Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force											Date: April 2022	
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)*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	86.918	26.942	11.701	0.000	11.701	4.077	1.020	1.022	1.043	0.000	132.723
657104: *MILSATCOM Space Modernization Initiative (SMI)*	-	86.918	26.942	11.701	0.000	11.701	4.077	1.020	1.022	1.043	0.000	132.723
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) that lead to a Protected Anti-Jam Tactical SATCOM (PATS) capability that provides tactical-level military SATCOM (MILSATCOM) users protected, anti-jam SATCOM while operating in a contested environment. 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.

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 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.

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B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	90.045	28.218	0.000	0.000	0.000
Current President's Budget	86.918	26.942	11.701	0.000	11.701
Total Adjustments	-3.127	-1.276	11.701	0.000	11.701
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-1.276			
• 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	-3.127	0.000			
• Other Adjustments	0.000	0.000	11.701	0.000	11.701

Change Summary Explanation

FY 2023: +11.701M; the FY 2022 President's Budget submittal did not reflect FY 2023 through FY 2026 funding. Therefore, an explanation of the change between the two budget positions for FY 2023 cannot be made in a relevant manner.

FY 2021: -$3.127M; SBIR

C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: Capabilities Insertion Program (CIP)	53.298	14.050	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, Operational Resiliency Phase 2 (OR 2/2B), Mission Planning Element (MPE) 8.4, and Cyber Defense-in-depth.			
FY 2022 Plans: Complete OR 2/2B Phase 2 ground software updates. Complete MPE 8.4 capability improvements to the AEHF system functionality and crypto design. Complete W/V Frequency utility assessments and demonstrations. Additionally, FY 2022 funding will allow the program 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 Plans:			

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decreased due to the Capabilities Insertion Program (CIP) AEHF Ground efforts completing in FY 2022.			
Title: Protected Tactical Testbed ***Description:*** Protected Tactical Testbed provides a government gold standard of reference for risk reduction and experimentation on critical technology elements for the space payload, terminals, and networking segments of the PATS system. Supports the hardware development of the hub component for the PTES ground system and any necessary test capabilities to support either the over-the-air (OTA) or laboratory demonstrations for the Protected Tactical Service Field Demonstration (PTSFD). 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 Protected Tactical Waveform (PTW). This effort moved to PE 1206761SF, Protected Tactical Service (PTS) in FY 2022. ***FY 2022 Plans:*** N/A ***FY 2023 Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** N/A	9.539	0.000	0.000
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 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 2022 Plans:*** Complete critical design review, integration and testing of production evaluation units. Test in an operationally-representative environment during the OA. The OA will inform the production decision for Milestone C. Complete PATS Risk Reduction	24.081	12.892	0.000

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Demonstrations (RRD) and Integration Events (IE). Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2023 Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decreased due to A3M Block I Development efforts completing in FY 2022.			
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 CSO SATCOM Vision for improved resiliency and agility. ***FY 2022 Plans:*** N/A ***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. 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 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 funds increased to support integrating A3M modems and PTW capabilities into GBS receive suites.	-	0.000	11.701
Accomplishments/Planned Programs Subtotals	86.918	26.942	11.701

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
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D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• SPSF 01 ADV555: *Advanced EHF*	7.823	-	-	-	-	-	-	-	-	0.000	7.823
• SPSF 01 MILSAT: *MILSATCOM*	4.518	13.927	16.722	-	16.722	23.148	21.635	4.534	4.625	0.000	89.109

Remarks

The FY21-26 MILSAT SPSF above funds the production of the A3M. A3M is a joint effort between the SSC and the Program Manager (PM) Tactical Networks (TN), Aberdeen Proving Ground (APG), to develop a common modem for the AF GMT and Army STT. 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.

E. Acquisition Strategy

A3M is an ACAT III program. A3M leverages the PTSFD 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.

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force		Date: April 2022
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 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Capabilities Insertion Program (CIP)	SS/CPFF	Lockheed Martin : Sunnyvale, CA	-	42.579	Feb 2021	1.625	Nov 2021	-		-		-	0.000	44.204	-
W/V Frequency utilization demonstration	MIPR	AFRL : Various	-	8.554	Mar 2021	8.554	Jan 2022	-		-		-	0.000	17.108	-
Protected Tactical Testbed	Various	MIT/LL : Hanscom AFB, MA	-	9.539	Feb 2021	-		-		-		-	0.000	9.539	-
A3M PTW Modem Development	C/CPAF	Various : Various	-	19.908	Feb 2021	12.542	Nov 2021	-		-		-	0.000	32.450	-
GBS-A3M Software/ Firmware design changes	C/CPFF	TBD : TBD	-	-		-		8.701	Nov 2022	-		8.701	Continuing	Continuing	-
GBS Receive Suite Integration	C/TBD	Not specified. : TBD	-	-		-		0.673	Apr 2023	-		0.673	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	3.165	Feb 2021	2.320	Nov 2021	-		-		-	0.000	5.485	-
Enterprise SE&I	C/CPAF	Linquest : Los Angeles, CA	-	3.073	Feb 2021	0.650	Nov 2021	0.600	Nov 2022	-		0.600	0.000	4.323	-
		Subtotal	-	86.818		25.691		9.974		-		9.974	Continuing	Continuing	N/A

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 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	Jan 2023	-		1.500	Continuing	Continuing	-
		Subtotal	-	-		-		1.500		-		1.500	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force			Date: April 2022
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)*	

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	-		1.076	Oct 2021	0.227	Oct 2022	-		0.227	0.000	1.303	-
Other Support	Various	Various : Various	-	0.100	Feb 2021	0.175	Oct 2021	-		-		-	0.000	0.275	-
		Subtotal	-	0.100		1.251		0.227		-		0.227	0.000	1.578	N/A

	Prior Years	FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	86.918		26.942		11.701		-		11.701	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force		Date: April 2022
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)*

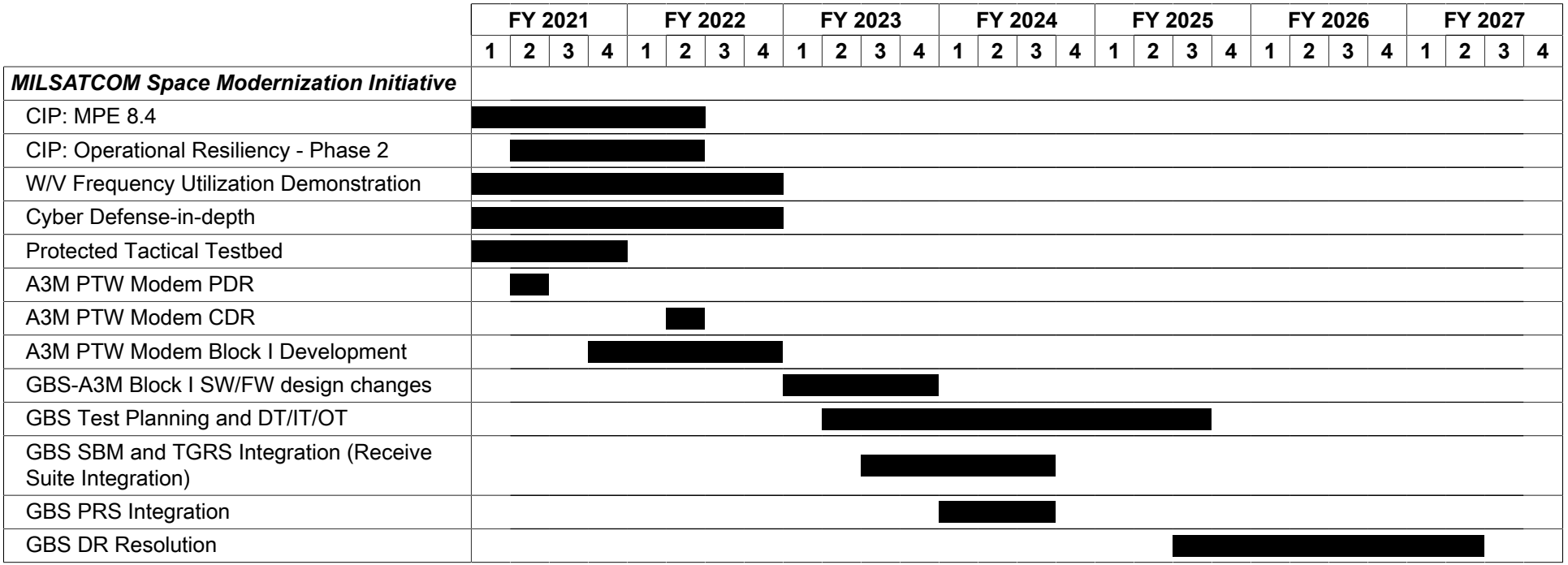

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206431SF / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MILSATCOM Space Modernization Initiative				
CIP: MPE 8.4	1	2021	2	2022
CIP: Operational Resiliency - Phase 2	2	2021	2	2022
W/V Frequency Utilization Demonstration	1	2021	4	2022
Cyber Defense-in-depth	1	2021	4	2022
Protected Tactical Testbed	1	2021	4	2021
A3M PTW Modem PDR	2	2021	2	2021
A3M PTW Modem CDR	2	2022	2	2022
A3M PTW Modem Block I Development	4	2021	4	2022
GBS-A3M Block I SW/FW design changes	1	2023	4	2023
GBS Test Planning and DT/IT/OT	2	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	2027