software services Indefinite Delivery/Indefinite Quantity (IDIQ) contract in Q4 FY 2021. This effort will provide incremental deliveries to the ITW/AA sustainment provider for incorporation into the operational system. The use of experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose existing capabilities will be accomplished through multi-source acquisitions.

USSF is developing acquisition strategies for the Missile Warning/Missile Track Enhancement and ITW/AA System of Systems Integration, but will maximize open competition as much as possible.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203906SF / *NCMC - TW/AA System*	**Project (Number/Name)** 67A051 / *Space Superiority - Advanced Intelligence Systems*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Product Development of ITW/AA C2 Integration of C2BMC Feeds	C/CPIF	LEIDOS : Colorado Springs, CO	-	4.033	Jan 2022	6.861	Jan 2023	-		-		-	Continuing	Continuing	-
Product Development of Missile Warning/Missile Track Enhancement	C/TBD	TBD : TBD	-	-		-		9.651	Mar 2024	-		9.651	Continuing	Continuing	-
Product Development of ITW/AA System of Systems Integration	C/TBD	TBD : TBD	-	-		-		8.520	Jan 2024	-		8.520	Continuing	Continuing	-
Product Development of Emerging Threat Lab	C/TBD	TBD : TBD	-	-		-		1.500	Jan 2024	-		1.500	Continuing	Continuing	-
SBIR/STTR	TBD	TBD : TBD	-	-		-		0.890		-		0.890	Continuing	Continuing	-
		Subtotal	-	4.033		6.861		20.561		-		20.561	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	C/CPIF	Various : Colorado Springs, CO	-	0.336	Jan 2022	0.388	Jan 2023	4.742	Jan 2024	-		4.742	Continuing	Continuing	-
Other Support	TBD	Not specified. : TBD	-	-		-		0.242	Jan 2024	-		0.242	Continuing	Continuing	-
		Subtotal	-	0.336		0.388		4.984		-		4.984	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	4.369		7.249		25.545		-		25.545	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203906SF / *NCMC - TW/AA System*	**Project (Number/Name)** 67A051 / *Space Superiority - Advanced Intelligence Systems*

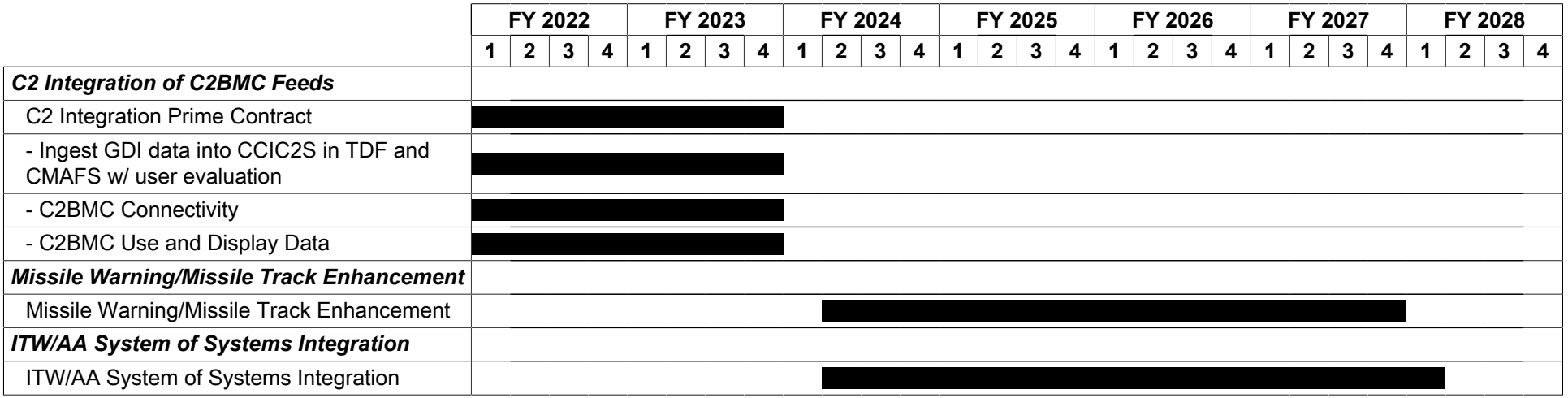

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203906SF / *NCMC - TW/AA System*	**Project (Number/Name)** 67A051 / *Space Superiority - Advanced Intelligence Systems*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
C2 Integration of C2BMC Feeds				
C2 Integration Prime Contract	1	2022	4	2023
- Ingest GDI data into CCIC2S in TDF and CMAFS w/ user evaluation	1	2022	4	2023
- C2BMC Connectivity	1	2022	4	2023
- C2BMC Use and Display Data	1	2022	4	2023
Missile Warning/Missile Track Enhancement				
Missile Warning/Missile Track Enhancement	2	2024	4	2027
ITW/AA System of Systems Integration				
ITW/AA System of Systems Integration	2	2024	1	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203913SF *I NUDET Detection System (SPACE)*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	45.887	60.429	93.391	0.000	93.391	86.481	76.836	78.405	81.239	0.000	522.668
672808: *Nuc Detonation Det Sys (sensors)*	-	45.887	60.429	93.391	0.000	93.391	86.481	76.836	78.405	81.239	0.000	522.668
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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, Treaty Monitoring, and a classified mission.

The USNDS program is jointly sponsored and funded by the Department of Defense (DoD), through the Space Force, 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 to the Space Force's USNDS Program Office, which is responsible for all acquisition and Systems Engineering, Integration and Test 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 1203913SF, Research, Development, Test and Evaluation, Space Force (RDT&E, SF), Procurement, Space Force, and Operations and Maintenance.

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 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 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, 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 operationally accepted. The ground segment provides ground receiving analysis and reporting capabilities to national authorities, commands, and forward users as well as Department of State for the Treaty Monitoring and Verification mission. The ground control segment is being modernized and continuously improved through an incremental, evolutionary acquisition approach.

The upgrades to the GNTs are the survivable/endurable UGNT which are funded with RDT&E in this program. The UGNT provides NUDET Detection Reports to end users through survivable/endurable USNDS communications via MilStar/Future Communication Systems (FCS)/Advanced Extremely High Frequency (AEHF) circuits. The GNT supports ITW/AA and NFM missions. The UGNT program modifies the baseline of the GNT subsystem and deploys as an integral part of the Space Based

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203913SF / *NUDET Detection System (SPACE)*

Infrared System Survivable (SBIRS) / Endurable Evolution (S2E2) Mobile Ground System (MGS) (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 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, Joint Staff, USSPACECOM, and USSTRATCOM, delivering long-term, cost effective, multi-role, multi-mission space effects to warfighters across the range of military operations.

ICADS 7 upgrades the ICADS 6 baseline necessary to process future GPS IIIF satellites GBD USNDS messages, address technology obsolescence, and meet updated cybersecurity requirements for system resiliency.

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 III Follow-on (IIIF) are funded in their respective programs.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

This program 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 programs 1206392SF and 1206398SF.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203913SF *I NUDET Detection System (SPACE)*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	45.887	80.429	93.588	0.000	93.588
Current President's Budget	45.887	60.429	93.391	0.000	93.391
Total Adjustments	0.000	-20.000	-0.197	0.000	-0.197
• 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	-0.197	0.000	-0.197

Change Summary Explanation

FY 2023: -20.000M Congressional Directed Reduction for ICADS 7 development delay.

FY 2024: -0.615M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +.418M PBD Inflation Rates for Non-pay and Non-fuel Purchases.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Integration with SBIRS S2E2 Mobile Ground Terminals (SMGTs)	8.900	3.800	0.000
Description: Support the Integration and test activities between UGNTs and the SMGTs, which together provide NUDET Detection Reports and missile warning data to end users through survivable/endurable USNDS communications via MilStar/FCS/ AEHF circuits. The UGNTs deploy as an integral part of the SMGS units also in support of ITW/AA and NFM. Support program scope analyzation for USNDS receiver and NUDET Decryption Unit (NDU) components. Additional support costs includes such activities as; receiver system engineering support, conceptual hardware and software design, check-out/support, testing, and system engineering.			
FY 2023 Plans: Complete UGNT integration and testing for the survivable and endurable mission necessary for S2E2/SMGT Operational Acceptance planned for 4th Quarter FY 2023. Provide Technical Order support, UGNT shelter maintenance, shipment of UGNT			

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
systems to operational locations, Installation and Checkout, and system testing at Continental United States (CONUS) and Outside CONUS locations. ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to completion of UGNT integration and testing for S2E2/SMGT Operational Acceptance.			
Title: GEO Payload Integration ***Description:*** Classified Integration efforts of the GEO payload. This effort is not a new start. It changed title from SABRS Integration to GEO Payload Integration to accurately describe the effort. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A	3.000	0.000	0.000
Title: ICADS 7 ***Description:*** ICADS 7 consists of satellite ground data processing systems that accommodate the new NDS payload on GPS IIIF SVs and is an upgrade to the current ICADS 6 system. ICADS 7 includes new software, hardware and cybersecurity capabilities and NDS Analysis Package Ground Station (NAPGS) ground systems. The effort includes, but not limited to, the upgrade of two new ICADS 7 test beds, the replacement of the NDU, Enhanced Receiver Subsystems (ERS), and Automated Data Processors (ADP). A non-recurring Engineering effort is required to design the replacements for the NDUs, ERSs and ADPs currently on USNDS tests beds and fielded systems. The ICADS upgrade includes data processing changes to support the new USNDS optical sensor, known as Spectral Imaging Geolocation Hyper-Temporal Sensor (SIGHTS), that will be hosted on the GPS IIIF SVs. ***FY 2023 Plans:*** Continue to ramp up ICADS 7 development post SRR/Integrated Baseline Review including NDU, ERS, and software and hardware to support the USNDS payloads on GPS IIIF SVs. Continue systems engineering and test planning for GPS IIIF MRC, GPS IIIF Early Integration to include signal verification/data processing, on-orbit USNDS sensor integration, and FCA/PCA. Support next generation USNDS receiver development to include collaboration with National Security Agency (NSA) for crypto	33.987	56.629	93.391

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203913SF *I NUDET Detection System (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
enclosure framework/algorithms and upgrade ICADS testbeds to include tech refresh/hardware, initiate ground modifications to USNDS sensor payload command plans to meet more resilient GPS IIIF command and telemetry specifications, and begin NAPGS integration and testing. Complete long lead development of decryption unit, ICADS 7 ADP and SIGHTS ADP. Complete design through Preliminary Design Review (PDR) in 4th Quarter FY 2023 and prepare for Milestone B in 2nd Quarter FY 2024. Rapidly implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2024 Plans:*** Continue to ramp up ICADS 7 preparation for Milestone B decision and Engineering & Manufacturing Development (EMD) phase leading up to Critical Design Review (CDR). Continue system development, including NDU, ERS, and software and hardware to support the USNDS payloads on GPS IIIF SVs. Continue systems engineering and test planning for GPS IIIF Mission Readiness Campaign, GPS IIIF Early Integration to include signal verification/data processing, on-orbit USNDS sensor integration, and Functional Configuration Audit/Physical Configuration Audit. Support next generation USNDS receiver development in collaboration with National Security Agency for crypto enclosure framework/algorithms. Continue upgrade of ICADS testbeds, ground modifications to USNDS sensor payload command plans for GPS IIIF, and NAPGS integration and testing. Rapidly implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increase is due to significant ramp up of effort to transition from design to development phase of major software architecture, preparing for NSA review and certification of new cryptographic devices, Milestone B decision and CDR.			
Accomplishments/Planned Programs Subtotals	45.887	60.429	93.391

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 01 Space Force NUDETS: *Nudet Detection Space*	6.690	7.062	0.000	-	0.000	0.000	0.000	-	-	0.000	13.752

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, Alternate Host, and SBIRS; funding is sent by Military Interdepartmental Purchase Request (MIPR) from DoD and DOE to Sandia, Los Alamos National Laboratories and other agencies on existing DOE/NNSA

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203913SF *I NUDET Detection System (SPACE)*

contracts. The ICADS 7 Acquisition Strategy was approved in September 2021 and the sole source prime contract awarded in June 2022. USNDS ICS funding for Ground Technology Program System of Systems will continue until UGNT is delivered at the end of FY 2023. USNDS requirements are defined in the Operational Requirements Document dated January 21, 2004.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203913SF / *NUDET Detection System (SPACE)*	**Project (Number/Name)** 672808 / *Nuc Detonation Det Sys (sensors)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USNDS ICADS, GNT/ UGNT, and Integration Support	MIPR	Sandia National Laboratory : Albuquerque, NM	-	8.100	Nov 2021	3.800	Nov 2022	0.000	Nov 2023	-		0.000	Continuing	Continuing	-
USNDS Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	0.730	Nov 2021	0.913	Nov 2022	1.085	Nov 2023	-		1.085	Continuing	Continuing	-
USNDS Enterprise SE&I	Various	TASC : El Segundo, CA	-	0.918	Nov 2021	2.557	Nov 2022	4.322	Nov 2023	-		4.322	Continuing	Continuing	-
Classified Development	TBD	Classified : Classified	-	3.000	Nov 2021	-		-		-		-	Continuing	Continuing	-
ICADS 7	MIPR	Sandia National Laboratory : Albuquerque, NM	-	21.108	May 2022	45.061	Nov 2022	75.970	Nov 2023	-		75.970	Continuing	Continuing	-
		Subtotal	-	33.856		52.331		81.377		-		81.377	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USNDS On-orbit Sensor Testing	MIPR	Various : LANL, SNL, NM	-	4.157	Dec 2021	3.747	Nov 2022	4.464	Nov 2023	-		4.464	Continuing	Continuing	-
		Subtotal	-	4.157		3.747		4.464		-		4.464	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
USNDS FFRDC	RO	Aerospace, MITRE : El Segundo, CA	-	1.477	Nov 2021	1.853	Nov 2022	3.735	Nov 2023	-		3.735	Continuing	Continuing	-
USNDS A&AS	Various	Various : Various	-	6.329	Nov 2021	2.418	Nov 2022	3.735	Nov 2023	-		3.735	Continuing	Continuing	-
USNDS Other Support	Various	Various : Various	-	0.068	Nov 2021	0.080	Nov 2022	0.080	Nov 2023	-		0.080	Continuing	Continuing	-
		Subtotal	-	7.874		4.351		7.550		-		7.550	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203913SF / *NUDET Detection System (SPACE)*	Project (Number/Name) 672808 / *Nuc Detonation Det Sys (sensors)*	

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	45.887		60.429		93.391		-		93.391	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203913SF / *NUDET Detection System (SPACE)*	**Project (Number/Name)** 672808 / *Nuc Detonation Det Sys (sensors)*

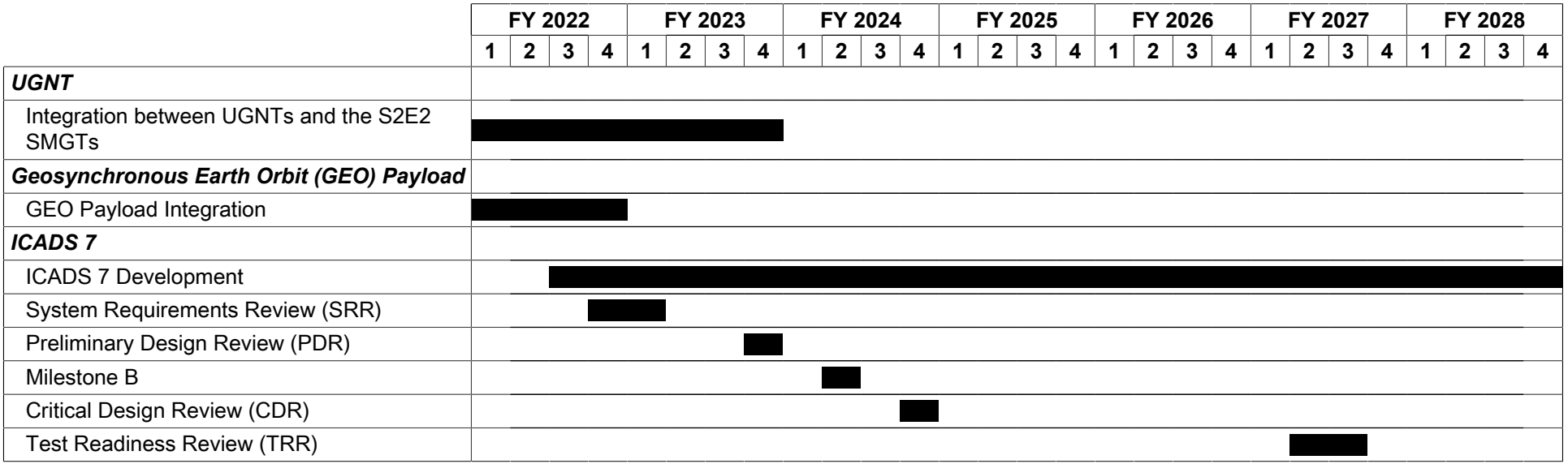

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203913SF / *NUDET Detection System (SPACE)*	**Project (Number/Name)** 672808 / *Nuc Detonation Det Sys (sensors)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
UGNT				
Integration between UGNTs and the S2E2 SMGTs	1	2022	4	2023
Geosynchronous Earth Orbit (GEO) Payload				
GEO Payload Integration	1	2022	4	2022
ICADS 7				
ICADS 7 Development	3	2022	4	2028
System Requirements Review (SRR)	4	2022	1	2023
Preliminary Design Review (PDR)	4	2023	4	2023
Milestone B	2	2024	2	2024
Critical Design Review (CDR)	4	2024	4	2024
Test Readiness Review (TRR)	2	2027	3	2027

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awareness Operations*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	62.795	90.678	264.966	0.000	264.966	145.957	133.893	106.442	108.508	Continuing	Continuing
673940: *Space Data Fusion*	-	62.795	58.027	73.665	0.000	73.665	70.718	78.660	80.719	74.604	Continuing	Continuing
673941: *Unified Data Library (UDL)*	-	0.000	29.507	187.370	0.000	187.370	72.123	52.016	22.441	30.503	Continuing	Continuing
67A018: *SF Weather Services Research*	-	0.000	3.144	3.931	0.000	3.931	3.116	3.217	3.282	3.401	0.000	20.091

A. Mission Description and Budget Item Justification

Space Domain Awareness (SDA) is one of five core competencies of the Space Force and is the effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain that could affect space operations and thereby impact the security, safety, economy, or environment of our nation. As the foundation for space control, SDA encompasses surveillance of all space objects and activities; detailed surveillance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering indications and warning on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities.

This program fields, upgrades, operationalizes, operates, and maintains Space Force sensors and information/data integration capabilities within the SDA network while companion program element 1206425SF, Space Situational Awareness Systems, develops new network sensors and associated information integration capabilities across the network. Activities funded in this program (1203940SF) focus on surveillance of objects in earth orbit and beyond 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. As a whole, this program upgrades, modifies, modernizes, operationalizes, fields, operates, and maintains sensors and information integration capabilities for an integrated, end-to-end SDA architecture that provides critical national security space solutions on tactical operational timelines.

The Space Data Fusion project (673940) develops and/or upgrades SDA data/data exploitation capabilities, to include Global Sensor Watch (GSW), TAPOUT, and Space Surveillance Telescopes, and provides Service Life Extension Programs (SLEPs) and pre-planned product improvement efforts to operational SDA capability. GSW, in partnership with Australia's Department of Defense, provides an integrated, end-to-end, SDA tip & cue capability that implements a resilient architecture providing overlapping, assured, and viable surveillance options for executing event response, SDA data processing at multiple classification levels, and automated, worldwide, cross-sensor tipping & cueing. TAPOUT is a tactical SDA system which consists of a Hardware Layer, a Data Layer, and an Application layer. The Space Surveillance Telescope (SST) provides rapid un-cued search, detection and tracking of dim objects in deep space, collecting data on all viewable objects in the Indio-Pacific region.

The SDF project (673940) is supported by, and supports, the Joint Task Force Space Defense (JTF-SD) Commercial Operations (JCO) cell. The JCO's mission is to provide persistent and rapid SDA coverage to maximize decision making space and reduce reaction time in support of Protect & Defend missions. SDF commercial data

buys beyond protect and defend missions support existing capabilities through improvements to architecture and system efficiency, cybersecurity, migration to cloud computing, building on artificial intelligence and machine learning (AI/ML) initiatives, and expanding agile software development, delivery, and integration practices.

The Unified Data Library project (673941) supports integration, exploitation, and delivery of data sources for command and control and battle management of space forces. UDL will continue to develop the library by on-boarding new data sets, directly connecting to SDA sensors, expanding data services, federating between enterprise data lakes, expanding defensive cyber operations capabilities, adding non-metric data to the SDA marketplace, continuing to expand local area network capability to share Space Surveillance Network (SSN) data in a cyber-secure manner, purchase commercial data and services to support USSPACECOM operations, allow optimized data flow for use of existing SDA capability, and provide access to new commercial SDA innovations that will enable the broader SDA mission.

The SF Weather Services Research project (67A018) funds the operational development necessary to acquire, sustain, and modernize Air Force Weather Service (AFWS) capabilities in support of the 2018 National Defense Strategy. AFWS provides timely, accurate, resilient, and relevant environmental information to enable global battlespace situational awareness for Air Force (AF), Army, Special Operations Forces (SOF), Space Force (USSF), combatant commands, the Intelligence Community (IC), and other government agencies. AFWS provides climate impacts and assessments, as well as space and terrestrial weather sensing, forecasting, and weather analytic capabilities, at home station and deployed, in order to deliver critical environmental intelligence in support of decision makers to gain the asymmetric advantage during the full spectrum of air and space combat operations.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awareness Operations*

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	64.763	80.903	79.710	0.000	79.710
Current President's Budget	62.795	90.678	264.966	0.000	264.966
Total Adjustments	-1.968	9.775	185.256	0.000	185.256
• Congressional General Reductions	0.000	-0.225			
• 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	-1.968	0.000			
• Other Adjustments	0.000	0.000	185.256	0.000	185.256

Change Summary Explanation

FY 2023: +10.000 Congressional add for Unified Data Library.

FY 2024: -0.523 to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +35.960 increase to Unified Data Library to accelerate integration of space data and enable real-time access to interoperable data in support of warfighting operations.

FY 2024: +17.90 increase to Space Data Fusion for commercial data buys beyond Protect and Defend missions.

FY 2024: +131.40 increase to Unified Data Library for expansion of sensor communication upgrades. Upon FY 2024 funds appropriation, funding will be executed within Project 673940 (Space Data Fusion).

FY 2024: +0.519M inflation increase for non-pay and non-fuel purchases.

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203940SF / *Space Situation Awarenes s Operations*	Project (Number/Name) 673940 / *Space Data Fusion*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
673940: *Space Data Fusion*	-	62.795	58.027	73.665	0.000	73.665	70.718	78.660	80.719	74.604	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Data Fusion project (673940) develops and/or upgrades SDA data/data exploitation capabilities, to include Space Surveillance Telescopes, Global Sensor Watch (GSW), TAPOUT, and provides Service Life Extension Programs (SLEPs) and pre-planned product improvement efforts to operational SDA capability.

GSW provides an integrated, end-to-end, SDA tip & cue capability that implements a resilient architecture providing overlapping, assured, and viable surveillance options for executing event response, SDA data processing at multiple classification levels, and automated, worldwide, cross-sensor tipping & cueing. Efforts directly enable support for Space Command & Control (C2) by developing & deploying advanced software algorithms to identify, acquire, characterize, and maintain custody of both space objects of interest and new foreign launches; developing & deploying advanced data analytics, machine learning, & artificial intelligence capabilities for rapid indication & warning; enhancing space environmental monitoring solutions; integrating and optimizing access to United States Government (USG), coalition, commercial, academic, intelligence community (IC) & Missile Defense Agency sensors to better support the broader space enterprise; supporting USSPACECOM operations and training exercises; leading trials, testing and training campaigns to test & optimize capabilities in support of the broader space kill chain; enhancing sensor performance to close the solar exclusion gap by leveraging modern technology and commercial & IC sensors for greater space domain coverage; and improving legacy communication paths through efforts such as upgrading legacy sensor communications and developing a redundant, terrestrial and space-based mesh communication network to enable a more complex space enterprise capability.

The mission of the current Joint Task Force Space Defense (JTF-SD) Commercial Operations (JCO) as of Aug 2022 is to provide persistent and rapid SDA coverage to maximize decision making space and reduce reaction time in support of Protect & Defend missions. The JCO augments JTF-SD tracking data, real-time visual magnitude, and real-time passive radio frequency (RF) using commercial capabilities. This funding will be used to support to a variety of other commercial mission sets beyond the protect and defend capabilities.

The Commercial Data Buys Beyond Protect and Defend Major Thrust Area will support existing capabilities through improvements to architecture and system efficiency, cybersecurity, migration to cloud computing, building on artificial intelligence and machine learning (AI/ML) initiatives, and expanding agile software development, delivery, and integration practices. As data ingress and egress grow, incorporate additional associated cloud-hosting, data service development, security, system administration, data on boarding, data as a service platform retention, processing, and normalization beyond protect and defend.

Provide support to JCO missions beyond the initial Protect & Defend capabilities. Review, adjudicate, and integrate initial capabilities with multiple commercial providers. These capabilities are planned to include: Geosynchronous Equatorial Orbit (GEO) spaceflight safety; Electromagnetic interference (EMI) detection and geolocation support for Positioning, Navigation and Timing (PNT); as well as space-based SDA augmentation from commercial providers. The expanding capabilities will build system resiliency and situational awareness. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673940 / *Space Data Fusion*

prototyping, integration and test of C2, resiliency measures and mission partner interfaces, and office support etc. Towards the close of FY24, the desired end state is the expectation of three new capabilities in deployment.

The Space Surveillance Telescope (SST) provides rapid un-cued search, detection and tracking of dim objects in deep space, collecting data on all viewable objects in the Indio-Pacific region. As a combined program with Australia's Department of Defense, per the 2013 US Secretary of Defense (USSECDEF) and the Australian Defence Minister (AUSMINDEF) SST Partnership Memorandum of Understanding (MOU), SST improves detection and characterization of friendly and enemy military space activities; improves orbital safety of flight during maneuver, separation, conjunction assessment, and proximity operations; and improves support to defensive and offensive counterspace operations.

TAPOUT is a tactical SDA system which consists of a Hardware Layer, a Data Layer, and an Application layer. The planned Hardware Layer is the result of 2 years of prototyping, analysis, and collaboration with industry. 16 sites have been identified to field daytime/nighttime capable ground based sensors which will be remotely commanded and controlled through the Data and Application layers. The Data Layer consists of multi-source data feeds which are aggregated at a classified level where predictive threat warning occurs. The Application Layer consists of a series of Threat Warning and C2 applications at multiple classification levels which enable monitoring, and tactical command and control of the network.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program may include necessary civilian pay expenses required to manage, execute, and deliver the weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Global Sensor Watch (GSW)	43.207	58.027	55.765
Description: GSW provides an integrated SDA architecture to deliver a resilient, high capacity, sensitive, timely, and comprehensive global ground and space-based network of sensors that cover the geocentric and cislunar orbital regimes. GSW is a resilient, automated cross-sensor tip and cue capability that provides overlapping, assured, and viable surveillance options for executing event response, and SDA data processing at multiple classification levels. In order to ensure the successful implementation of a resilient, overlapping, assured, and viable architecture, GSW includes the necessary sensor communication upgrades to ensure data transport/throughput, compatibility, and effects-based tactical tasking/response functionality. To do this, GSW enables highly available, non-stovepiped sensor planning, tasking, response, and data collection, as well as processed information/products/results to be stored, shared, and integrated for warfighting and analysis.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673940 / *Space Data Fusion*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
GSW will continue coordination international work with Japanese Ministry of Defense (JMOD) on the development of classified C2 and SDA data sharing between a Japanese Space Operations Center (SpOC) and the U.S. Combined Space Operations Center (CSpOC). This will align Japanese sensors and United States Government (USG) and non-USG assets to provide critical national security space solutions on tactical operational timelines and continue to pursue security cooperations with other international partners such as Canada and the United Kingdom. ***FY 2023 Plans:*** Complete and operationalize GSW sensor comm upgrades for the first and second sites. Begin third phase of GSW software development for incorporating non-traditional data sources. GSW will continue to upgrade sensor communications to existing systems, including radar sites at Eglin Air Force Base, Florida, Upgraded Early Warning Radars (UEWR), Millstone Radar Site Massachusetts, Space Fence (Reagan Test site) assets, to facilitate GSW tip and cue operations. Modernize legacy sensor message formats and protocols for greater accuracy; support USSPACECOM operations and test activities to vet new SDA capability deliveries and concepts of operations for optimizing legacy SDA sensors operations; establish a SDA tip and cue sensor test asset; continue integration of GSW tip and cue software at existing radar sites; continue automation of manual SDA processes; develop classified C2 and SDA sharing with Japanese Space Operations Center (JSpOC) and expand Security Cooperation activities with mission partners in Canada and the United Kingdom; align USG and non-USG assets to provide critical national security space solutions on tactical operational timelines; and accomplish satellite tracking, space object identification (SOI), tracking, and cataloging of data collected from global assets. TAPOUT will 1) begin operations immediately with existing sensors, 2) begin procuring and fielding TAPOUT sensors, especially long lead items that require early purchase orders to meet the 24 month Fully Operational Capability (FOC) timeline, 3) improve external network interfaces, 4) enhance existing TAPOUT Threat Warning capabilities and tactical messaging, and 5) provide training. Additionally, FY 2023 funding will allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of command and control (C2), resiliency measures and mission partner interfaces via network and network modernization, space test/combat range events, and office support etc. ***FY 2024 Plans:*** Continue GSW sensor communication upgrades (SCU) for the remaining sites of existing systems, including radar sites at Eglin Air Force Base, Florida, Upgraded Early Warning Radars (UEWR), Millstone Radar Site Massachusetts, and Reagan Test Site assets, to facilitate GSW tip and cue operations. Complete mesh network prototype demonstration for essential communications and resilient data transport capability. Continuation of RTS work on radome and sensor array development on Ground Based Radar-Kwajalein work. Continuation of planning and upgrades to other SDA sensors, such as DARC Site 1, COBRA DANE, GEODSS, and Ascension Site C (depending on Ascension status). Integrate MDA to augment SSN connectivity.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673940 / *Space Data Fusion*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue GSW software development for incorporating non-traditional data sources and efforts to modernize legacy sensor message formats and protocols for greater accuracy. Continue integration of GSW tip and cue software at existing radar sites. Continue automation of manual SDA processes. Support USSPACECOM operations and test activities to vet new SDA capability deliveries and concepts of operations for optimizing legacy SDA sensors operations. Establish a SDA tip and cue sensor test asset. Complete Mission-driven Autonomous Collaborative Heterogeneous Intelligent Network Architecture (MACHINA) integration with the Air Force Research Lab (AFRL) Tako telescope network. Complete MACHINA integration with the secret-level Dynamic Optical Telescope System (DOTS) in Maui, and other sensors. Complete initial ops fielding for dynamic tasking input compatibility with mission partner Concept C mission system. Complete fielding of launch custody and high-rate-revisit capabilities at Millstone, Haystack, and ALTAIR radars. Continue developing classified C2 and SDA sharing with the Japanese Space Operations Center (JSpOC) and expand Security Cooperation activities with other International mission partners, such as Canada and the United Kingdom. TAPOUT will continue 1) operations with existing sensors, 2) procuring and fielding TAPOUT sensors, especially long lead items that require early purchase orders to meet the FOC timeline, 3) improve external network interfaces, 4) enhance existing TAPOUT Threat Warning capabilities and tactical messaging, and 5) provide training. Additionally, FY 2024 funding will allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of command and control (C2), resiliency measures and mission partner Interfaces via network and network modernization, space test/combat range events, and office support etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to additional modernization efforts.			
Title: Commercial Data Buys Beyond Protect and Defend	-	0.000	17.900
Description: The mission of the current Joint Task Force Space Defense (JTF-SD) Commercial Operations (JCO) as of Aug 2022 is to provide persistent and rapid Space Domain Awareness (SDA) coverage to maximize decision making space and reduce reaction time in support of Protect & Defend missions. The JCO augments JTF-SD tracking data, real-time visual magnitude,			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673940 / *Space Data Fusion*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
and real-time passive radio frequency (RF) using commercial capabilities. This funding will be used to support a variety of other commercial mission sets beyond the protect and defend capabilities. ***FY 2023 Plans:*** N/A. ***FY 2024 Plans:*** Provide support to JCO missions beyond the initial Protect & Defend capabilities. Review, adjudicate, and integrate initial capabilities with multiple commercial providers. These capabilities are planned to include: Geosynchronous Equatorial Orbit (GEO) spaceflight safety; Electromagnetic interference (EMI) detection and geolocation support for Positioning, Navigation and Timing (PNT); as well as space-based SDA augmentation from commercial providers. The expanding capabilities will build system resiliency and situational awareness. Support existing capabilities through improvements to architecture and system efficiency, cybersecurity, migration to cloud computing, building on artificial intelligence and machine learning (AI/ML) initiatives, and expanding agile software development, delivery, and integration practices. As data ingress and egress grow, incorporate additional associated cloud-hosting, data service development, security, system administration, data on boarding, data as a service platform retention, processing, and normalization beyond protect and defend, with the goal of deploying three new capabilities by the end of FY 2024. Activities may include, but are not limited to studies, technical analysis, risk reduction experiments and prototyping, integration and test of C2, resiliency measures and mission partner interfaces, and office support etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to addition of Commercial Data Buys Beyond Protect and Defend effort.			
Title: Space Data Fusion/Unified Data Library (UDL) ***Description:*** Space Data Fusion develops Unified Data Library (UDL) capabilities to support integration, exploitation, and delivery of data sources for command and control and battle management of space forces. UDL will continue to develop the library by onboarding new data sets, expand data services, expand defensive cyber operations capabilities, add non-metric data to the SDA marketplace, continue to expand local area network capability to share Space Surveillance Network (SSN) data in a cyber-secure manner, and purchase commercial data and services to support USSPACECOM operations, allow optimized data flow for use of existing SDA capability, and provide access to new commercial SDA innovations that will enable the broader SDA mission. ***FY 2023 Plans:***	17.788	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673940 / *Space Data Fusion*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
N/A ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A			
Title: Space Surveillance Telescope (SST) ***Description:*** Space Surveillance Telescope (SST) provides rapid un-cued search, detection, and tracking of dim objects in deep space, collecting data on all viewable objects in the Indo-Pacific region. As a combined program with Australia's Department of Defence, per the 2013 USSECDEF and AUSMINDEF SST Partnership MOU, SST improves detection and characterization of friendly and enemy military space activities; improves orbital safety of flight during maneuver, separation, conjunction assessment, and proximity operations; and improves support to defensive and offensive counterspace operations addressing critical space domain awareness gaps. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A	1.800	0.000	0.000
Accomplishments/Planned Programs Subtotals	62.795	58.027	73.665

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPAF 01 SPCMOD: *Space Mods*	0.000	8.589	2.000	-	2.000	-	-	-	-	0.000	10.589

Remarks

D. Acquisition Strategy

The acquisition strategies for GSW include a mix of modifications to existing Air Force or Space Force contracts and directing funds to other Air Force, Space Force, or DoD organizations for contract support.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673940 / *Space Data Fusion*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GSW Integration (Dev, Sensor, C2)	Various	MIT/LL : Lexington, MA	-	-		-		18.678	Nov 2023	-		18.678	Continuing	Continuing	-
GSW Sensor Comm Upgrades	Various	Various : Various	-	16.423	Mar 2022	22.865	Mar 2023	26.464	Nov 2023	-		26.464	Continuing	Continuing	-
GSW Exploitation	Various	MIT/LL : Lexington, MA	-	11.488	Nov 2021	16.150	Mar 2023	-		-		-	0.000	27.638	-
GSW Dynamic Tasking	Various	Various : Various	-	9.213	Dec 2021	9.850	Dec 2022	-		-		-	0.000	19.063	-
GSW SW Development 3	Various	Sandia National Labs : Albuquerque, NM	-	1.000	Nov 2021	1.337	Nov 2022	-		-		-	0.000	2.337	-
UDL Data Science WG	C/CPAF	L3 Harris : Colorado Springs, CO	-	-		-		-		-		-	0.000	0.000	-
GSW Commercial Data Buys Beyond Protect and Defend	Various	Various : Colorado Springs, CO	-	-		-		15.740	Oct 2023	-		15.740	Continuing	Continuing	-
UDL Commercial Data	C/CPAF	Various : Various	-	1.534	Jan 2022	-		-		-		-	0.000	1.534	-
UDL Development/Data Onboarding	Various	Various : Various	-	6.734	Dec 2021	-		-		-		-	0.000	6.734	-
UDL Cloud Hosting	Various	Not specified. : TBD	-	6.193	Mar 2022	-		-		-		-	0.000	6.193	-
Space Surveillance Telescope	Various	Various : Exmouth, Australia	-	1.800	Oct 2021	-		-		-		-	0.000	1.800	-
TAPOUT	MIPR	AFRL : Various	-	-		2.425	Oct 2022	2.425	Nov 2023	-		2.425	Continuing	Continuing	-
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		2.578	Oct 2023	-		2.578	Continuing	Continuing	-
		Subtotal	-	54.385		52.627		65.885		-		65.885	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Colorado Springs, CO	-	6.610	Dec 2021	2.650	Dec 2022	4.700	Nov 2023	-		4.700	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203940SF / *Space Situation Awarenes s Operations*	Project (Number/Name) 673940 / *Space Data Fusion*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Various : Colorado Springs, CO	-	1.500	Nov 2021	2.000	Nov 2022	2.700	Nov 2023	-		2.700	Continuing	Continuing	-
Other Support	Various	Various : Colorado Springs, CO	-	0.300	Dec 2021	0.750	Dec 2022	0.380	Nov 2023	-		0.380	Continuing	Continuing	-
		Subtotal	-	8.410		5.400		7.780		-		7.780	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	62.795		58.027		73.665		-		73.665	Continuing	Continuing	N/A

Remarks

The Space Data Fusion project has minimal organic resources. The FY 2024 Management Services includes project management support for efforts to connect the SDA enterprise via a mesh network and establish secure connectivity between the US and Allied Space Operations Centers.

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673940 / *Space Data Fusion*

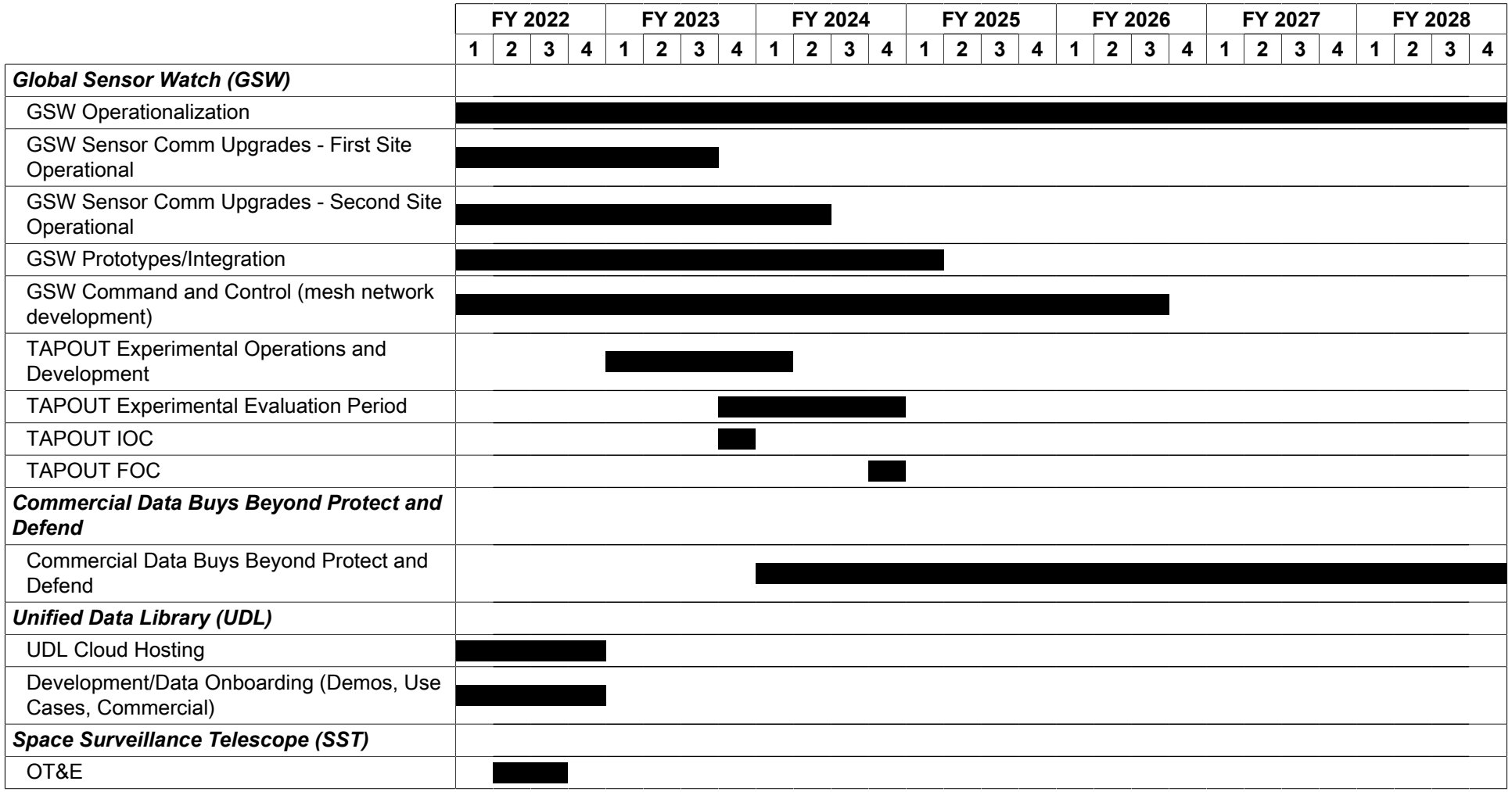

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673940 / *Space Data Fusion*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Global Sensor Watch (GSW)				
GSW Operationalization	1	2022	4	2028
GSW Sensor Comm Upgrades - First Site Operational	1	2022	3	2023
GSW Sensor Comm Upgrades - Second Site Operational	1	2022	2	2024
GSW Prototypes/Integration	1	2022	1	2025
GSW Command and Control (mesh network development)	1	2022	3	2026
TAPOUT Experimental Operations and Development	1	2023	1	2024
TAPOUT Experimental Evaluation Period	4	2023	4	2024
TAPOUT IOC	4	2023	4	2023
TAPOUT FOC	4	2024	4	2024
Commercial Data Buys Beyond Protect and Defend				
Commercial Data Buys Beyond Protect and Defend	1	2024	4	2028
Unified Data Library (UDL)				
UDL Cloud Hosting	1	2022	4	2022
Development/Data Onboarding (Demos, Use Cases, Commercial)	1	2022	4	2022
Space Surveillance Telescope (SST)				
OT&E	2	2022	3	2022

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203940SF / *Space Situation Awarenes s Operations*	Project (Number/Name) 673941 / *Unified Data Library (UDL)*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
673941: *Unified Data Library (UDL)*	-	0.000	29.507	187.370	0.000	187.370	72.123	52.016	22.441	30.503	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Unified Data Library (UDL) supports the integration, exploitation and delivery of Space Domain Awareness (SDA) data sources for Command and Control (C2) and battle management of space forces. It focuses on enabling data sharing, establishing the data architecture required to aggregate multi-sensor data for broader use at different clearance levels, transforming any-source data into normalized, usable information via data exploitation tools, followed by data hand off to Battle Management Command and Control mission systems to support actual space operations. UDL efforts include purchasing commercial SDA data and services in support of US Space Command (USSPACECOM) operations. The UDL will directly connect to USSF owned and collateral sensors with modernized interfaces and transport options to broadly expose data. The UDL will be the single source for accessing and managing all data in support of the USSF, providing a central location to find and access data, enabling superior analytics.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Center (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Unified Data Library (UDL)	-	29.507	55.970
Description: UDL capabilities support integration, exploitation, and delivery of data sources for command and control and battle management of space forces. UDL will continue to develop the library by on-boarding new data sets, directly connecting to SDA sensors, expanding data services, federating between enterprise data lakes, expanding defensive cyber operations capabilities, adding non-metric data to the SDA marketplace, continuing to expand local area network capability to share Space Surveillance Network (SSN) data in a cyber-secure manner, purchasing commercial data and services to support USSPACECOM operations, allowing optimized data flow for use of existing SDA capability, and providing access to new commercial SDA innovations that will enable the broader SDA mission. The UDL enables analysis across the global space enterprise, as well as for Space Force related exercise support, cross-domain solution services and integration of the legacy communications architecture with the UDL.			
FY 2023 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673941 / *Unified Data Library (UDL)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Continue to expand UDL infrastructure to support increased number of customers and operations across multiple security environments by initiating an Enterprise Support structure that allows for the UDL to be "franchised" and proliferated at different classification levels, yet still supported by a common source of system administration for all UDL instances located at any classification level. All commercial SDA related funding will result in the timely provision of accurate data and information to government customers. Fund the expansion of defensive cyber operations capability, to include persistent red team analysis of broader UDL architecture. Overall, funds cover cloud hosting cost, data service development, security, system administration, data on boarding, Data as a Service platform for data ingestion, retention, processing, normalization, and analysis across the global space enterprise, Space Force related exercise support, cross domain solution services and integration of the legacy communications architecture with the UDL. Additionally, FY 2023 funding will allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of C2, resiliency measures and mission partner interfaces, space test/combat range events, and office support etc. ***FY 2024 Plans:*** Continue to expand UDL infrastructure to maintain digital superiority, support an increased number of customers and operations across multiple security environments. Expand the enterprise support structure to allow the UDL to be "franchised" and proliferated at different classification levels, yet supported by a common source of system administration for all UDL instances located at any classification level through Special Access Programs (SAP). Implement federation with five other existing Department of the Air Force (DAF) enterprise data lakes to expose data for the purposes of advanced data analytics. Incorporate commercial SDA related data and information to increase data samples and improve overall SDA picture for government customers. Expand cybersecurity efforts to include persistent red team analysis of broader UDL architecture and ensure zero trust. Directly connect the UDL to 20+ additional Space Surveillance Network (SSN) and non-traditional SDA sensors with modernized interfaces and transport options. Streamline SDA related data flows as transport options are implemented to meet SDA objectives. Expand bi-directional data sharing capabilities between C2 Centers and SDA systems, implement bi-directional data sharing with coalition and allied partners, and implement edge computing platform strategies to enhance the situational awareness necessary to operate in a congested space domain. As data ingress and egress grow, a portion of the funds will cover associated cloud-hosting costs, data service development, security, system administration, data on boarding, data as a service platform retention, processing, and normalization. Analyze space warfighting data across the global space enterprise, as well as for Space Force related exercise support, cross-domain solution services and integration of the legacy communications architecture with the UDL.			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673941 / *Unified Data Library (UDL)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Additionally, FY 2024 funding will enable the program to implement system redundancy and resiliency to meet availability objectives in support of analysis and planning requirements. Activities may include, but are not limited to studies, technical analysis, risk reduction experiments , prototyping, integration and test of C2, evaluation of resiliency measures and mission partner interfaces, space test/combat range events, and expanded program support. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to directly connecting additional USSF sensors to the UDL, establishing bi-directional data sharing with coalition and allied partners, and increasing cloud hosting services.			
Title: Expansion of sensor communications upgrades and data integration ***Description:*** Expand planned sensor communications upgrades and the integration of non-traditional and commercial data. Deliver data on tactically relevant timelines from sensor to UDL and C2. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** Due to the classified nature of this project, specific details are available at a higher classification level. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to a classified add which will expand planned upgrades and integration efforts.	-	0.000	131.400
Accomplishments/Planned Programs Subtotals	-	29.507	187.370

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

During the first half of FY 2024, the Unified Data Library will continue to leverage the existing prime General Services Administration (GSA) contract. In parallel, the UDL will define the acquisition strategy for the next generation of the platform in support of emerging mission requirements, leading to a follow-on contract planned for late FY 2024, just prior to the expiration of the current GSA contract.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673941 / *Unified Data Library (UDL)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
UDL Data Science Working Group	C/CPFF	L3Harris : Colorado Springs, CO	-	-		-		0.600	Jan 2024	-		0.600	Continuing	Continuing	-
UDL Commercial Data	C/Various	Various : Various	-	-		3.141	Jan 2023	3.000	Jan 2024	-		3.000	Continuing	Continuing	-
UDL Development/Data Onboarding	C/Various	Various : Various	-	-		7.431	Dec 2022	27.027	Dec 2023	-		27.027	Continuing	Continuing	-
UDL Cloud Hosting	C/Various	Various : Various	-	-		10.723	Mar 2023	15.690	Mar 2024	-		15.690	Continuing	Continuing	-
SBIR/STTR	Allot	TBD : TBD	-	-		0.000	Oct 2022	1.950	Oct 2023	-		1.950	Continuing	Continuing	-
Technical Mission Analysis	RO	Various : Various	-	-		1.331	Nov 2022	1.122	Nov 2023	-		1.122	Continuing	Continuing	-
Expansion of sensor comm upgrades and data integration	TBD	TBD : TBD	-	-		-		131.400	Jan 2024	-		131.400	Continuing	Continuing	-
		Subtotal	-	-		22.626		180.789		-		180.789	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Colorado Springs, CO	-	-		4.273	Dec 2022	3.931	Dec 2023	-		3.931	Continuing	Continuing	-
FFRDC	RO	Various : Colorado Springs, CO	-	-		2.518	Nov 2022	2.550	Nov 2023	-		2.550	Continuing	Continuing	-
Other Support	C/Various	Various : Colorado Springs, CO	-	-		0.090	Dec 2022	0.100	Dec 2023	-		0.100	Continuing	Continuing	-
		Subtotal	-	-		6.881		6.581		-		6.581	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		29.507		187.370		-		187.370	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673941 / *Unified Data Library (UDL)*

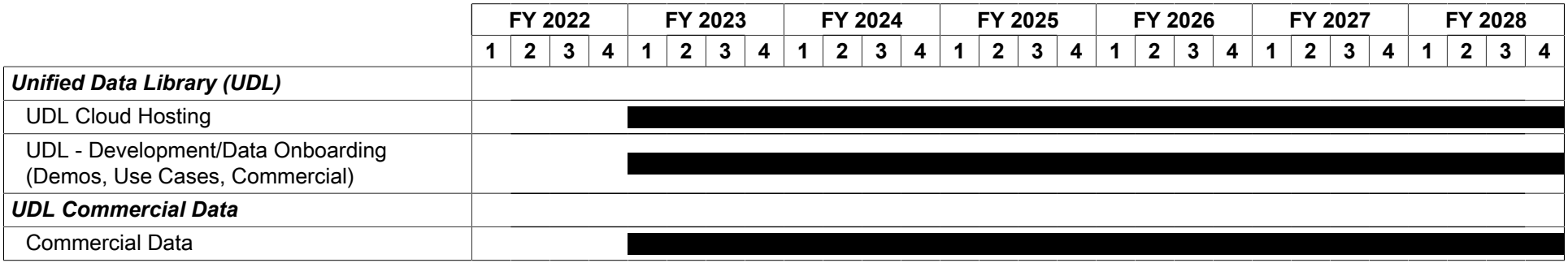

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 673941 / *Unified Data Library (UDL)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Unified Data Library (UDL)				
UDL Cloud Hosting	1	2023	4	2028
UDL - Development/Data Onboarding (Demos, Use Cases, Commercial)	1	2023	4	2028
UDL Commercial Data				
Commercial Data	1	2023	4	2028

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203940SF / *Space Situation Awarenes s Operations*	Project (Number/Name) 67A018 / *SF Weather Services Research*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
67A018: *SF Weather Services Research*	-	0.000	3.144	3.931	0.000	3.931	3.116	3.217	3.282	3.401	0.000	20.091
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This budget activity funds the operational development necessary to acquire, sustain, and modernize SF Weather Services Research capabilities in support of the 2022 National Defense Strategy's (NDS) three lines of effort: build a more lethal force, strengthen alliances and attract new partners, and change the way we do business.

To improve readiness for a more lethal force, SF Weather Services Research provides timely, accurate, resilient, and relevant environmental information to enable global battlespace situational awareness for Air Force (AF), Army, Special Operations Forces (SOF), Space Force (USSF), combatant commands, the Intelligence Community (IC), and other government agencies. SF Weather Services Research provides climate impacts and assessments, as well as space and terrestrial weather sensing, forecasting, and weather analytic capabilities, at home station and deployed, in order to deliver critical environmental intelligence in support of warfighters to gain the asymmetric advantage during the full spectrum of air and space combat operations. SF Weather Services Research decreases the risk to mission and risk to force by increasing the lethality, effectiveness, and survivability of Department of Defense (DoD) weapon systems.

To strengthen alliances and partnerships, SF Weather Services Research 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.

To ensure greater performance and affordability for the Department of the AF, SF Weather Services Research sensors and information systems are being modernized through improvements to architecture and system efficiency, cybersecurity, joint all-domain command and control (JADC2) and sensing grid integration, migration to cloud computing, artificial intelligence and machine learning (AI/ML) initiatives, and expanding agile software development, delivery, and integration practices. The AF Weather Enterprise digital transformation and cloud migration effort modernizes key capabilities providing the military advantage to accurately predict environmental impacts optimizing mission planning, targeting, weaponeering, mission execution, battle damage assessment, and space systems operations.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Center (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

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).

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 67A018 / *SF Weather Services Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Space Weather Analysis and Forecast System (SWAFS)	0.000	3.144	3.931

Description: The SWAFS legacy baseline is currently being redesigned and upgraded under the Space Domain Awareness Environmental Toolkit for Defense (SET4D) effort to satisfy Space Domain Awareness goals for a modern cloud hosted infrastructure that is cyber resilient and integrated with the Unified Data Library. The Energetic Charged Particle Hazard Assessment System (ECP HAS) is one of several models and applications within the SET4D environment designed to inform satellite operators of hazards and the impacts of those hazards to their spacecraft that will provide warfighters with the environmental awareness to safely sustain their respective orbits and missions.

FY 2023 Plans:
Complete integration of the last component of the ECP HAS into the SET4D cloud infrastructure. This final phase will incorporate the Versatile Electron Radiation Belt (VERB) outer zone application which provides a Complete picture of the space environment charging impacts on satellites.
- Leverage and integrate data from the Military Application of the Space Environment (MASE) effort and Unified Data Library (UDL) effort to improve data for SWAFS analysis.
- Integrate the newest version of the Radio Frequency Ionospheric Scintillation Analysis Tool (RISA.v1.0) application for improved solar forecasting capabilities. This application will enhance the prediction and forecasting capabilities associated with major solar events that impact critical VHF/UHF/HF communication lines in support of global combat operations.
- Integrate new Data sources such as Global Positioning System Radio Occultation and Ultraviolet Photometer Co-located/Limb-imaging Ionospheric and Thermospheric Extreme Ultraviolet Spectrograph (GROUP CLites) and Responsive Environmental Assessment Commercially hosted (REACH) to enhance the performance and accuracy of numerous models within the SET4D baseline. Integrate electro-magnetic and Ionospheric impact Assessment capabilities such as Ovation Prime and Wide Band Model (WBMOD).

FY 2024 Plans:
Development activities include integration of software into the Space Environment Toolkit for Defense (SET4D) baseline that includes decomposing, developing, testing, and validating software applications that support the prediction/forecasting processors for global geomagnetic, auroral and solar activities that impact satellite, communication, radar, high flyer, and intelligence operations. The contractor will perform integration and cloud migration efforts of prototype tools developed to a Technology Readiness level (TRL) 6 or higher delivered to them from the Air Force Research Lab (AFRL), Atmospheric Environmental Research Corporation (AER), Boston College (BC), and John Hopkins University/Applied Physics Lab (JHU/APL) for integration into the SET4D baseline that give DOD customer's customized tools for performing space environment characterization for the different layers of the atmosphere. AFRL's Radio Frequency Ionospheric Scintillation Analysis tool (RISA v1 and v2) requires integration into the SET4D baseline and will produce a Global 4 dimensional Specification Product, a communications link Outage Map Product, and a ground-to-sky outage SkyMap Product. Boston College developed Constellation Observing System for

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 67A018 / *SF Weather Services Research*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Meteorology,Inosphere and Climate2 (COSMIC2) All Clear algorithms which contain additional filters that remove radio frequency interruptions (RFI) will require integration into the SET4D baseline. Additional AFRL tools such as Solar Indices Forecasting Tool (SIFT), Air Force Data Assimilative Photospheric Flux Transport (ADAPT), Solar Radio Burst (SRB) forecast, Radiation Exposure (RADEX), and the International Reference Ionosphere (IRI) 2016 model that provides an empirical electron density specification or forecast (by forecasting drivers) will require integration into SET4D baseline. JHU/APL software modernization of the OVATION-Prime (aurora radar model) and the global Ionospheric assimilation model (IDA4D) that replaces the Global Assimilation of Ionospheric Measurements (GAIM) will require integration into the SET4D baseline. The contractor will develop SET4D metrics that track performance of all the SET4D applications and perform raw data qualitative analysis to ensure the applications can discern good data from bad data in the final products. The contractor will perform integration of the Wideband Model (WBMOD) software in support of scintillation climatology characterization for Electromagnetic Induction (EMI) attribution of the DOD's ground and space assets for improved space situational awareness. Lastly, the contractor will address any carry-over of Continues Improvement/Continuous Development (CI/CD) activities for space environment characterization algorithm improvements. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to ramping up development and integration effort required to integrate multiple new software algorithm tools into SET4D.			
Accomplishments/Planned Programs Subtotals	0.000	3.144	3.931

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPAF 01 SPCMOD: *Space Mods*	-	5.299	3.200	-	3.200	3.062	3.152	3.234	3.299	0.000	21.246
• RDTE 04 0604002F: *Air Force Weather Services Research*	-	0.796	-	-	-	-	-	-	-	0.000	0.796

Remarks

D. Acquisition Strategy

SF Weather Services Research uses a Continuous Integration/Continuous Deployment (CI/CD) approach to rapidly deliver capabilities using multiple contracts to support a family of systems through development, fielding and sustainment.

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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203940SF / *Space Situation Awarenes s Operations*	Project (Number/Name) 67A018 / *SF Weather Services Research*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
SET4D Modernization	C/CPFF	Peraton : Herndon, VA	-	-		3.144	Feb 2023	3.931	Feb 2024	-		3.931	Continuing	Continuing	-
		Subtotal	-	-		3.144		3.931		-		3.931	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		3.144		3.931		-		3.931	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 67A018 / *SF Weather Services Research*

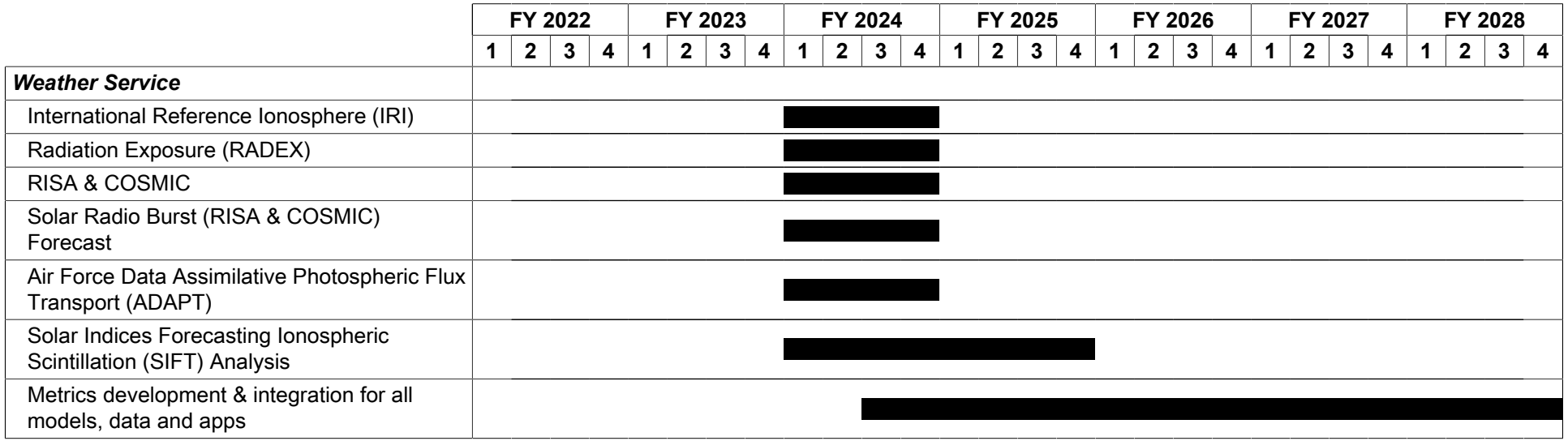

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203940SF / *Space Situation Awarenes s Operations*	**Project (Number/Name)** 67A018 / *SF Weather Services Research*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Weather Service				
International Reference Ionosphere (IRI)	1	2024	4	2024
Radiation Exposure (RADEX)	1	2024	4	2024
RISA & COSMIC	1	2024	4	2024
Solar Radio Burst (RISA & COSMIC) Forecast	1	2024	4	2024
Air Force Data Assimilative Photospheric Flux Transport (ADAPT)	1	2024	4	2024
Solar Indices Forecasting Ionospheric Scintillation (SIFT) Analysis	1	2024	4	2025
Metrics development & integration for all models, data and apps	3	2024	4	2028

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 1206423SF / *Global Positioning System III - Operational Control Segment*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	459.346	388.977	277.052	317.309	0.000	317.309	82.385	22.836	6.616	6.855	0.000	1,561.376
67A021: *OCX*	405.425	334.680	191.073	200.452	0.000	200.452	19.181	0.000	0.000	0.000	0.000	1,150.811
67A023: *OCX Block 3F*	0.000	0.000	85.979	116.857	0.000	116.857	63.204	22.836	6.616	6.855	0.000	302.347
67A025: *GPS Enterprise Integrator*	53.921	54.297	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	108.218

A. Mission Description and Budget Item Justification

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. GPS also includes the Nuclear Detonation (NUDET) Detection System (NDS). The Government is responsible for the integration of the GPS Segments such that they provide worldwide GPS capability to support the warfighter and over four billion national security, civil, Allied, and commercial GPS users.

Program Element (PE) 1206423SF funds Research, Development, Test and Evaluation (RDT&E) for the Next Generation Operational Control System (OCX), which includes OCX Blocks 0, 1, and 2, and the upgrade to OCX called OCX Block 3F (OCX 3F), which incorporates Regional Military Protection (RMP) and command and control functionality for GPS III Follow-on (GPS IIIF) satellites. GPS Enterprise Integrator (EI) activities are systems engineering and integration activities conducted across the space, user, and ground segments. This activity formerly resided in the OCX PE and was switched to the GPS III Follow-on (GPS IIIF) PE in FY 2023.

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 3F will upgrade OCX to provide RMP, a high-powered military signal which strengthens U.S. and allied forces' GPS resiliency in contested on tested environments to mitigate future jamming threats. OCX 3F also provides the ability to rapidly reconfigure GPS IIIF satellites to create time-critical warfighter effects. 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 and OCX 3F 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, pre-operational support activities, and interim contractor support. These activities support upgrades and product improvements for military and civil applications necessary to enable efforts to protect the

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1206423SF *I Global Positioning System III - Operational Control Segment*

United States Military and Allies' use of GPS. Additionally, funds ensure OCX and OCX Block 3F efforts meet Joint Requirements Oversight Council (JROC) approved required capabilities.

OCX Block 1 and 2 primary development concludes at system acceptance executed via DoD Form DD 250 (planned for late FY 2023). Pre-Operational Support (pre-ops acceptance) and Interim Contractor Support (ICS) (post-ops acceptance) is the final contract phase that completes development, achieves the program's final Acquisition Program Baseline (APB) milestone Ready to Transition to Operations (RTO), supports Operational Acceptance (OA), and transitions OCX to long-term sustainment. Specifically, ICS provides contractor support services to sustain and provide capability insertions; maintain system performance requirements; and participate in government led events, maintenance, integrated supply support, security, and launch activities. RDT&E funded government activities include Development Test and Evaluation (DT&E), GPS Constellation Transfer (CTX), Operational Test and Evaluation OT&E, and OA. Upon completion of those activities, OCX will prepare for, and transition to O&M funded Contractor Logistics Support (CLS).

OCX 3F, which achieved Milestone B May 2022, is required to launch and operationally command and control GPS IIIF space vehicles. OCX 3F will upgrade OCX with new capabilities to synchronize with GPS IIIF Space Segment and Military GPS User Equipment (MGUE) Increment 2 capabilities. This includes master control station development, GPS system simulator modification, launch and 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 3F will maintain backward compatibility to support the legacy constellation develop solutions necessary to command, control and monitor GPS IIIF, to include integration of RMP high power regional M-code signals, rapid warfighter effects and support to GPS auxiliary payloads.

The GPS EI project, transferred from the OCX PE 1206423SF to the GPS IIIF PE 1203269SF in FY23, includes critical efforts associated with the Government's responsibility to accomplish integration of multiple prime contracts across the three GPS enterprise segments, along with the transition to sustainment and operational communities. GPS EI maintains the current GPS architecture and system definition, controls and validates interfaces, ensures compatibility across current Generation II and III systems, and supports ongoing developments within the Space, Ground Control, and User Equipment Segments. GPS EI also develops/manages plans for execution and fielding of new capability like the new Military Code for use at the earliest opportunity. 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.

GPS EI project funds the technical evolution, risk reduction, enterprise-level testing and delivery of all GPS Enterprise, capabilities. The GPS EI project also assists in the analysis and assessment of futures technology to continue the advancement of the GPS enterprise ensuring GPS capabilities continue to be at the forefront. 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.

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

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
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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 PNT 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.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) has transformed 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, SSC 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 and OCX 3F weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in PEs 1206392SF and 1206398SF.

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	402.532	359.720	274.887	0.000	274.887
Current President's Budget	388.977	277.052	317.309	0.000	317.309
Total Adjustments	-13.555	-82.668	42.422	0.000	42.422
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-82.668			
• 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	-13.555	0.000			
• Other Adjustments	0.000	0.000	42.422	0.000	42.422

Change Summary Explanation

FY 2023: -$82.668M Congressional Directed Reduction

FY 2024: +$43.000M to support Blocks 1 and 2 development completion, and transition to pre-operational support/ICS phase. Plus OCX 3F software sustainment, and development costs from new Agile cost model.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1206423SF *I Global Positioning System III - Operational Control Segment*

FY 2024: -$1.806M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.
FY 2024: +$1.228M Inflation adjustment

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1206423SF / *Global Positioning System III - Operational Control Segment*	Project (Number/Name) 67A021 / *OCX*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
67A021: *OCX*	405.425	334.680	191.073	200.452	0.000	200.452	19.181	0.000	0.000	0.000	0.000	1,150.811
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Prior Years Funding $4,366.725M was executed in PE 1206423F.

A. Mission Description and Budget Item Justification

The Global Positioning System (GPS) is a space based Position, Navigation and Timing (PNT) distribution system which operates through all weather. This project funds the research and development for the Next Generation Operational Control System (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 monitor 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 Navigation Warfare (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, pre-operational support activities, and interim contractor support, in support of upgrades and product improvements for military and civil applications necessary to support efforts to protect the United States military and Allies' use of GPS. Additionally, funds will ensure efforts to meet Joint Requirements Oversight Council (JROC) approved required capabilities.

OCX Block 0 is the Launch and Checkout System (LCS) intended to conduct Launch and Early Orbit (LEO) operations and the on-orbit checkout of all GPS III satellites. The 2nd Space Operations Squadron (2SOPS) can also call upon OCX Block 0 capabilities at any time to support GPS III anomaly resolution activities. OCX Block 0 is a subset of OCX Block 1.

OCX Block 1 fields the operational capability to control all legacy satellites, the legacy civil signal (L1C/A), the legacy 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.

In FY 2023, the effort for OCX Block 3F (OCX 3F) was captured in a new Project 67A023, OCX Block 3F, for transparency. OCX 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 RMP to handle future threats. OCX 3F will upgrade OCX with new capabilities to synchronize with GPS III Follow-on (GPS IIIF) Space Segment and Military GPS User Equipment (MGUE) Increment 2 capabilities. OCX 3F will

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
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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 3F effort will develop solutions necessary to launch, 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 Nuclear Detonation (NUDET), NUDET Detection System (NDS), and Search and Rescue (SAR).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: OCX Development	251.275	173.854	189.123
Description: Development of Next Generation Operational Control System (OCX) system to launch Global Positioning System (GPS) III, operate a mixed GPS II and GPS III constellation, and provide for a robust Information Assurance system. ***FY 2023 Plans:*** Continue contractor support of the OCX Block 0 baseline that is supporting the launch checkout, and anomaly support for GPS III satellites. For Blocks 1/2, address and resolve technical challenges that have delayed completion of formal qualification and system acceptance testing and DD250 into Fourth Quarter FY2023; also study and implement updates and operational procedures to meet the intent of multiple Positioning Signal Integrity and Continuity Assurance (PSICA) related requirements. Also, in support of those activities, continue software fixes, version updates, software patches, and maintaining the global monitor stations. Prepare closeout activities post-DD250 for applicable contract line items. Award and begin Pre-Operational Support (pre-ops acceptance) and Interim Contractor Support (ICS) (post-ops acceptance) activities for OCX Block 0 and Blocks 1/2. Pre-Operational support activities occur with the program office's system acceptance via DD250 but prior to the warfighter's Operational Acceptance (OA). The contractor will provide extensive critical support to certify OCX as ready for Operational Testing (OT): training, demonstrations, readiness campaigns, and enterprise level tests among ground, space, and users. Continue to rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2024 Plans:*** Focus on executing Pre-Ops Support/ICS contract line items (i.e., on-going ICS for OCX Blocks 0 and Blocks 1/2). Continue supporting the launch checkout and anomaly resolution of GPS III satellites. Perform maintenance activities for Blocks 1 and 2, provide contractor staff to support government activities, and conduct pre-planned system updates to align ground capabilities with GPS enterprise changes involving the space and user segments. Begin activities to achieve Blocks 1/2 OA. Planned activities include: Development Testing (Integrated System Test 3-1 (IST 3-1)), contractor performed crew operations, supporting additional crew, training, performing transition rehearsals that validate the procedures to transition the GPS satellite constellation to OCX, transferring the GPS Constellation from the legacy Operational Control System (OCS) to OCX, troubleshooting issues and/or rectifying deficiency reports levied by the operational community in connection with Operational Test and Evaluation (OT&E), and conducting OT&E that culminates with OA. Interim Contractor Support begins immediately upon OA, and the contractor will continue maintenance and pre-planned system updates providing contractor crew operators, support to crew training, and support for other GPS constellation activities. O&M funded long-term Contractor Logistics Support (CLS). CLS transition activities may			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
entail, but are not limited to: movement of depot support equipment, laboratories, simulators, upgrades to fielded interfaces, and stand-up of organic Depot Support activities. Finally, ICS must continue to rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to: program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased to support: Focus on executing Pre-Ops Support/ICS contract line items; troubleshooting issues and/or rectifying deficiency reports levied by the operational community in connection with DT, RTO, and OT prep.			
Title: Technical Support ***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). ***FY 2023 Plans:*** Support upgrade of Enterprise Mission Planning Systems as required. Continue data collection and tuning of the monitoring stations equipment as needed. Continue witnessing contractor testing in support of system acceptance. Perform SE and technical support and analysis for planning government led development testing, and operational acceptance testing. Provide contract technical support and assistance as required. Continue support towards OCX Block 1 and 2 Ready to Transition to Operation milestone. ***FY 2024 Plans:*** Continue data collection and tuning of the monitoring stations equipment as needed. Continue Systems Engineering and technical support and analysis for Government led testing, and operational demonstrations, exercises, and training. Assist with plans for transition to sustainment, provide contract technical support, and assist with closeout activities as required. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to ramp down of technical support effort after DD250; less documentation to review and system engineering to perform.	14.694	17.219	11.329
Title: OCX Block 3F ***Description:*** OCX Block 3F will upgrade OCX Block 1 & 2 with new capabilities necessary for the launch and operation of GPS IIIF and incorporate RMP to handle future threats. OCX Block 3F will maintain backward compatibility to support the legacy constellation develop solutions necessary to command, control and monitor GPS IIIF, to include advance collection and integration of RMP high power regional M-code signals, rapid warfighter effects and support to GPS auxiliary payloads.	68.711	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A021 / *OCX*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: N/A ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	334.680	191.073	200.452

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• RDTE 07 1203265F: *GPS III Space Segment*	6.998	1.526	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.524
• RDTE 05 1203269SF: *GPS III Follow-on*	237.947	232.783	247.278	-	247.278	190.442	128.163	100.481	9.000	277.486	1,423.580
• SPSF 01 GPSIII: *GPS III Space Segment*	84.452	103.340	121.770	-	121.770	75.491	50.078	2.809	0.000	0.000	437.940
• SPSF 01 GPS03C: *GPSIII Follow On*	835.176	616.962	119.700	-	119.700	678.531	708.802	743.060	758.646	2,051.461	6,512.338

Remarks

D. Acquisition Strategy

The Space Force is pursuing a "Block" approach for OCX in order to respond to warfighter capability requirements. Enterprise studies will ensure GPS Enterprise synchronization across space and ground segments.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS OCX Phase B OCX Block 1 & 2 Development	C/CPAF	Raytheon : Aurora, CO	289.954	232.361	Oct 2021	152.855	Oct 2022	2.600	Oct 2023	-		2.600	0.000	677.770	3,876.024
GPS OCX Pre Operational and Interim Contractor Support	SS/CPIF	Raytheon : Aurora, CO	0.000	-		5.000	Jul 2023	166.548	Oct 2023	-		166.548	16.926	188.474	-
GPS OCX SBIR/STTR	Various	Various : Various	0.000	-		-		7.016	Mar 2024	-		7.016	0.671	7.687	-
GPS OCX Block 3F Development	Various	Various : Various	62.308	68.711	Nov 2021	-		-		-		-	0.000	131.019	-
GPS OCX Technical Mission Analysis	RO	Aerospace : El Segundo, CA	13.660	7.488	Nov 2021	5.408	Nov 2022	3.151	Nov 2023	-		3.151	0.000	29.707	-
GPS OCX Enterprise SE&I	C/CPAF	TASC : El Segundo, CA	11.162	2.869	Nov 2021	1.028	Nov 2022	0.276	Nov 2023	-		0.276	0.000	15.335	-
GPS OCX Modernization/ SE & Tech Support	Various	Various : Various	5.374	0.990	Nov 2021	10.332	Nov 2022	8.178	Nov 2023	-		8.178	0.767	25.641	-
GPS OCX Standardized Space Trainer (SST)	C/CPAF	Sonalyst, Inc. : Waterford, CT	6.000	0.316	Nov 2021	-		-		-		-	0.000	6.316	-
GPS OCX Enterprise Mission Planning	MIPR	Various : Various	5.800	5.900	Jan 2022	-		-		-		-	0.000	11.700	-
		Subtotal	394.258	318.635		174.623		187.769		-		187.769	18.364	1,093.649	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS OCX T&E	C/Various	Various : Various	4.355	-		1.479	Nov 2022	-		-		-	0.000	5.834	-
		Subtotal	4.355	-		1.479		-		-		-	0.000	5.834	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A021 / *OCX*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS OCX FFRDC	Various	Various : Various	1.790	3.300	Oct 2021	0.950	Oct 2022	0.548	Oct 2023	-		0.548	0.000	6.588	-
GPS OCX A&AS	Various	Various : Various	4.793	12.171	Nov 2021	13.271	Nov 2022	11.435	Nov 2023	-		11.435	0.817	42.487	-
GPS OCX Other Support	Various	Various : Various	0.229	0.574	Oct 2021	0.750	Oct 2022	0.700	Oct 2023	-		0.700	0.000	2.253	-
		Subtotal	6.812	16.045		14.971		12.683		-		12.683	0.817	51.328	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	405.425	334.680		191.073		200.452		-		200.452	19.181	1,150.811	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A021 / *OCX*

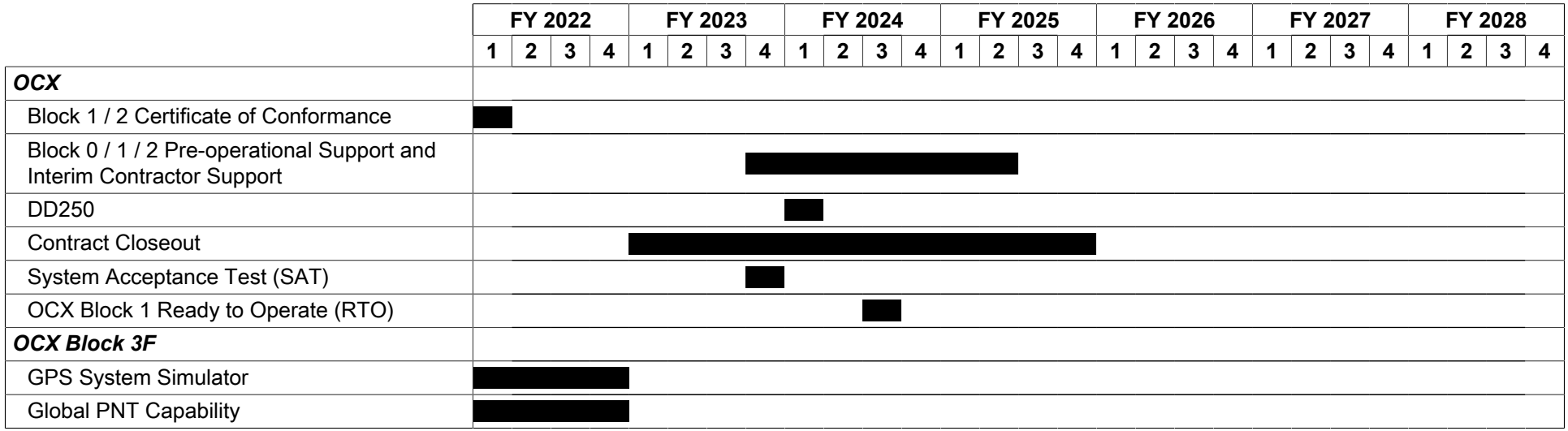

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A021 / *OCX*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
OCX				
Block 1 / 2 Certificate of Conformance	1	2022	1	2022
Block 0 / 1 / 2 Pre-operational Support and Interim Contractor Support	4	2023	2	2025
DD250	1	2024	1	2024
Contract Closeout	1	2023	4	2025
System Acceptance Test (SAT)	4	2023	4	2023
OCX Block 1 Ready to Operate (RTO)	3	2024	3	2024
OCX Block 3F				
GPS System Simulator	1	2022	4	2022
Global PNT Capability	1	2022	4	2022

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1206423SF / *Global Positioning System III - Operational Control Segment*	Project (Number/Name) 67A023 / *OCX Block 3F*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
67A023: *OCX Block 3F*	0.000	0.000	85.979	116.857	0.000	116.857	63.204	22.836	6.616	6.855	0.000	302.347
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

OCX Block 3 Follow-on (OCX 3F) will modify OCX Command and Control (C2) for new Global Positioning System (GPS) III Follow-On (GPS IIIF) satellites and Military GPS User Equipment (MGUE) system capabilities, including Regional Military Protection (RMP) high-powered military signal to strengthen U.S. and allied forces' GPS resiliency in contested environments to mitigate future threats, and the ability to rapidly reconfigure GPS IIIF satellites to create time-critical warfighter effects. OCX 3F will maintain backward compatibility with the existing OCX capabilities to support the legacy GPS constellation as well as GPS IIIF. OCX 3F includes critical functions necessary to launch, command, control, and monitor GPS IIIF spacecraft, collect and integrate RMP high-power regional Military Code (M-Code) signals for rapid warfighter effects, and support GPS IIIF auxiliary payloads, including Search and Rescue (SAR) and Nuclear Detonation (NUDET) Detection System (NDS).

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: OCX Block 3F	0.000	85.979	116.857
Description: OCX Block 3F upgrades OCX Block 1 & 2 with new capabilities in support of GPS IIIF and incorporate RMP to handle future threats. OCX 3F will maintain backward compatibility to support the legacy constellation develop solutions necessary to command, control and monitor GPS IIIF, to include advance collection and integration of RMP high power regional M-code signals, rapid warfighter effects and support to GPS auxiliary payloads.			
FY 2023 Plans: Continue OCX 3F Command and Control (C2) system development, integration and test, and training capabilities to support GPS IIIF launch, checkout, and on-orbit operations. Support early Enterprise risk reduction integration exercises with GPS IIIF space vehicles. Continue software coding and development of C2 capabilities for Regional Military Protection (RMP) and Rapid Warfighter Effects (RWE). Begin accreditation of the GPS System Simulator for OCX 3F and work on development of the Global Positioning, Navigation, and Timing (PNT) critical capability. Support GPS Systems Integration (SI) Demonstrations to mitigate risks for key interfaces and functionality between the GPS space, ground and user equipment segments. Continue cybersecurity resiliency development and test and support Tabletop exercises to identify and mitigate cybersecurity threats. Upgrade Enterprise Mission Planning Systems to use OCX 3F. Develop OCX 3F upgrades for Standardized Space Trainer (SST) to support OCX 3F C2 operator training. 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 2024 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A023 / *OCX Block 3F*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Deliver initial OCX 3F Launch and Checkout System (LCS) software to support enterprise integration risk reduction events with GPS IIIF space vehicles. Initiate refresh of LCS hardware to support Enterprise events. Continue system development, integration and test, and training capabilities to support GPS IIIF launch, checkout, and on-orbit operations. Continue software coding and development of C2 capabilities for RMP and RWE. Finalize accreditation of and complete upgrades to the OCX 3F GPS System Simulator and work on development of the Global Positioning, Navigation, and Timing (PNT) critical capability. Support GPS Systems Integration (SI) Demonstrations to mitigate risks for key interfaces and functionality between the GPS space, ground and user equipment segments. Continue cybersecurity resiliency development and test and support Tabletop exercises to identify and mitigate cybersecurity threats. Incorporate Enterprise Mission Planning Systems capability into OCX 3F baseline. The Enterprise Mission Planning Systems enable Over the Air Rekey capability and other navigation warfare effects taskings. Develop OCX 3F upgrades for SST to support OCX 3F C2 operator training. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to the support for testing of initial delivery of the LCS software and maturity of OCX 3F specific upgrade efforts for Enterprise Mission Planning System and SST.			
Accomplishments/Planned Programs Subtotals	0.000	85.979	116.857

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 1203265SF: *GPS III Space Segment*	84.452	103.340	121.770	-	121.770	75.491	50.078	2.809	0.000	0.000	437.940
• SPSF 01 GPS03C: *GPSIII Follow On*	835.176	616.962	119.700	-	119.700	678.531	708.802	743.060	758.646	2,051.461	6,512.338
• RDTE 07 1203265F: *GPS III Space Segment*	7.207	1.526	0.000	-	0.000	0.000	0.000	0.000	0.000	0.000	8.733
• RDTE 05 1203269SF: *GPS III Follow-On (GPS IIIF)*	237.947	232.783	247.278	-	247.278	190.442	128.163	100.481	9.000	277.486	1,423.580

Remarks

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A023 / *OCX Block 3F*

D. Acquisition Strategy

OCX Block 3F is a separate, tailored Acquisition Category (ACAT) II program. It is part of the overall GPS Enterprise Modernization effort. The OCX 3F development contract was awarded sole source to Raytheon Intelligence and Space in 3rd Quarter FY 2021. The OCX 3F program uses an agile software development approach to upgrade the OCX system to support the first GPS IIIF satellite launch, while also maintaining backwards compatibility for C2 of the existing GPS satellite constellation.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A023 / *OCX Block 3F*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
OCX 3F Development	C/CPAF	Raytheon : Aurora, CO	0.000	-		65.484	Oct 2022	86.906	Oct 2023	-		86.906	Continuing	Continuing	-
OCX 3F SBIR/STTR	Various	Various : Various	0.000	-		-		4.090	Mar 2024	-		4.090	Continuing	Continuing	-
OCX 3F Technical Mission Analysis	RO	Aerospace : El Segundo, CA	0.000	-		3.789	Nov 2022	4.589	Nov 2023	-		4.589	Continuing	Continuing	-
OCX 3F Enterprise SE&I	C/CPAF	TASC : El Segundo, CA	0.000	-		0.622	Nov 2022	2.890	Nov 2023	-		2.890	Continuing	Continuing	-
OCX 3F Enterprise Mission Planning	MIPR	Various : Various	0.000	-		5.900	Jan 2023	7.000	Jan 2024	-		7.000	Continuing	Continuing	-
OCX 3F Modernization/SE & Tech Support	Various	Various : Various	0.000	-		-		1.214	Nov 2023	-		1.214	Continuing	Continuing	-
OCX 3F Standardized Space Trainer (SST)	C/CPAF	Sonalyst, Inc : Waterford, CT	0.000	-		1.943	Nov 2022	3.471	Nov 2023	-		3.471	Continuing	Continuing	-
		Subtotal	0.000	-		77.738		110.160		-		110.160	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
OCX 3F FFRDC	RO	Aerospace : El Segundo, CA	0.000	-		0.765	Oct 2022	1.041	Oct 2023	-		1.041	Continuing	Continuing	-
OCX 3F A&AS	Various	Various : Various	0.000	-		7.108	Nov 2022	5.356	Nov 2023	-		5.356	Continuing	Continuing	-
OCX 3F Other Support	Various	Various : Various	0.000	-		0.368	Oct 2022	0.300	Oct 2023	-		0.300	Continuing	Continuing	-
		Subtotal	0.000	-		8.241		6.697		-		6.697	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	-		85.979		116.857		-		116.857	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A023 / *OCX Block 3F*

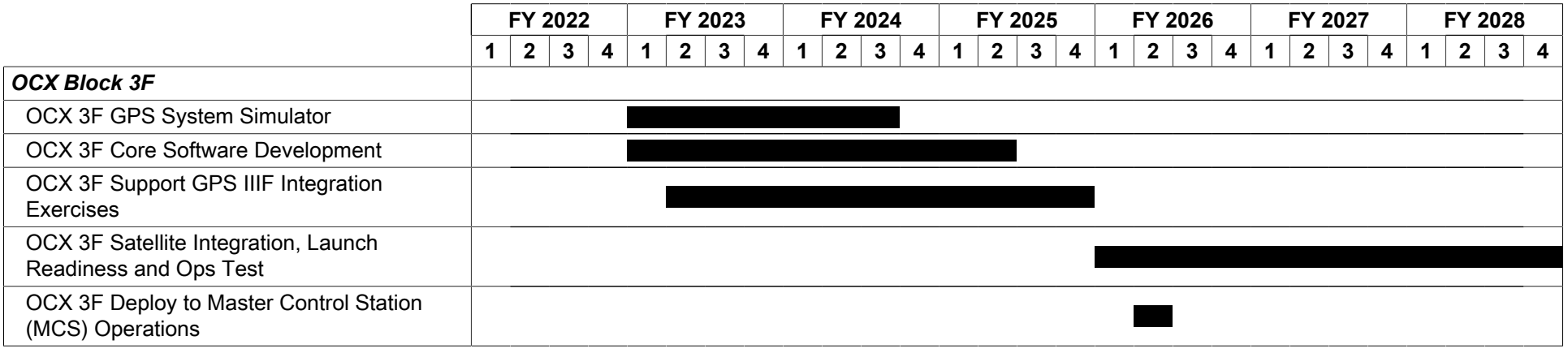

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A023 / *OCX Block 3F*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
OCX Block 3F				
OCX 3F GPS System Simulator	1	2023	3	2024
OCX 3F Core Software Development	1	2023	2	2025
OCX 3F Support GPS IIIF Integration Exercises	2	2023	4	2025
OCX 3F Satellite Integration, Launch Readiness and Ops Test	1	2026	4	2028
OCX 3F Deploy to Master Control Station (MCS) Operations	2	2026	2	2026

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1206423SF / *Global Positioning System III - Operational Control Segment*	Project (Number/Name) 67A025 / *GPS Enterprise Integrator*	

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
67A025: *GPS Enterprise Integrator*	53.921	54.297	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	108.218
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

In FY 2023, PE 1206423SF, Global Positioning System III - Operational Control Segment, Project 67A025, GPS Enterprise Integrator efforts were transferred PE 1203269SF, Global Positioning System IIIF, Project 653171, Space Programs in order to continue enterprise integration activities to support GPS IIIF Space, Ground and User Segment.

A. Mission Description and Budget Item Justification

The Global Positioning System (GPS) 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 Positioning, Navigation, and Timing (PNT) 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, GPS III Follow-on (GPS IIIF), Operational Control System (OCS), Next Generation Operational Control System (OCX), Military GPS User Equipment (MGUE) Increment 1 and Increment 2, and other PNT investment projects. 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 legacy systems such as, GPS Block II satellites, OCS 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 PNT capabilities, and various other obligations to the international community that provide inter-operable PNT signals.

GPS EI also supports 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

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A025 / *GPS Enterprise Integrator*

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.

GPS EI also manages GPS and other navigation system performance monitoring and publishes performance specifications and reports to ensure anomalies with GPS can be resolved. In addition GPS EI provides technical expertise for the development for GPS program technical baselines and public specifications to make certain that the Department of Defense (DOD) fulfills its commitment to the world for civilian GPS Service.

GPS EI also provides the PNT 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 the PNT Enterprise Segments, cybersecurity, and associated test cases necessary to deliver a secure operational system.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: GPS Enterprise Integrator	54.297	0.000	0.000
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. ***FY 2023 Plans:*** In FY 2023, GPS Enterprise Integrator efforts were transferred PE 1203269SF, Global Positioning System IIIF, Project 653170, Space Programs in order to continue enterprise integration activities to support GPS IIIF Space, Ground and User Segment. ***FY 2024 Plans:*** N/A ***FY 2023 to FY 2024 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	54.297	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A025 / *GPS Enterprise Integrator*

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 1203164SF: *NAVSTAR Global Positioning System (User Equipment) (SPACE)*	434.194	-	-	-	-	-	-	-	-	0.000	434.194
• SPSF 01 1203265SF: *GPS III Space Segment*	6.998	-	-	-	-	-	-	-	-	0.000	6.998
• RDTE 05 1203269SF: *GPS III Follow-On (GPS IIIF)*	246.332	-	-	-	-	-	-	-	-	0.000	246.332
• SPSF 01 1203913SF: *NUDET Detection System (SPACE)*	45.887	-	-	-	-	-	-	-	-	0.000	45.887
• SPSF 01 GPSIII: *GPS III Space Segment*	84.452	-	-	-	-	-	-	-	-	0.000	84.452
• SPSF 01 GPS03C: *GPS IIIF*	852.918	-	-	-	-	-	-	-	-	0.000	852.918
• SPSF 01 GPSSPC: *GPS UE Space*	2.274	-	-	-	-	-	-	-	-	0.000	2.274

Remarks

D. Acquisition Strategy

In accordance with a "back to basics" acquisition approach the Space Force is required to exercise complete ownership of the architecture, system definition, technical baseline, and integration of the GPS space, ground, and user segments. This complex inter-segment integration 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. SE&I effort was awarded in April 2022 through a full and open competition, following a sole source SE&I Bridge Contract that began in 1QFY22.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A025 / *GPS Enterprise Integrator*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS EI Enterprise SE&I	C/CPAF	TASC : El Segundo, CA	31.976	27.802	Nov 2021	-		-		-		-	0.000	59.778	-
GPS EI Technical Mission Analysis 1	RO	Aerospace : El Segundo, CA	6.574	5.460	Oct 2021	-		-		-		-	0.000	12.034	-
GPS EI Technical Mission Analysis 2	Various	MITRE : Various	10.073	10.763	Oct 2021	-		-		-		-	0.000	20.836	-
GPS EI MRTA/MSTA	C/CPAF	Draper Labs : Cambridge, MA	1.544	4.568	Dec 2021	-		-		-		-	0.000	6.112	-
GPS EI Cybersecurity	Various	Various : El Segundo, CA	1.208	0.000	Dec 2021	-		-		-		-	0.000	1.208	-
GPS EI Additional Product Development	Various	Various : Various	1.466	1.387	Oct 2021	-		-		-		-	0.000	2.853	-
		Subtotal	52.841	49.980		-		-		-		-	0.000	102.821	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS Integrated System Test	Various	Various : TBD	0.171	3.951	Oct 2021	-		-		-		-	0.000	4.122	-
		Subtotal	0.171	3.951		-		-		-		-	0.000	4.122	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
GPS EI FFRDC	Various	Various : El Segundo, CA	0.635	0.000	Oct 2021	-		-		-		-	0.000	0.635	-
GPS EI A&AS	Various	Various : El Segundo, CA	0.238	0.167	Oct 2021	-		-		-		-	0.000	0.405	-
GPS EI Other Support	Various	Various : Various	0.036	0.199	Oct 2021	-		-		-		-	0.000	0.235	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A025 / *GPS Enterprise Integrator*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	0.909	0.366		-		-		-		-	0.000	1.275	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	53.921	54.297		-		-		-		-	0.000	108.218	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A025 / *GPS Enterprise Integrator*

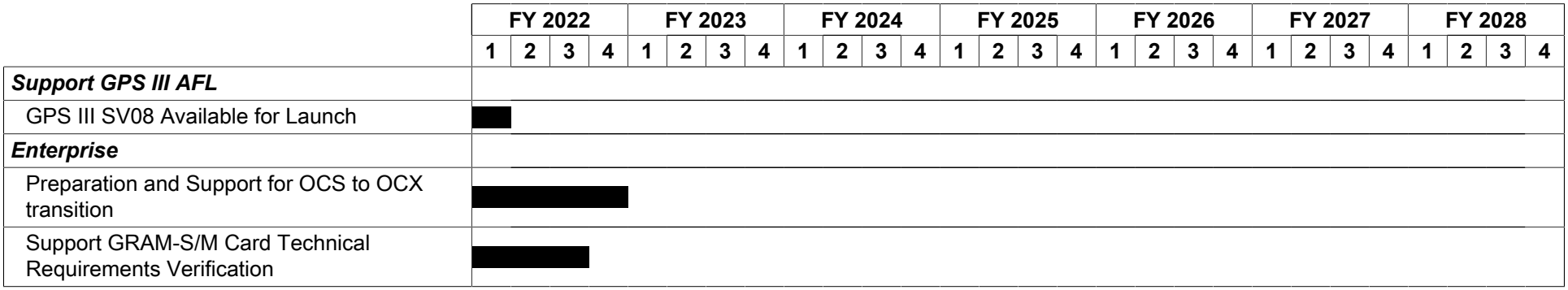

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206423SF / *Global Positioning System III - Operational Control Segment*	**Project (Number/Name)** 67A025 / *GPS Enterprise Integrator*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Support GPS III AFL				
GPS III SV08 Available for Launch	1	2022	1	2022
Enterprise				
Preparation and Support for OCS to OCX transition	1	2022	4	2022
Support GRAM-S/M Card Technical Requirements Verification	1	2022	3	2022

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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1206770SF / *Enterprise Ground Services*

COST ($ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	170.083	123.251	155.825	0.000	155.825	137.645	137.475	139.512	144.551	Continuing	Continuing
673140: *Enterprise Ground Services EGS*	-	170.083	123.251	155.825	0.000	155.825	137.645	137.475	139.512	144.551	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Today's rapidly changing threat environment requires the Department of Defense to deliver agile, integrated, and resilient effects in, from, and through space to meet the nation's warfighting needs. The Enterprise Ground Services (EGS) program will provide a robust enterprise ground architecture for United States Space Force (USSF) satellite systems. EGS capability will become the primary ground command and control (C2) suite of services for the Space Force enterprise that integrates with mission partner capabilities to meet evolving current and future space domain demands that will fully enable warfighting effects to maintain United States space dominance.

The EGS program will perform technology maturation, development, prototyping and operational mission transition for increased commonality and resiliency in space program systems. EGS will focus efforts on the rapid development and deployment of tactical C2 services, developing and integrating on-premise and cloud infrastructure to laboratories and multiple sites, exploring advanced concepts, developing prototypes and demonstrations, maturing user experience, refining Concept of Operations (CONOPs), and supporting cybersecurity operations and operational mission training. These efforts will require support such as systems engineering, integration and test, standards and interface development, architecture development, enhanced cybersecurity development and implementation and address Zero Trust. Programs and projects in the space warfighting enterprise are evaluating ways to maximize innovation, resiliency, and the ability to respond to known and emerging threats, as well as to identify shared/common platform, infrastructure, and data layer solutions to support open frameworks and architectures across the enterprise ground portfolio. Space enterprise efforts aim to execute technology risk-reduction efforts and integrate new or re-purposed 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 into its service catalog to support integrating legacy and new missions such as Missile Warning; Missile Defense; MILSATCOM; Positioning, Navigation, and Timing; Environmental Monitoring; Space Domain Awareness; Space Rapid Capabilities Office (SpRCO) Ground Command, Control, and Communications (GC3) and various classified and experimental satellites and missions to support a message standard compliant open architecture to meet Space Domain Awareness and Battle Management Command, Control, and Communication dynamic emerging threats. The modifications to catalog software applications provided by EGS are being made in an agile development, security, and operations (DevSecOps) environment.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

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 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	191.713	123.601	155.835	0.000	155.835
Current President's Budget	170.083	123.251	155.825	0.000	155.825
Total Adjustments	-21.630	-0.350	-0.010	0.000	-0.010
• Congressional General Reductions	0.000	-0.350			
• 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	-15.244	0.000			
• SBIR/STTR Transfer	-6.386	0.000			
• Other Adjustments	0.000	0.000	-0.010	0.000	-0.010

Change Summary Explanation

FY 2022: -15.244M reprogramming for higher Space Force priorities and -6.386M SBIR reduction.

FY 2023: -0.350M for congressionally-directed Federally Funded Research and Development Center (FFRDC) reduction.

FY 2024: +1.014M for inflation adjustment.

FY 2024: -1.024M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Enterprise Ground Services (EGS) Development	82.628	49.577	78.268

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1206770SF / *Enterprise Ground Services*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Description: Integrate common applications and services, refine standards and interfaces, develop and implement cybersecurity and cryptography requirements, refine training and CONOPs, address Zero Trust, and mature advanced concepts. Support prototype mission partner demonstrations and integration and test of mission-unique software. Expand the development environment in order to develop software applications and services in support of integrating additional satellite missions. ***FY 2023 Plans:*** Continue the development and deployment of existing EGS services, prototype mission partner demonstrations, implement cybersecurity and cryptography development, update platform development and interfaces, refine training and CONOPs, mature advanced concepts, support integration and test of mission-unique software, and integrate common applications and services at the distributed System Integration Lab (SIL). Continue development and update of the Enterprise Capability Minimum Viable Product (MVP): Antenna as a Service (AaaS) comprised of Ground Resource Manager, Ground Resource Scheduler, and Transmit/Receive; Archiving; Platform; and Infrastructure. Mature EGS deployment automation and testing. Provide infrastructure to support mission partners integrated with EGS. Further develop on-premise and cloud-based DevSecOps capabilities at the EGS Canopy lab at the Catalyst Campus in Colorado Springs, Colorado. Robust enterprise ground architecture can include studies to identify shared platform, infrastructure, and data layer solutions that will inform future concepts and activities in support of enterprise open frameworks and architectures as well as risk reduction activities, technical analysis for common platform, infrastructure and data layers for ground and communication systems to build upon. Additionally, FY 2023 funding will allow the program 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, and prototyping. ***FY 2024 Plans:*** Award contract to a systems integrator to manage development and execute integration and test of additional enterprise services such as flight dynamics and Space C2 and Unified Data Library interfaces for missile warning (Geosynchronous (GEO) Non-Integrated Tactical Warning and Attack Assessment (ITW/AA) Ops Migration to EGS (GNOME), Future Operationally Resilient Ground Evolution (FORGE)), MILSATCOM (Command and Control System-Consolidated (CCS-C)), Research and Development Space and Missile Operations (RDSMO) Multi-Mission Satellite Operations Center (MMSOC), and classified mission partners. Collaborate with the Space Rapid Capabilities Office (SpRCO) Global Command, Control, and Communications (GC3) program to integrate and test SpRCO's GC3 developed services for EGS enterprise catalog adoption. Scale development and expand integration, test, and deployment of cybersecurity, cryptography, security architectures, service catalog, and support beyond EGS Minimum Viable Product (MVP) capabilities. Support increasing integration with mission-partner developed unique software to meet tactical end-to-end C2 requirements. Grow infrastructure and network connectivity to support new mission partners integrating with EGS. Mature a hybrid multi-cloud architecture comprised of on-premise and cloud-based integration and test capabilities at the EGS Canopy lab and operational locations such as Buckley Space Force Base (BSFB), Schriever Space Force			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1206770SF / *Enterprise Ground Services*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Base (SSFB), and multiple cloud environments. Robust and resilient enterprise ground architectures can include studies to identify shared platform, infrastructure, and data layer solutions that will inform future concepts and activities in support of enterprise open frameworks and architectures as well as risk-reduction activities, technical analyses for common platform, infrastructure, and data layers for ground and communication systems to operate in a contested space domain. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased due to adding an EGS systems integrator, expanding EGS service development, growing a hybrid multi-cloud and on-premise architecture, and scaling enterprise capabilities up to meet increasing needs of existing and new mission partners.			
Title: EGS Pre-Operations (Pre-Ops) Support	21.376	20.484	31.477
Description: Maintain EGS hardware and software baselines, update software licenses, cybersecurity, help-desk operations, and associated training. ***FY 2023 Plans:*** Continue conducting pre-ops support activities for satellites using enterprise services to include maintaining EGS hardware and software baselines for EGS services, updating software licenses, prototyping, furthering CI/CD efforts, facilitating user engagement, help desk operations, and associated training and cybersecurity support for EGS. Implement state-of-the-art hardware components at key EGS operational locations. Improve service center capabilities to support mission partners integrating with EGS, accomplish necessary infrastructure technical refresh, patching, and cyber updates. Complete GNOME effort and continue support to missile warning (GNOME, FORGE) and other mission partners integrating with EGS. ***FY 2024 Plans:*** Scale pre-ops support activities and facilities for increasing number of mission partners using enterprise services to include maintaining EGS hardware and software baselines for EGS services, expanding into other multiple cloud environments, updating software licenses, prototyping, furthering CI/CD efforts, facilitating user engagement, and continuing 24x7 help desk operations, associated training, and cybersecurity support for EGS. Provide pre-ops support for SpRCO GC3 developed services adopted into the EGS enterprise catalog. Continue implementing state-of-the-art hardware and software components at key EGS operational locations, such as BSFB and SSFB. Improve service center capabilities to support mission partners developing, integrating, testing, and operating with EGS. Accomplish necessary infrastructure technical refresh, patching, and cybersecurity updates. Expand support to a growing number of mission partners integrating and operating with EGS, including missile warning (GNOME, FORGE), MILSATCOM (CCS-C), RDSMO (MMSOC), and classified mission partners. ***FY 2023 to FY 2024 Increase/Decrease Statement:***			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1206770SF / *Enterprise Ground Services*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2024 increased due to additional technologies such as Zero Trust and pre-ops support activities at different classification levels for additional mission partners integrating with EGS.			
Title: EGS Deployment ***Description:*** Rapidly deploy tactical C2 services and space domain capabilities to support customer-funded mission integration with EGS activities including future mission acquisition planning and risk-reduction efforts. ***FY 2023 Plans:*** Continue the operational deployment of C2 services and maturation of networks and links across the EGS enterprise to support mission partners. Continue integration efforts with space domain capabilities. Update service offerings and functionality for both existing and new satellites that will use EGS. Continue refining the programmatic, technical and architectural roadmaps to enable the phased integration of mission partners to EGS. Provide technical information and guidance to programs which are developing EGS interfaces, mission applications, factory connectivity, and integration and test plans and procedures. Support customer-funded mission integration plans including future mission acquisition planning and risk-reduction efforts. Build upon previous integration efforts with missile warning (GNOME, FORGE) and other mission partners. Improve capability at SSFB and BSFB. ***FY 2024 Plans:*** Continue the operational deployment of C2 services and maturation of environments, networks, and links across the EGS enterprise to support a growing number of mission partners. Reduce operational deployment timelines through automation and other capabilities to optimize resilient operations such as mission failover across the multi-hybrid cloud architecture for workload mobility. Continue the integration efforts with space domain capabilities. Update service offerings and functionality for both existing and new mission partners that integrate with EGS. Refine the programmatic, technical and architectural roadmaps to enable the phased integration of mission partners to EGS. Provide technical information and guidance to programs that are developing EGS interfaces, mission applications, factory connectivity, and integration and test plans and procedures. Support customer-funded mission integration plans including future mission acquisition planning and risk-reduction efforts. Continue building upon previous efforts with mission partners integrating and operating with EGS, including missile warning (GNOME, FORGE), MILSATCOM (CCS-C),SpRCO GC3 and classified mission partners. Continue improving capability at SSFB and BSFB. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to EGS deployment automation efficiencies and migrating from an on-premise to a hybrid-cloud infrastructure.	66.079	53.190	46.080
Accomplishments/Planned Programs Subtotals	170.083	123.251	155.825

D. Other Program Funding Summary ($ in Millions)

N/A

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1206770SF *I Enterprise Ground Services*

D. Other Program Funding Summary ($ in Millions)

Remarks

N/A

E. Acquisition Strategy

The EGS acquisition strategy focuses on rapidly delivering C2 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 used a combination of existing and new contracts and agreements with government partners, industry, and academia to develop and procure operational capabilities, platform services, system engineering services, and pre-ops support for mission users. EGS leveraged two Small Business Innovation Research (SBIR) Phase III five-year contracts that were awarded sole source in late FY 2019 to scale EGS capabilities and enable more rapid development and deployment of tactical C2 services to operational users. Additionally, EGS provided development, integration, and pre-ops support for mission users through a five-year contract competitively awarded in FY 2020.

As EGS transitions from prototyping activities in FY 2023, the program will expand its collaboration with government partners to develop and deliver complete end-to-end tactical C2 solutions while also implementing a contractor-led systems integration approach.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206770SF / *Enterprise Ground Servic es*	**Project (Number/Name)** 673140 / *Enterprise Ground Services EGS*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
EGS Development	Various	Various : Various	-	63.921	Nov 2021	34.855	Nov 2022	51.703	Nov 2023	-		51.703	Continuing	Continuing	-
EGS Pre-Ops Support	Various	Various : Various	-	21.376	Dec 2021	20.484	Dec 2022	31.477	Dec 2023	-		31.477	Continuing	Continuing	-
EGS Deployment	Various	Various : Various	-	51.502	Oct 2021	47.020	Nov 2022	29.983	Oct 2023	-		29.983	Continuing	Continuing	-
EGS Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA	-	5.035	Jan 2022	5.000	Oct 2022	7.000	Jan 2024	-		7.000	Continuing	Continuing	-
Enterprise Systems Engineering and Integration (SE&I)	Various	MITRE : Bedford, MA	-	14.577	Dec 2021	6.170	Oct 2022	16.097	Oct 2023	-		16.097	Continuing	Continuing	-
SBIR/STTR	Allot	TBD : TBD	-	-		-		5.454	Oct 2023	-		5.454	Continuing	Continuing	-
		Subtotal	-	156.411		113.529		141.714		-		141.714	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp : El Segundo, CA	-	4.906	Jan 2022	3.900	Oct 2022	6.727	Oct 2023	-		6.727	Continuing	Continuing	-
A&AS Support	Various	Various : Various	-	7.985	Jan 2022	4.722	Dec 2022	6.884	Dec 2023	-		6.884	Continuing	Continuing	-
Other Support	Various	Various : Various	-	0.781	Dec 2021	1.100	Dec 2022	0.500	Dec 2023	-		0.500	Continuing	Continuing	-
		Subtotal	-	13.672		9.722		14.111		-		14.111	Continuing	Continuing	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	170.083		123.251		155.825		-		155.825	Continuing	Continuing	N/A

Remarks

FY 2024 Product Development and Management Services requirements may vary during year of execution due to integration and cybersecurity necessary to complete delivery of Enterprise services and Minimum Viable Product (MVP) capability for mission partner integration.

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206770SF / *Enterprise Ground Services*	**Project (Number/Name)** 673140 / *Enterprise Ground Services EGS*

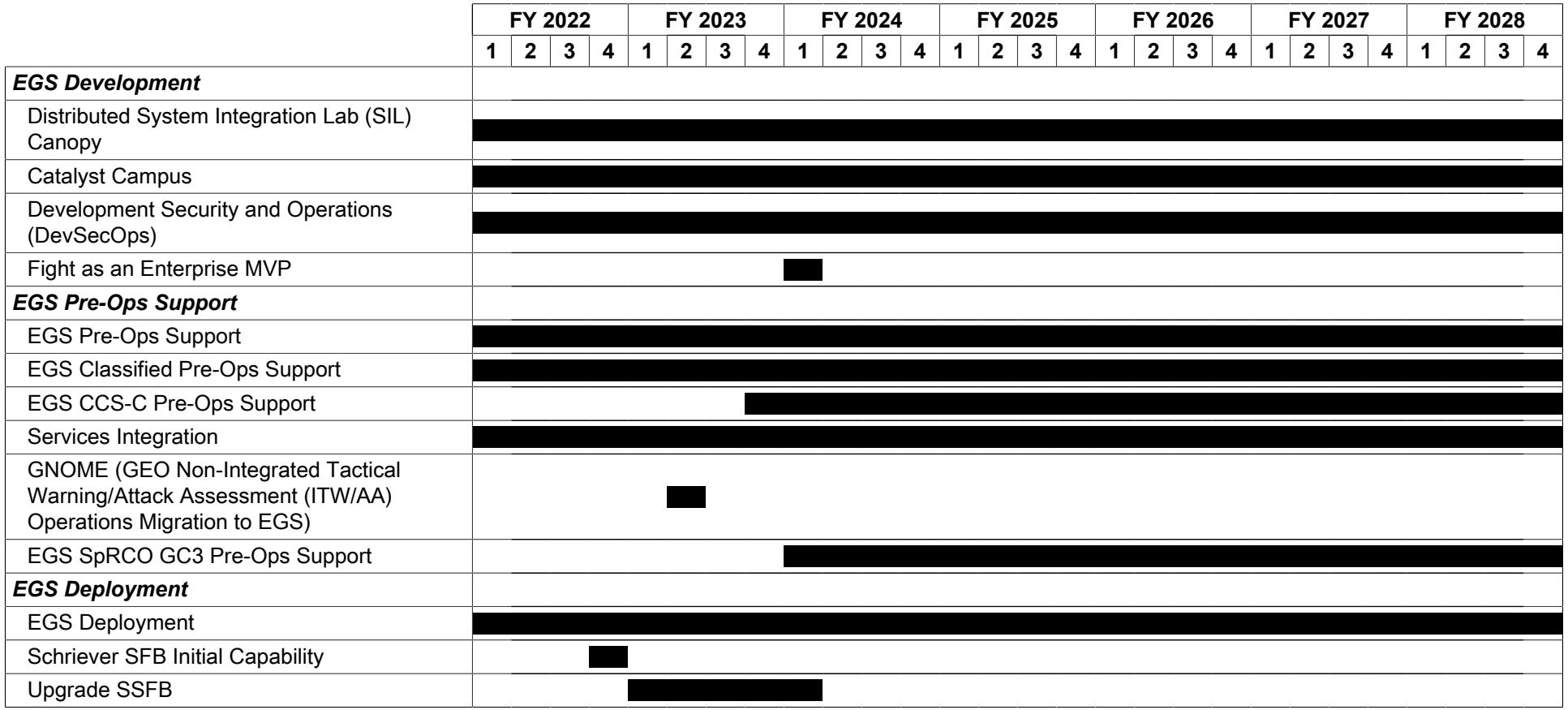

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1206770SF / *Enterprise Ground Services*	**Project (Number/Name)** 673140 / *Enterprise Ground Services EGS*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
EGS Development				
Distributed System Integration Lab (SIL) Canopy	1	2022	4	2028
Catalyst Campus	1	2022	4	2028
Development Security and Operations (DevSecOps)	1	2022	4	2028
Fight as an Enterprise MVP	1	2024	1	2024
EGS Pre-Ops Support				
EGS Pre-Ops Support	1	2022	4	2028
EGS Classified Pre-Ops Support	1	2022	4	2028
EGS CCS-C Pre-Ops Support	4	2023	4	2028
Services Integration	1	2022	4	2028
GNOME (GEO Non-Integrated Tactical Warning/Attack Assessment (ITW/AA) Operations Migration to EGS)	2	2023	2	2023
EGS SpRCO GC3 Pre-Ops Support	1	2024	4	2028
EGS Deployment				
EGS Deployment	1	2022	4	2028
Schriever SFB Initial Capability	4	2022	4	2022
Upgrade SSFB	1	2023	1	2024

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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Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 1208053SF *I Joint Tactical Ground System*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	0.000	14.568	0.000	14.568	6.925	6.929	7.007	7.085	0.000	42.514
676760: *Joint Tactical Ground Station*	-	0.000	0.000	14.568	0.000	14.568	6.925	6.929	7.007	7.085	0.000	42.514
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

This program, BA 7, PE 1208053SF, project 676760, Development and Test of Block II CDD requirnments, is a new start.
This program, BA 7, PE 1208053SF, project 676760, JTAGS Test and Evaluation Support, is a new start.

A. Mission Description and Budget Item Justification

The Joint Tactical Ground Station (JTAGS) is a post-production, Acquisition Category (ACAT) III program. JTAGS provides missile warning message data for the Air and Missile Defense (AMD) architecture and improves performance for Integrated Air and Missile Defense Fire Control Systems/Composite Army Air and Missile Defense Brigades. JTAGS disseminates near real time warning, alerting, and cueing information on ballistic missile launches and other tactical events of interest throughout the theater using existing communication networks, providing critical support to Combatant Commanders in their Areas of Responsibility (AOR). JTAGS consist of Two sheltered operation rooms, one equipment room , and three antennas. Four OCONUS deployed JTAGS units, which are deployed in three theaters (United States Pacific Command (PACOM), United States Central Command (CENTCOM), United States European Command (EUCOM)), constitute DoD's only in-theater system providing space-based missile warning. The fifth CONUS system is used as an institutional trainer, but is available as a deployable asset. JTAGS is designated as the in-theater element of the United States Strategic Command's Theater Event System (TES), supporting all Theater Missile Defense pillars, affording the shortest sensor-to-shooter connectivity. On 14 January 2016, the Army Acquisition Executive designated the JTAGS Pre-Planned Product Improvement (JTAGS P3I) program as a separate ACAT III modification program.

The JTAGS Program Element (PE) supports development and testing of the JTAGS Block II Preplanned Product Improvements (P3I) program based on the JTAGS Operational Requirements Document (ORD), additive Joint Requirements Oversight Council - Memorandum (JROC-M) requirements, and the formal JTAGS Block II Capability Development Document (CDD) thresholds. P3I upgraded JTAGS to a Block II configuration for operation with the next generation of Space Based Infrared System (SBIRS) satellites, and improved warning tactical parameters and timeliness. The JTAGS Block II P3I program based on the 2009 JTAGS ORD is on contract as a two-phase development effort. JTAGS Block II Phase 2 activities seek to develop and test capabilities identified in 2009 JTAGS Operational Requirements Document(ORD). Joint Requirements Oversight Council (JROC) Memos 197-12, 113-13, and 042-19 and PL 111-383(Ike Skelton National Defense Authorization Act for FY 2011) support of the requirements to develop and fieled JTAGS Block II capabilities as soon as possible.

JTAGS Block II P3I Phase 1 is complete. The final developmental efforts of JTAGS Block II P3I Phase 2 to achieve 2009 ORD requirements completed in FY2022. Follow-on Test and Evaluation (FOTE) completed in FY2022 with Materiel Release efforts to be conducted in FY2023. JTAGS Block II Phase 2 Spiral 3 fielding is planned for FY 2024. The JTAGS Block II CDD addresses evolving User-driven needs such as emerging threats and interface efforts that were not known at the time the JTAGS ORD was validated. Developmental efforts to achieve JTAGS Block II CDD threshold requirements continue through FY28.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1208053SF *I Joint Tactical Ground System*

Fiscal Year 2024 (FY24) requested funding allows for the continued development of cyber compliance, defense against emerging threats, system materiel release, Assured Positioning, Navigation and Timing (APNT) and M-code GPS compliance, addresses obsolescence mitigation with Commercial Off The Shelf (COTS) hardware/ software upgrades, and NextGen Polar Geosynchronous satellite interface efforts.

The Joint Tactical Ground Station (JTAGS) transitions to US Space Force in FY2024 and FY2023 is the last year for Army 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)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	14.568	0.000	14.568
Total Adjustments	0.000	0.000	14.568	0.000	14.568
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	14.568	0.000	14.568

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Development and Test of Block II CDD requirnments	0.000	0.000	14.276
Description: JTAGS Block II program continues to focus on development/integration of evolving cyber hardening advances, defense against emerging threats, and JTAGS Capability Development Document (CDD) threshold requirements. JROC-Memos 197-12, 113-13, and 042-19 and PL 111-383 (Ike Skelton National Defense Authorization Act for FY2011) require fielding of these capabilities as soon as possible.			
FY 2023 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1208053SF *I Joint Tactical Ground System*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Funding required continues to support the development efforts detailed in the JTAGS Block II CDD of A-PNT and M-Code GPS compliance and continues to address obsolescence mitigation and COTS hardware and software upgrades. The funding supports continued efforts to complete requirements in the Block II CDD. ***FY 2024 Plans:*** Funding required to complete development and deployment of cyber security tools to be achieve compliance with Risk Management Framework (RMF) requirements; completes development of new capabilities detailed in the JTAGS Block II Capability Development Document (CDD) defense against emerging threats, system materiel release, and addresses obsolescence mitigation with Commercial Off the Shelf (COTS) hardware/software upgrades. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2023 to FY2024 increases as development is focused on completion of capabilities detailed in the JTAGS Block II Capability Development Document (CDD).			
Title: JTAGS Test and Evaluation Support ***Description:*** Test and evaluation support for the JTAGS program. ***FY 2023 Plans:*** Funding provides for A-PNT Cooperative Vulnerability & Penetration Assessment (CVPA) and Technical Manual Delta Validation and Verification Certification and of the JTAGS Block II system. ***FY 2024 Plans:*** Funding provides for Technical Manual Delta Validation and Verification Certification of the JTAGS Block II system. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY2023 to FY2024 decrease due to completion of JTAGS Block II Follow-on Test and Evaluation (FOTE) with the exception of APNT and CVPA which have been removed.	0.000	0.000	0.292
Accomplishments/Planned Programs Subtotals	0.000	0.000	14.568

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
• SPSF 01 JTAGS0: *Joint Tactical Ground Station*	8.088	0.349	0.576	-	0.576	-	-	-	-	0.000	9.013

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1208053SF *I Joint Tactical Ground System*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost

Remarks

The Joint Tactical Ground Station (JTAGS) transitions to US Space Force in FY2024 and FY2023 is the last year for Army Funding.

E. Acquisition Strategy

This program element develops critical software intensive improvements, while continuing to make maximum use of Non-Developmental Items (NDI)/Commercial Off-The-Shelf (COTS) components and Government Furnished Equipment (GFE). After design and integration, the system will be subject to thorough developmental and validation/verification testing to verify performance, operational effectiveness and suitability. The JTAGS Block II Pre-planned Product Improvement (P3I) program was initiated based on a 2009 JTAGS Operational Requirements Document (ORD) and upgrades JTAGS to a Block II configuration for operation with the next generation of Space Based Infrared System (SBIRS) satellites, improving warning tactical parameters and timeliness. The JTAGS Block II P3I contract was a full and open competition, but only the incumbent JTAGS contractor submitted a proposal, resulting in a sole-source contract on 26 Aug 2012. The contract's development options are Cost Plus Incentive Fee; its production options are Firm Fixed Price, and its Sustainment options are Cost Plus Fixed Fee. The JTAGS Block II contract's period of performance is from 1 October 2012 through 30 September 2021 with a contract extension to March 2022. As threats continue to evolve and change as well as new satellite sensors become available, the JTAGS Users in conjunction with the Army Capabilities Manager have developed a JTAGS Block II Capability Development Document (CDD), requiring JTAGS to address new/changing threats that were not addressed in the 2009 JTAGS ORD. The acquisition of the continued JTAGS Block II efforts based on the JTAGS Block II CDD was performed under a sole source follow-on contract awarded May 2022 to the current JTAGS contractor.

The Joint Tactical Ground Station (JTAGS) transitions to US Space Force in FY2024 and FY2023 is the last year for Army Funding.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1208053SF / *Joint Tactical Ground System*	**Project (Number/Name)** 676760 / *Joint Tactical Ground Station*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development and Test Block II CDD requirnments	SS/ Various	Northrup-Grumman : Colorado springs, CO	-	0.000	May 2022	0.000	Nov 2023	7.829	Nov 2023	-		7.829	0.000	7.829	-
System Engineering Support	C/CPFF	Intrepid : Huntsville, AL	-	0.000	Jan 2023	0.000	Jan 2023	1.949	Jan 2024	-		1.949	0.000	1.949	-
		Subtotal	-	0.000		0.000		9.778		-		9.778	0.000	9.778	N/A

Remarks

Continues development of the JTAGS Block II capabilities based on the JTAGS Block II Capability Development Document (CDD)

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
System Engineering Technical Assistance	C/CPFF	Intrepid : Huntsville, AL	-	0.000	Jan 2023	0.000	Jan 2023	2.253	Jan 2024	-		2.253	0.000	2.253	-
		Subtotal	-	0.000		0.000		2.253		-		2.253	0.000	2.253	N/A

Remarks

Provides technical assistance in implementing the JTAGS Block II CDD

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
JTAGS Test Support (ATEC/AIC/JITC)	Allot	Various (ATEC,AIC,JITC) : : Various	-	0.000	Oct 2021	0.000	Oct 2022	0.426	Oct 2023	-		0.426	0.000	0.426	-
		Subtotal	-	0.000		0.000		0.426		-		0.426	0.000	0.426	N/A

Remarks

Supports testing of JTAGS Block II development efforts based on the JTAGS Block II CDD.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1208053SF / *Joint Tactical Ground System*	Project (Number/Name) 676760 / *Joint Tactical Ground Station*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Government Program Management	Allot	Various(AMC,AMCOM,CDDC): : Redstone Arsenal, AL	-	0.000	Oct 2021	0.000	Oct 2022	2.111	Oct 2023	-		2.111	0.000	2.111	-
		Subtotal	-	0.000		0.000		2.111		-		2.111	0.000	2.111	N/A

Remarks

Provides Other Government Agency (OGA) support to the JTAGS acquisition program

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		0.000		14.568		-		14.568	0.000	14.568	N/A

Remarks

The Joint Tactical Ground Station (JTAGS) transitions to US Space Force in FY2024 and FY2023 is the last year for Army Funding.

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1208053SF / *Joint Tactical Ground System*	**Project (Number/Name)** 676760 / *Joint Tactical Ground Station*

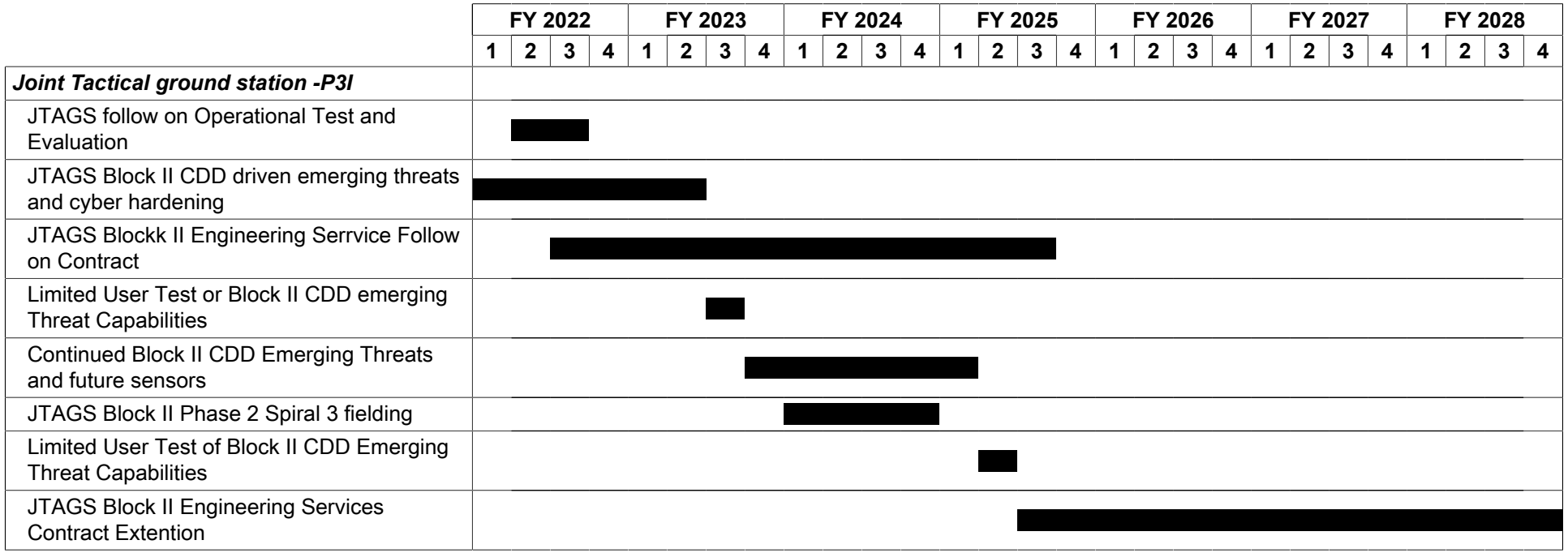

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1208053SF / *Joint Tactical Ground System*	**Project (Number/Name)** 676760 / *Joint Tactical Ground Station*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Joint Tactical ground station -P3I				
JTAGS follow on Operational Test and Evaluation	2	2022	3	2022
JTAGS Block II CDD driven emerging threats and cyber hardening	1	2022	2	2023
JTAGS Blockk II Engineering Serrvice Follow on Contract	3	2022	3	2025
Limited User Test or Block II CDD emerging Threat Capabilities	3	2023	3	2023
Continued Block II CDD Emerging Threats and future sensors	4	2023	1	2025
JTAGS Block II Phase 2 Spiral 3 fielding	1	2024	4	2024
Limited User Test of Block II CDD Emerging Threat Capabilities	2	2025	2	2025
JTAGS Block II Engineering Services Contract Extention	3	2025	4	2028

Note

The Joint Tactical Ground Station (JTAGS) transitions to US Space Force in FY2024 and FY2023 is the last year for Army Funding.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force												Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 8: *Software and Digital Technology Pilot Programs*					R-1 Program Element (Number/Name) PE 1203614SF / *JSpOC Mission System*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	0.000	150.287	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	150.287
68A035: *SSA/BMC2*	0.000	150.287	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	150.287
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Program MDAP/MAIS Code: N82												

A. Mission Description and Budget Item Justification

In FY 2023, PE 1203614SF, Project 68A035 SSA/BMC2 efforts was transferred to PE 1208248SF, Enterprise Space BMC2, Project 68A035 SSA/BMC2, for Space C2 software program transparency.

The FY 2018 National Defense Authorization Act (Sections 873/874) directed the Office of the Secretary of Defense (OSD) to streamline software development. The Space Command and Control (C2) program is an OSD pilot initiative in which all lifecycle funding is tracked under Budget Activity 08 (BA08), Software and Digital Technology Pilot Programs, beginning in FY 2021. Pilot programs enable the execution of modern software development practices encompassing development, procurement, modification and maintenance activities. This program includes Research, Development, Test & Evaluation (RDT&E), Space Procurement, and Operations and Maintenance funds transferred from within PE 1203614F, JSpOC Mission Systems and consolidated into the RDT&E appropriation.

The Space Force is developing a Space C2 and Space Domain Awareness (SDA) capability for the Combined Force Space Component Commander (CFSCC) and the Joint Task Force - Space Defense (JTF-SD). The Space C2 program provides a collaborative environment that will enhance and modernize SDA and Battle Management C2 (BMC2) capabilities; create decision-relevant views of the space and multi-domain 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). The program maintains enterprise infrastructure, platform and data services, and develops mission applications to enable responsive, resilient operational-level Space C2 capabilities for the National Space Defense Center (NSDC), Combined Space Operations Center (CSpOC), 18th Space Control Squadron (SPCS) and other C2 centers. Employing an agile-based Rapid Delivery Framework with a 90-day Program Increment (PI) construct fosters a collaborative and integrated environment for the community to effectively plan and deliver C2 capabilities. The enterprise-wide system will provide a common government infrastructure and standards for rapid prototyping of dynamic SDA and BMC2 applications to address the evolving and dynamic threat. The system will provide a collaborative environment that will enhance and modernize SDA and BMC2 capabilities. Funding includes technical studies, development, experimentation, integration and related support costs.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 8: *Software and Digital Technology Pilot Programs*	**R-1 Program Element (Number/Name)** PE 1203614SF / *JSpOC Mission System*

This Program Element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in Program Elements 1206392SF and 1206398SF. In PY 120K was expended for civilian pay expenses in this Program Element, and in CY 0 is forecasted for civilian pay expenses in this Program Element.

This program is in Budget Activity 8, Software and Digital Technology Pilot Program because this Budget Activity includes funding provided for expenses necessary for Agile Development, Test & Evaluation, Procurement, Production and Modification, and the Operation and Maintenance of these programs.

This program is in Budget Activity 8, Software and Digital Technology Pilot Program because this budget activity includes funding provided for expenses necessary for agile development, test and evaluation, procurement, production and modification, and the operation and maintenance of these programs.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	154.529	0.000	0.000	0.000	0.000
Current President's Budget	150.287	0.000	0.000	0.000	0.000
Total Adjustments	-4.242	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	-4.242	0.000			
• Other Adjustments	0.000	0.000	0.000	0.000	0.000

Change Summary Explanation

FY 2022: -4.242M SBIR transfer.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Enterprise Space BMC2 Development	94.086	0.000	0.000
Description: This program delivers a robust and responsive Space Domain Awareness (SDA) 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, the following: SDA, Indications & Warning (I&W), Transmit/Receive, Space Control, Tactical Operations and Common Data Management Layer, Platforms and Infrastructure; and Cyber and Threat Warning. The program maintains foundational DevSecOps enablers such as, but not limited to, Data as a Service, Platform Support, Continuous Improvement/Continuous			

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 8: *Software and Digital Technology Pilot Programs*	**R-1 Program Element (Number/Name)** PE 1203614SF *I JSpOC Mission System*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Deployment (CI/CD) toolchain, and infrastructure and inherent sustainment efforts that are an integral part of the agile software development process. 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. ***FY 2023 Plans:*** N/A N/A ***FY 2024 Plans:*** N/A			
Title: Space C2 Sustainment ***Description:*** The program maintains existing capability for the CSpOC, NSDC and other C2 centers. These tasks include maintaining the Commercial Off The Shelf (COTS) software database, removing and canceling decommissioned systems and unused tools, adding new tools required for ongoing support of the system, maintaining data support systems, and maintaining day to day software operations which continuously ensures and optimizes reliability, security, resiliency, availability, flexibility and scalability of the warfighter tools. The program maintains foundational DevSecOps enablers such as, but not limited to, Data as a Service, Platform Support, Continuous Improvement/Continuous Deployment (CI/CD) toolchain, and infrastructure and inherent sustainment efforts that are an integral part of the agile software development process. ***FY 2023 Plans:*** N/A ***FY 2024 Plans:*** N/A	56.201	0.000	0.000
Accomplishments/Planned Programs Subtotals	150.287	0.000	0.000

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The Space Force is employing agile software development practices such as flexible requirements, frequent user interaction, and rapid delivery and deficiency retirement. The program acquires tools and capabilities through an agile-based Rapid Delivery Framework that delivers and sustains new features and capabilities

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 8: *Software and Digital Technology Pilot Programs*	**R-1 Program Element (Number/Name)** PE 1203614SF *I JSpOC Mission System*

through a CI/CD pipeline with 90-day Program Increments. This strategy focuses on rapidly delivering capability to warfighters and leveraging commercial, industry and government partners. Currently there are multiple contractors performing on competitively-awarded contracts with no single prime contractor responsible for the entire ecosystem.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 8	R-1 Program Element (Number/Name) PE 1203614SF / *JSpOC Mission System*	Project (Number/Name) 68A035 / *SSA/BMC2*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space C2 Technical Mission Analysis (WS) Development	RO	Aerospace : El Segundo, CA	0.000	1.711	Dec 2021	-		-		-		-	0.000	1.711	-
Space C2 Enterprise Systems Engineering & Integration Development	Various	Various : various	0.000	6.405	Nov 2021	-		-		-		-	0.000	6.405	-
Space C2 Applications Development	Various	Various : Various	0.000	78.932	Nov 2021	-		-		-		-	0.000	78.932	-
Space C2 Platform Sustainment	Various	Various : Various	0.000	20.915	Dec 2021	-		-		-		-	0.000	20.915	-
Space C2 Infrastructure Sustainment	Various	Various : Various	0.000	3.588	Dec 2021	-		-		-		-	0.000	3.588	-
Legacy System Sustainment	Various	Various : Various	0.000	2.957	Nov 2021	-		-		-		-	0.000	2.957	-
Space C2 Data Management Sustainment	SS/FFP	Palantir : Denver, CO	0.000	24.500	Nov 2021	-		-		-		-	0.000	24.500	-
		Subtotal	0.000	139.008		-		-		-		-	0.000	139.008	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test	Various	Various : Various	0.000	2.322	Dec 2021	-		-		-		-	0.000	2.322	-
		Subtotal	0.000	2.322		-		-		-		-	0.000	2.322	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	C/CPAF	Various : Various	0.000	3.453	Nov 2021	-		-		-		-	0.000	3.453	-
FFRDC	RO	Various : Various	0.000	5.098	Dec 2021	-		-		-		-	0.000	5.098	-
Other	Various	Various : Various	0.000	0.406	Oct 2021	-		-		-		-	0.000	0.406	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force			Date: March 2023
Appropriation/Budget Activity 3620F / 8	R-1 Program Element (Number/Name) PE 1203614SF / *JSpOC Mission System*	Project (Number/Name) 68A035 / *SSA/BMC2*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	0.000	8.957		-		-		-		-	0.000	8.957	N/A

	Prior Years	FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	150.287		-		-		-		-	0.000	150.287	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 8	**R-1 Program Element (Number/Name)** PE 1203614SF / *JSpOC Mission System*	**Project (Number/Name)** 68A035 / *SSA/BMC2*

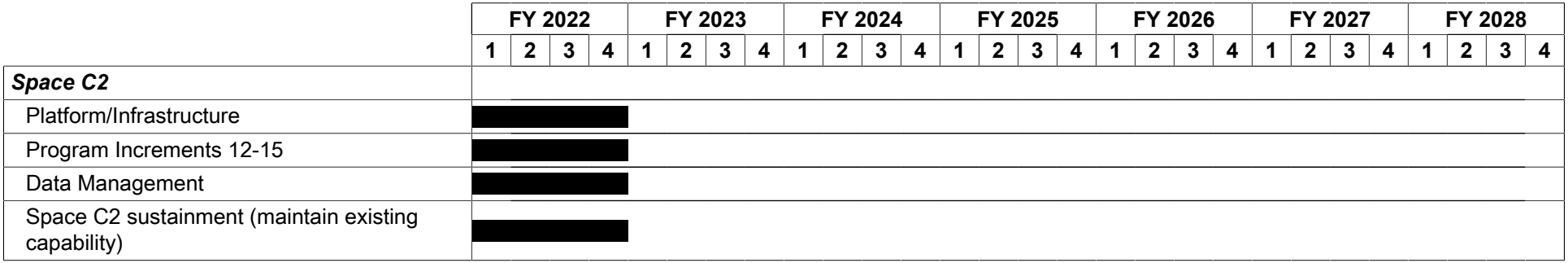

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 8	**R-1 Program Element (Number/Name)** PE 1203614SF / *JSpOC Mission System*	**Project (Number/Name)** 68A035 / *SSA/BMC2*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space C2				
Platform/Infrastructure	1	2022	4	2022
Program Increments 12-15	1	2022	4	2022
Data Management	1	2022	4	2022
Space C2 sustainment (maintain existing capability)	1	2022	4	2022

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force											Date: March 2023	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 8: *Software and Digital Technology Pilot Programs*					R-1 Program Element (Number/Name) PE 1208248SF / *Space Command & Control - Software Pilot Program*							
COST ($ in Millions)	**Prior Years**	**FY 2022**	**FY 2023**	**FY 2024 Base**	**FY 2024 OCO**	**FY 2024 Total**	**FY 2025**	**FY 2026**	**FY 2027**	**FY 2028**	**Cost To Complete**	**Total Cost**
Total Program Element	-	0.000	155.553	122.326	0.000	122.326	123.422	126.137	128.715	133.365	Continuing	Continuing
68A035: *SSA/BMC2*	-	0.000	155.553	122.326	0.000	122.326	123.422	126.137	128.715	133.365	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The FY 2018 National Defense Authorization Act (Sections 873/874) directed the Office of the Secretary of Defense (OSD) to streamline software development. The Space C2 program is an OSD pilot initiative in which all lifecycle funding is tracked under Budget Activity 8 (BA 8), Software and Digital Technology Pilot Programs, beginning in FY 2021. Pilot programs enable the execution of modern software development practices encompassing development, procurement, modification and maintenance activities within a single RDT&E appropriation in this PE.

In FY 2023, PE 1203614SF, JSpOC Mission System, Project 68A035 SSA/BMC2 efforts were transferred to PE 1208248SF, Enterprise Space BMC2, Project 68A035 SSA/BMC2 for Space Command and Control (Space C2) software program transparency.

The Space Force is developing a Space C2 and Space Domain Awareness (SDA) capability for the Combined Force Space Component Commander (CFSCC) and the Joint Task Force - Space Defense (JTF-SD). The Space C2 program provides a collaborative environment that will enhance and modernize SDA and Battle Management C2 (BMC2) capabilities; create decision-relevant views of the space and multi-domain 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). The program maintains enterprise infrastructure, platform and data services, and develops mission applications to enable responsive, resilient operational-level Space C2 capabilities for the National Space Defense Center (NSDC), Combined Space Operations Center (CSpOC), 18th Space Defense Squadron (SDS) and other C2 centers. Employing an agile-based Rapid Delivery Framework with a 90-day Program Increment (PI) construct fosters a collaborative and integrated environment for the community to effectively plan and deliver C2 capabilities. The enterprise-wide system provides a common government infrastructure and processes to allow C2 capabilities at USSF operational Deltas to rapidly address the evolving and dynamic threat. The program also identifies shared/common platform, infrastructure, and data layer solutions to support open frameworks and architectures across the enterprise ground portfolio. Funding includes technical studies, development, experimentation, integration and related support costs.

In FY 2023 this Program Element also includes effort for the Cyber Halo Innovation Research Program (CHIRP) based on a Congressional add. CHIRP will continue collaboration between Space Systems Command (SSC), universities/colleges, and industry with a mission to drive innovation and to create a pipeline of talent in cyber security with the specialized expertise to protect mission-critical, space-borne assets from cyber threats by adversaries.

Space acquisition must respond with speed and agility to emerging adversary threats. SSC has transformed the organization and implementation of space acquisition to an enterprise approach, to increase 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space C2 for weapon system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF.

This program is in Budget Activity 8, Software and Digital Technology Pilot Program because this budget activity includes funding provided for expenses necessary for agile development, test and evaluation, procurement, production and modification, and the operation and maintenance of these programs.

B. Program Change Summary ($ in Millions)	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total
Previous President's Budget	0.000	155.053	122.584	0.000	122.584
Current President's Budget	0.000	155.553	122.326	0.000	122.326
Total Adjustments	0.000	0.500	-0.258	0.000	-0.258
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-4.500			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	5.000			
• 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	-0.258	0.000	-0.258

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2022	FY 2023
Project: 68A035: *SSA/BMC2*		
Congressional Add: *Cyber Halo Innovation Research Program (CHIRP) Development*	0.000	5.000
Congressional Add Subtotals for Project: 68A035	0.000	5.000
Congressional Add Totals for all Projects	0.000	5.000

Change Summary Explanation

FY 2023: +0.500 Congressional add is the net increase resulting from -4.500M unjustified cost growth Space C2 sustainment mark and +5.00M for Cyber Halo Innovation Research Program (CHIRP).

FY 2024: -0.258M consisting of (1) -0.806M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity, and (2) +0.548M for inflation adjustment.

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 8: *Software and Digital Technology Pilot Programs*	**R-1 Program Element (Number/Name)** PE 1208248SF / *Space Command & Control - Software Pilot Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
Title: Enterprise Space BMC2 Development	0.000	111.459	85.738

Description: This program delivers a robust and responsive Space Domain Awareness (SDA) 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, the following: SDA, Indications & Warning (I&W), Planning & Tasking, Theater & Coalition Support, Transmit/Receive, Space Control, Tactical Operations and Common Data Management Layer, Platforms and Infrastructure; and Cyber and Threat Warning. The program maintains foundational DevSecOps enablers such as, but not limited to, Data as a Service, Zero Trust Architecture, Platform Support, Continuous Improvement/Continuous Deployment (CI/CD) toolchain, and infrastructure and inherent sustainment efforts that are an integral part of the agile software development process. 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.

FY 2023 Plans:
Continue to plan and develop a message standard compliant open architecture to support both the SDA and BMC2 missions to meet dynamic emerging threats. The enterprise architecture and platform/infrastructure will modernize and deliver new capabilities in the NSDC, CSpOC, and other operations centers supporting SDA, BMC2, Theater Support, Data Analytics & Visualization, and Modeling & Simulation tools. Efforts will enhance the scalability, performance, and reliability of the platform. Continue developmental, system engineering and contracting efforts to integrate best in breed commercial, contractor, and government applications through the release of multiple incremental software capability in program increments 16-19 drops throughout FY 2023. FY 2023 funding will allow the program to conduct studies to identify shared platform, infrastructure, and data layer solutions that will inform future concepts and activities in support of enterprise open frameworks and architectures, as well as risk reduction activities, technical analysis for common platform, infrastructure and data layers for ground and communication systems to build upon. Rapidly respond to implement system resiliency, cybersecurity 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 2024 Plans:
Continue to plan and develop a message standard compliant open architecture to support both the SDA and BMC2 missions to meet dynamic emerging threats. The enterprise architecture and platform/infrastructure will modernize and deliver new capabilities in the NSDC, CSpOC, and other operations centers supporting SDA, BMC2, Theater Support, Battle Space Awareness, and Planning & Tasking & Electronic Warfare tools. Enhance the scalability, performance, and reliability of the platform. These requirements will include design, enablement services, security, services necessary for authority to operate (ATO), engineering, network and platform architecture, reliability testing, prototyping efforts to increase platform, communications, and network capabilities, data science, data engineering, reinforcement learning, machine learning, artificial intelligence, product management

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 8: *Software and Digital Technology Pilot Programs*	**R-1 Program Element (Number/Name)** PE 1208248SF *I Space Command & Control - Software Pilot Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
services. Continue development, system engineering and contracting efforts to integrate best in breed commercial, contractor, and government applications through the release of multiple incremental software capability in program increments 20-23 drops throughout FY 2024. FY 2024 funding will allow the program to implement system resiliency, cybersecurity, and situational awareness necessary to operate in the contested space domain, conduct studies to identify shared platform, infrastructure, and data layer solutions that will inform future concepts and activities in support of enterprise open frameworks and architectures, as well as risk reduction activities, technical analysis for common platform, infrastructure and data layers for ground and communication systems to build upon. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to reduced effort on SDA, BMC2, and Theater Support applications and infrastructure.			
Title: Space C2 Procurement ***Description:*** Provides hardware, software, technical documents, integration, testing and associated support to modernize and enhance Space C2 infrastructure for operations centers. ***FY 2023 Plans:*** SSC will procure Commercial and Government Off The Shelf (COTS/GOTS) hardware and software necessary to host and field critical applications as well as refresh existing hardware in use at Vandenberg Space Force Base (VSFB) and Schriever Space Force Base (SSFB). Activities may include but are not limited to program office support, studies, technical analysis, etc. ***FY 2024 Plans:*** SSC will procure Commercial and Government Off The Shelf (COTS/GOTS) hardware and software necessary to host and field critical applications as well as refresh existing hardware in use at Space Force locations. Activities may include but are not limited to program office support, studies, technical analysis, etc. ***FY 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 increased slightly due to minor variations in COTS/GOTS hardware and software costs.	0.000	2.326	2.436
Title: Space C2 Sustainment ***Description:*** The program maintains existing capability for the CSpOC, NSDC and other C2 centers. These tasks include maintaining the Commercial Off The Shelf (COTS) software database, removing and canceling decommissioned systems and unused tools, adding new tools required for ongoing support of the system, maintaining data support systems, and maintaining day to day software operations which continuously ensures and optimizes reliability, security, resiliency, availability, flexibility and scalability of the warfighter tools.	0.000	36.768	34.152

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 8: *Software and Digital Technology Pilot Programs*	**R-1 Program Element (Number/Name)** PE 1208248SF *I Space Command & Control - Software Pilot Program*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2022	FY 2023	FY 2024
FY 2023 Plans: SSC will continue to fund government software centers, laboratories, and contractors for supporting the update, maintenance and modification, integration, configuration management and cybersecurity requirements of infrastructure and legacy software associated hardware. The program maintains foundational DevSecOps enablers such as, but not limited to, Data as a Service, Platform Support, continuous Improvement/Continuous Deployment (CI/CD) toolchain, and infrastructure and inherent sustainment efforts that are an integral part of the agile software development process. 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 2024 Plans:*** SSC will continue to fund government software centers, laboratories, and contractors for supporting the update, maintenance and modification, integration, configuration management and cybersecurity requirements of infrastructure and legacy software associated hardware. The program maintains foundational DevSecOps enablers such as, but not limited to, Data as a Service, Platform Support, continuous Improvement/Continuous Deployment (CI/CD) toolchain, and infrastructure and inherent sustainment efforts that are an integral part of the agile software development process. 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 2023 to FY 2024 Increase/Decrease Statement:*** FY 2024 decreased due to platform and infrastructure configuration maturation allowing for increased efficiencies.			
Accomplishments/Planned Programs Subtotals	0.000	150.553	122.326

	FY 2022	FY 2023
Congressional Add: Cyber Halo Innovation Research Program (CHIRP) Development	0.000	5.000
FY 2022 Accomplishments: N/A		
FY 2023 Plans: Funds will be used for continued collaboration between Space Systems Command (SSC), universities/colleges, and industry with a mission to drive innovation and to create a pipeline of talent in cyber security to fill positions at SSC that includes but is not limited to: network security, cyber analysis, incident response, cyber policy, data architecture, continuity of operations, data analytics, machine learning, artificial intelligence, and secure software development. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc.		
Congressional Adds Subtotals	0.000	5.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force	Date: March 2023
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 8: *Software and Digital Technology Pilot Programs*	**R-1 Program Element (Number/Name)** PE 1208248SF *I Space Command & Control - Software Pilot Program*

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

E. Acquisition Strategy

The Space Force is employing agile software development practices such as flexible requirements, frequent user interaction, and rapid delivery and deficiency retirement. The program acquires tools and capabilities through an agile-based Rapid Delivery Framework that delivers and sustains new features and capabilities through a CI/CD pipeline with 90-day Program Increments. This strategy focuses on rapidly delivering capability to warfighters and leveraging commercial, industry and government partners. Currently there are multiple contractors performing on competitively-awarded contracts with no single prime contractor responsible for the entire ecosystem.

Space C2 entered the planning phase of the Software Acquisition Pathway May 21 while continuing to execute as an OSD DEVSECOPS pathfinder program. The program is updating its acquisition strategy to align with this pathway and will continue to execute in a DevSecOps environment in accordance with guidance provided by DoD Instruction 5000.87.

In FY 2023 CHIRP will implement Congressional direction by utilizing contracts currently in place with Pacific Northwest National Laboratory (PNNL).

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 8	**R-1 Program Element (Number/Name)** PE 1208248SF / *Space Command & Contro / - Software Pilot Program*	**Project (Number/Name)** 68A035 / *SSA/BMC2*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space C2 Applications Development	Various	Various : Various	-	0.000		91.653	Nov 2022	64.405	Nov 2023	-		64.405	Continuing	Continuing	-
Space C2 Platform Sustainment	Various	Various : Various	-	0.000		12.968	Dec 2022	10.502	Dec 2023	-		10.502	Continuing	Continuing	-
Space C2 Infrastructure Sustainment	Various	Various : Various	-	0.000		3.600	Nov 2022	3.600	Nov 2023	-		3.600	Continuing	Continuing	-
Space C2 Enterprise Systems Engineering & Integration (Development)	Various	Various : Various	-	0.000		2.860	Nov 2022	3.595	Nov 2023	-		3.595	Continuing	Continuing	-
Space C2 Data as a Service Sustainment	Various	Various : Various	-	0.000		20.200	Nov 2022	20.050	Nov 2023	-		20.050	Continuing	Continuing	-
Space C2 Procurement	TBD	TBD : TBD	-	0.000		2.326	Mar 2023	2.436	Mar 2024	-		2.436	Continuing	Continuing	-
Space C2 Technical Mission Analysis (Development)	RO	Aerospace : El Segundo, CA	-	0.000		2.000	Jan 2023	2.000	Jan 2024	-		2.000	Continuing	Continuing	-
CHIRP	TBD	PNNL : Richland, WA	-	0.000		5.000	Apr 2023	0.000		-		0.000	0.000	5.000	5.000
SBIR/STTR	Allot	TBD : TBD	-	0.000		0.000	Oct 2022	4.263	Oct 2023	-		4.263	Continuing	Continuing	-
		Subtotal	-	0.000		140.607		110.851		-		110.851	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Space C2 Test	Various	Various : Various	-	0.000		1.600	Dec 2022	1.600	Dec 2023	-		1.600	Continuing	Continuing	-
		Subtotal	-	0.000		1.600		1.600		-		1.600	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 8	**R-1 Program Element (Number/Name)** PE 1208248SF / *Space Command & Contro* *l - Software Pilot Program*	**Project (Number/Name)** 68A035 / *SSA/BMC2*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Various : Various	-	0.000		6.500	Dec 2022	5.500	Dec 2023	-		5.500	Continuing	Continuing	-
A&AS	Various	Various : Various	-	0.000		6.346	Dec 2022	4.025	Dec 2023	-		4.025	Continuing	Continuing	-
Other	Various	Various : Various	-	0.000		0.500	Oct 2022	0.350	Oct 2023	-		0.350	Continuing	Continuing	-
		Subtotal	-	0.000		13.346		9.875		-		9.875	Continuing	Continuing	N/A

	Prior Years	FY 2022 Cost	FY 2022 Award Date	FY 2023 Cost	FY 2023 Award Date	FY 2024 Base Cost	FY 2024 Base Award Date	FY 2024 OCO Cost	FY 2024 OCO Award Date	FY 2024 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	0.000		155.553		122.326		-		122.326	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 8	**R-1 Program Element (Number/Name)** PE 1208248SF / *Space Command & Contro* *l - Software Pilot Program*	**Project (Number/Name)** 68A035 / *SSA/BMC2*

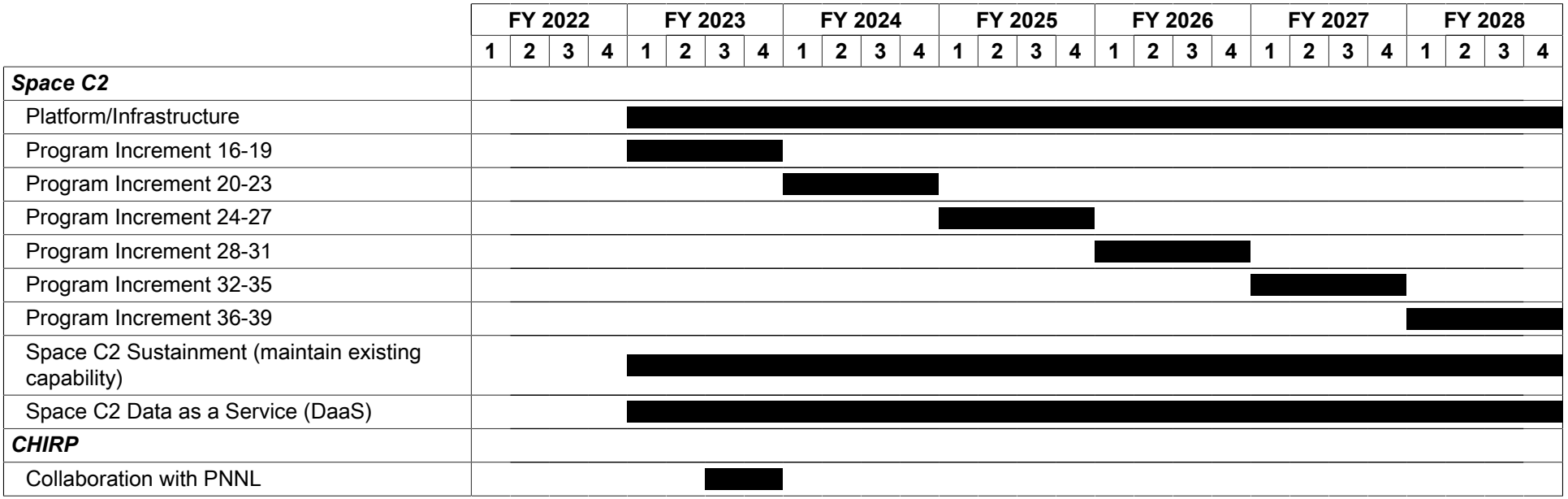

Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force		Date: March 2023
Appropriation/Budget Activity 3620F / 8	**R-1 Program Element (Number/Name)** PE 1208248SF / *Space Command & Contro* *l - Software Pilot Program*	**Project (Number/Name)** 68A035 / *SSA/BMC2*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space C2				
Platform/Infrastructure	1	2023	4	2028
Program Increment 16-19	1	2023	4	2023
Program Increment 20-23	1	2024	4	2024
Program Increment 24-27	1	2025	4	2025
Program Increment 28-31	1	2026	4	2026
Program Increment 32-35	1	2027	4	2027
Program Increment 36-39	1	2028	4	2028
Space C2 Sustainment (maintain existing capability)	1	2023	4	2028
Space C2 Data as a Service (DaaS)	1	2023	4	2028
CHIRP				
Collaboration with PNNL	3	2023	4	2023