Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force												Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*							
COST ($ in Millions)	**Prior Years**	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**	**FY 2020**	**FY 2021**	**FY 2022**	**FY 2023**	**Cost To Complete**	**Total Cost**
Total Program Element	427.288	221.584	145.610	151.506	0.000	151.506	106.378	55.157	14.745	15.015	Continuing	Continuing
657103: *Advanced MILSATCOM*	427.288	30.241	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	457.529
657104: *MILSATCOM Space Modernization Initiative (SMI)*	0.000	191.343	145.610	151.506	0.000	151.506	106.378	55.157	14.745	15.015	Continuing	Continuing
Program MDAP/MAIS Code: 261												

A. Mission Description and Budget Item Justification

The Space Modernization Initiative (SMI) strategy is to evolve current and future Protected MILSATCOM systems, sustain the existing AEHF system capability and develop a more affordable and resilient MILSATCOM enterprise capable of meeting near term and emerging MILSATCOM requirements. A significant thrust for this initiative is to demonstrate technologies and Concepts of Operations (CONOPS) that lead to a future Protected Anti-Jam Tactical SATCOM (PATS) capability that provides tactical-level MILSATCOM users protected, anti-jam satellite communications while operating in a contested environment. PATS will provide tactical users significantly higher data rates than AEHF and a security architecture that enables forward deployed users to have protected satellite communications in scenarios where AEHF terminals cannot be deployed. Under this construct the SMI will: 1) Reduce parts/obsolescence risk to AEHF space vehicles, 2) Continue the AEHF Capabilities Insertion Program (CIP) to enhance the current AEHF constellation performance, and improve system operational resiliency, and 3) Invest in technologies and demonstrations (e.g. Protected Tactical Service Field Demonstration) that enable the future Protected Tactical Enterprise Service and SATCOM programs by continued development of the Protected Tactical Waveform (PTW) technologies, maturing the Protected Tactical Testbed, and demonstrating resilient and affordable wideband protected technologies and CONOPS.

The current and future space domain demands that space systems be responsive to new and changing threats, and can rapidly integrate new capabilities to make our warfighting force more resilient in a contested battlespace. This agility, survivability, and rapid reconstitution must extend through the entire space warfighting enterprise, to include how we learn about the threat; develop solutions; acquire, test, deploy, train, operate and integrate new systems into the greater system of systems; and ensure our space mission force is ready to defeat a thinking adversary in a complex, multi-domain battlespace. The enterprise will use all of its elements to accelerate decision-making, prototype potential solutions, rapidly integrate decision-making tools and sustain a war-winning capability by delivering multi-domain effects in, from, and through space and cyberspace enabling battle management and resilience options to "fight through."

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

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full-rate production.

Exhibit R-2, RDT&E Budget Item Justification: PB 2019 Air Force					Date: February 2018
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*			R-1 Program Element (Number/Name) PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*		
B. Program Change Summary ($ in Millions)	**FY 2017**	**FY 2018**	**FY 2019 Base**	**FY 2019 OCO**	**FY 2019 Total**
Previous President's Budget	259.131	145.610	129.946	0.000	129.946
Current President's Budget	221.584	145.610	151.506	0.000	151.506
Total Adjustments	-37.547	0.000	21.560	0.000	21.560
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	-30.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-7.547	0.000			
• Other Adjustments	0.000	0.000	21.560	0.000	21.560

Change Summary Explanation

FY2017: -$30.000M Congressional Directed Reduction for unjustified growth

FY2019: +$21.560M: +$12.400M for AEHF crypto and survivability improvements (Mission Control Segment Increment 8.4); +$5.300M to fund AEHF Operational Resiliency Phase 2 to expand resiliency capability from AEHF SV 5-6 to AEHF SV-4; and +$5.000M for Protected Tactical Service Field Demonstration (PTSFD); -$1.140M inflation adjustment

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	Project (Number/Name) 657103 / *Advanced MILSATCOM*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657103: *Advanced MILSATCOM*	427.288	30.241	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	457.529
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

As of the December 2016 Selected Acquisition Report, Prior Years dollars total $7,354.7M and include $270.5M of International Partners funding.

A. Mission Description and Budget Item Justification

Develop and acquire Advanced Extremely High Frequency (AEHF) Military Satellite Communications (MILSATCOM) satellites, mission control segment and cryptography for survivable, anti-jam, worldwide, secure communications for the strategic and tactical warfighters. AEHF satellites will replenish the existing EHF system (Milstar) providing much higher capacity and data rate (5x increase over Milstar II) capabilities.

AEHF is a cooperative program that includes International Partners (Canada, the United Kingdom, and the Kingdom of the Netherlands).

AEHF Initial Operational Capability (IOC) was declared on 28 July 2015.

Advanced EHF and Enhanced Polar System (EPS) Key Management Architectures (KMA) are not compatible with the National Security Agency's new enterprise system, Key Management Infrastructure (KMI). Per the Acquisition Decision Memorandum signed by (USD)AT&L on June 2013, the Air Force shall transition the AEHF and EPS KMA from the Electronic Key Management System (EKMS) to the KMI by March 2018. This funding supports development, acquisition, integration and testing of a Protected SATCOM Key Management Architecture (PKMA) that will replace the legacy EKMS to be compatible with the KMI by March 2018.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: AEHF Key Management Infrastructure (KMI) transition	30.241	0.000	0.000
Description: Develop and conduct systems engineering, integration and test of the Protected SATCOM Key Management Architecture (PKMA). National Security Agency (NSA) will lead the development of the PKMA centralized elements. Enable testing and integration of AEHF Local Key Management functionality within the KMI client with the AEHF system. Initiate PKMA integration activities with the AEHF prime contractor and the Enhanced Polar System (EPS) Control and Planning Segment (CAPS) contractor.			
FY 2018 Plans: N/A			
FY 2019 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	30.241	0.000	0.000

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line Item ADV555: *Advanced EHF*	645.569	56.974	29.829	-	29.829	31.894	17.240	-	-	0.000	781.506
• RDTE 05 PE 0605433F: *Wideband Global SATCOM (Space)*	11.800	-	0.000	-	0.000	0.000	0.000	-	-	0.000	11.800
• RDTE 05 PE 1206433F: *Wideband Global SATCOM (Space)*	0.000	4.263	3.970	-	3.970	1.920	0.000	0.000	-	0.000	10.153

Remarks

Wideband Global SATCOM (Space) funding is within the Command and Control System - Consolidated (CCS-C) project.

D. Acquisition Strategy

The Advanced MILSATCOM, also known as Advanced EHF (AEHF), program is a sole source acquisition to a contractor team comprised of Lockheed Martin (prime/integrator) and Northrop Grumman (provider of the satellite payload). This team performed the Advanced Component Development and Prototypes (ACD&P) and Systems Development and Demonstration (SDD) of two RDT&E-funded satellites and associated mission command and control ground capabilities under Cost Plus Award Fee line items on the contract. AEHF incorporated lessons learned and improvements from Milstar and commercial SATCOM practices into the next generation EHF secure, anti-jam military communications satellite system.

The Protected SATCOM Key Management Architecture (PKMA) acquisition is a software development effort to update DoD secure satellite communication encryption systems and become compatible with the National Security Agency's enterprise Key Management Infrastructure (KMI). The Acquisition Decision Memorandum was signed by USD(AT&L) on 17 June 2013. The prime contractor for the PKMA development under the NSA is Leidos with subcontracts to L3 Communications and General Dynamics. The acquisition strategy is managed by NSA.

E. Performance Metrics

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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Crypto Interim Contractor Support	MIPR	Cryptologic Sys Group : San Antonio, TX	10.100	-		-		-		-		-	0.000	10.100	-
AEHF SVs 1-2 and MCS Interim Contractor Support	SS/CPIF	Lockheed Martin : Sunnyvale, CA	214.139	-		-		-		-		-	0.000	214.139	-
GFP - AEHF Calibration Facility (ACF)	Various	Lincoln Labs : Lexington, MA	3.286	-		-		-		-		-	0.000	3.286	-
PKMA MIT/LL Test Support	Various	Lincoln Labs : Lexington, MA	0.696	0.509	Apr 2017	-		-		-		-	0.000	1.205	-
New KMI Component Development	MIPR	NSA : Ft Meade, MD	145.684	-		-		-		-		-	0.000	145.684	-
Enterprise SE&I	C/CPIF	Linquest Corp : Los Angeles, CA	2.803	0.925	Jun 2017	-		-		-		-	0.000	3.728	-
NSA Interim Contractor Support/KMI Component Development	MIPR	NSA : Ft Meade, MD	-	18.708	Jan 2017	-		-		-		-	0.000	18.708	10.000
Install/Integrate/Test New AEHF KMI Components	SS/CPIF	Lockheed Martin : Sunnyvale, CA	12.463	2.200	Aug 2017	-		-		-		-	0.000	14.663	12.464
Install/Integrate/Test New EPS KMI Componenets	SS/CPIF	Northrop Grumman Info Sys : Redondo Beach, CA	8.830	-		-		-		-		-	0.000	8.830	-
Test New KMI Hardware/ Software	MIPR	AFLCMC : San Antonio, TX	12.410	5.869	Apr 2017	-		-		-		-	0.000	18.279	21.893
Operational Test Support	Various	17th Test Sqd : Peterson, CO	0.373	0.521	Sep 2017	-		-		-		-	0.000	0.894	-
		Subtotal	410.784	28.732		-		-		-		-	0.000	439.516	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	Project (Number/Name) 657103 / *Advanced MILSATCOM*	

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Development Test and Evaluation Support	Various	Various : Various	0.250	-		-		-		-		-	0.000	0.250	-
		Subtotal	0.250	-		-		-		-		-	0.000	0.250	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	The Aerospace Corporation : El Segundo, CA	3.146	-		-		-		-		-	0.000	3.146	-
A&AS	Various	Various : Various	11.549	1.417	Dec 2016	-		-		-		-	0.000	12.966	-
Other Support	Various	Various : Various	1.559	0.092	Oct 2016	-		-		-		-	0.000	1.651	-
		Subtotal	16.254	1.509		-		-		-		-	0.000	17.763	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	427.288	30.241		0.000		-		-		-	0.000	457.529	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*

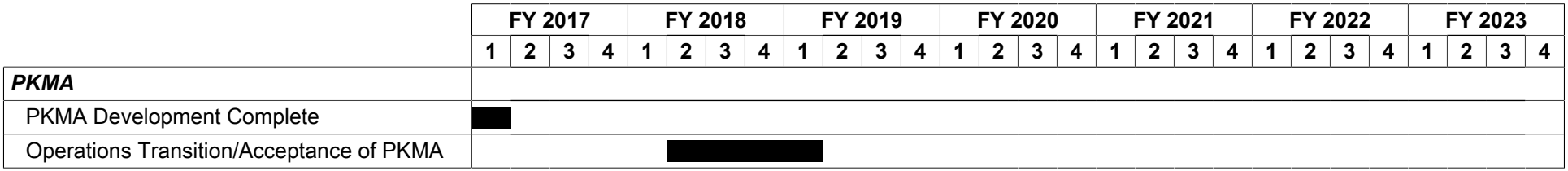

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657103 / *Advanced MILSATCOM*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
PKMA				
PKMA Development Complete	1	2017	1	2017
Operations Transition/Acceptance of PKMA	2	2018	1	2019

Note

PKMA operations transition is funded with RDT&E

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	Project (Number/Name) 657104 / *MILSATCOM Space Modernization Initiative (SMI)*	

COST ($ in Millions)	Prior Years	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
657104: *MILSATCOM Space Modernization Initiative (SMI)*	0.000	191.343	145.610	151.506	0.000	151.506	106.378	55.157	14.745	15.015	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Space Modernization Initiative (SMI) strategy is to evolve current and future Protected MILSATCOM systems, sustain the existing AEHF system capability and develop a more affordable and resilient MILSATCOM enterprise capable of meeting near term and emerging MILSATCOM requirements. A significant thrust for this initiative is to demonstrate technologies and Concepts of Operations (CONOPS) that lead to a future Protected Anti-Jam Tactical SATCOM (PATS) capability that provides tactical-level MILSATCOM users protected, anti-jam satellite communications while operating in a contested environment. PATS will provide tactical users significantly higher data rates than AEHF and a security architecture that enables forward deployed users to have protected satellite communications in scenarios where AEHF terminals cannot be deployed. Under this construct the SMI will: 1) Reduce parts/obsolescence risk to AEHF space vehicles, 2) Continue the AEHF Capabilities Insertion Program (CIP) to enhance the constellation performance and improve mission operational resiliency and 3) Invest in technologies and demonstrations (e.g. Protected Tactical Service Field Demonstration or PTSFD) that enable the future Protected Tactical Enterprise Service (PTES) and SATCOM programs by continued development of the Protected Tactical Waveform (PTW) technologies, maturing the Protected Tactical Testbed, and demonstrating resilient and affordable wideband protected technologies and CONOPS.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
Title: Capabilities Insertion Program (CIP)	29.900	57.194	82.972
Description: Develop software that will increase the current AEHF constellation capacity by 10%, broaden overall user base, and accommodate a larger user population through improved resource utilization efficiencies. Develop modifications that will improve the mission operational resiliency. Develop software to increase current AEHF terminal data rates with adaptive coding algorithms. These efforts are included in PNO 261. ***FY 2018 Plans:*** Complete Phase III INC (8.1) development and verifications. Continue Phase IV INC (8.2) development. Award and begin Phase V INC (8.3) development to enable endurance mission replan and other improvements. Develop modifications to increase the systems operational resiliency. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Complete Phase IV (Inc 8.2) Terminal Integration development and verifications. Continue Phase V (Inc 8.3) XDR Transition development. Begin Phase VI (Inc 8.4) Endurance Mission Replan to provide crypto and survivability improvements, maintain user communication when fixed site support is unavailable, adds capability for planning downlink resources and other			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
improvements. Complete Operational Resiliency (OR) 2 & OR2B - Phase 1 (i.e., Engineering analysis of SV 5/6, Command and Control System-Consolidated (CCS-C) maintain vehicle configuration). Initiate OR2 & OR2B - Phase 2 (i.e., Engineering analysis of SV-4 and Flight software). Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 increased compared to FY2018 by $26.402M. Justification for this increase is described in plans above.			
Title: Evolved AEHF ***Description:*** The Evolved AEHF (E-AEHF) provides nuclear survivable, protected MILSATCOM to eXtended Data Rate (XDR) users only. E-AEHF supports strategic mission requirements such as Presidential and National Voice Conferencing (PNVC), Nuclear Command and Control (NC2) strategic networks, terminal report back, and Emergency Action Message (EAM) dissemination. ***FY 2018 Plans:*** Effort has transitioned to PE 1206855F. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	2.796	0.000	0.000
Title: Protected Tactical Testbed ***Description:*** Protected Tactical Testbed provides a government gold standard of reference for risk reduction and experimentation on critical technology elements for the space payload, terminals and networking segments of the PATS system. Supports the hardware development of the hub component for the PTES ground system and any necessary test capabilities to support either the over-the-air (OTA) or laboratory demonstrations for the PTSFD. It enables system integration capabilities with industry and FFRDC partners for interoperability testing and conducting experiments to mature the PATS operations, with a focus on the PTW. ***FY 2018 Plans:*** Conduct Protected Tactical Testbed test readiness-review in preparation for PTSFD contractor compatibility testing. Support three PTSFD contractor modem-to-testbed PTW compatibility technology demonstrations. Finalize Protected Testbed baseline configuration to support OTA technology demonstrations over Wideband Global SATCOM (WGS) and commercial satellites for	37.224	13.000	11.910

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
PTSFD. Prepare Protected Testbed for OTA WGS certification testing. Enhance Protected Testbed capabilities to support PTES and Protected Tactical SATCOM (PTS) risk-reduction efforts. ***FY 2019 Plans:*** Conduct compatibility testing between the ground testbed and the Terminal Modem (TM) Line Replaceable Unit (LRU). This is a precursor activity to the compatibility testing with representative WGS payload hardware. Begin OTA testing. Expand Hub capability for PTES and PTS risk reduction event. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 decreased compared to FY2018 by $1.000M. Justification for this decrease is described in plans above.			
Title: Protected Tactical Service Field Demonstration (PTSFD)	94.552	75.416	56.624
Description: PTSFD is a technology demonstration that will develop and demonstrate prototype Terminal Modem (TM) Line Replaceable Units (LRUs) utilizing PTW over wideband space/ground systems with an option to demonstrate over a commercial SATCOM system and design and build the Mission Management System (MMS) simulator. Develop PTW components, protected tactical terminal modems that will be capable of being fully integrated into existing wideband terminals, and a new End Cryptographic Unit (ECU) that will support the PTW. The ECUs will be integrated with the PTW modem and certified by NSA. The PTSFD will demonstrate an Anti-Jam (AJ) and Low Probability of Intercept (LPI)/Low Probability of Detection (LPD) communications capability that can be provided to tactical users in all Services through fielded terminals, existing wideband MILSATCOM assets, and potential COMSATCOM assets. Conduct trade space and requirements definition to support future PTW-related capabilities. Identify potential assets such as ground hubs and information assurance components that can be further developed by future PTW-related programs for wideband users and explore releasability of PTW-related technologies to International Partners. ***FY 2018 Plans:*** Conduct Protected Testbed test readiness-review in preparation for PTSFD contractor compatibility testing. Support three PTSFD contractor modem-to-testbed PTW compatibility technology demonstrations. Finalize Protected Testbed baseline configuration to support over-the-air technology demonstrations over WGS and commercial satellites for PTSFD. Prepare Protected Testbed for over-the-air WGS certification testing. Enhance Protected Testbed capabilities to support PTES and PTS risk-reduction efforts. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Plans:*** Complete Terminal to TM LRU Integration and Test (I&T) for each vendor and each identified service terminal. Complete Compatibility Test involving the first System Integration Lab (SIL) test using the Protected Tactical Testbed. Conduct Modem Certification Test with ARSTRAT. Conduct first Physical Hardware Equipment Chain (PHEC) test to verify compatibility using			

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
a WGS emulator on the ground prior to the WGS demo. Conduct over-the-air technology demonstrations over WGS and commercial satellites for PTSFD and conduct the second SIL test. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY2019 decreased compared to FY2018 by $18.366M. Justification for this decrease is described in plans above.			
Title: Protected Tactical Enterprise Service (PTES) ***Description:*** The PTES will utilize the PTW to provide a protected anti-jam communications capability over the WGS system. The PTES system will consist of three segments: a Mission Management System (MMS), a Key Management System (KMS), and Joint Hubs integrated into existing SATCOM gateways. PTES will enable, along with the TM LRU's developed during the PTSFD, an anti-jam communications capability over WGS for tactical users in all Services and International Partners. ***FY 2018 Plans:*** Effort has transitioned to PE 1206760F. ***FY 2019 Plans:*** N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A	19.800	0.000	0.000
Title: Enterprise Ground Services (EGS) ***Description:*** EGS is envisioned to provide a robust enterprise ground architecture for Air Force space systems, which leverages mission commonality and automation to reduce sustainment costs and re-focus manpower on warfighting capabilities. In addition, EGS will enable a near-real-time common operating picture of enterprise-wide tactical health, status, indications, and warnings for Air Force satellites. The end-state will be a modern technical infrastructure which is cyber-secure and resilient against the Advanced Persistent Threat and employs streamlined architecting, acquisition, and operational processes. Through early architecture studies and prototyping, the government will establish clear ownership of the technical baseline to meet Better Buying Power principles as the EGS effort evolves through development. This effort provides focus and expertise for the development, test, certification and enforcement of standards and interfaces for all AFSPC satellite ground systems to enable transition planning for legacy ground systems, new capability demonstrations, and systems acquisition leading to an enterprise ground architecture for Air Force space systems. ***FY 2018 Plans:*** In FY18, Enterprise Ground Services has been consolidated under Space and Missile Test and Evaluation Center; PE 1203173F. ***FY 2019 Plans:***	7.071	0.000	0.000

Exhibit R-2A, RDT&E Project Justification: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019
N/A ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	191.343	145.610	151.506

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total	FY 2020	FY 2021	FY 2022	FY 2023	Cost To Complete	Total Cost
• SPAF 01 Line Item ADV555: *Advanced EHF*	645.569	56.974	29.829	-	29.829	31.894	17.240	-	-	0.000	781.506

Remarks

AEHF CIP: OR2 (software) & OR2B (hardware/software): Provides automated space resiliency planning elements into AEHF mission control and provides system level capability to execute both OR2 and OR2B resiliency CONOPS in phases

D. Acquisition Strategy

MILSATCOM SMI includes parts obsolescence redesign and incremental capability upgrades contracted with current Prime contractor team. Enterprise studies, system design for affordability, protected tactical awards and risk reduction efforts for next generation capabilities.

The PTSFD is a technology maturation and risk reduction effort that will demonstrate the ability to provide wideband anti-jam communications to tactical users using the WGS constellation and Commercial SATCOM by developing production-representative Terminal Modem Line Replaceable Units (TM LRUs) that implement the government-developed PTW, and integrating and demonstrating them with existing WGS-certified terminals. The effort includes the design, development, factory testing and fabrication of PTW-enabled TM LRU prototypes for integration, compatibility testing and Type-1 cryptographic certification evaluation by the NSA to support potential future acquisitions by the service Terminal Program Offices (TPOs). The acquisition strategy includes the award of up to three TM LRU contracts; each a four-year, Cost-Plus Incentive Fee, Cost-Plus Fixed Fee with a Firm Fixed Price option contract, awarded through a full and open competitive, best-value source selection process. The PTSFD will use a Government-built ground test bed to facilitate the demonstrations and to allow for compatibility and integration testing for the TM LRU.

E. Performance Metrics

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

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
AEHF Capabilities Insertion Program (CIP)	SS/CPIF	Lockheed Martin : Sunnyvale, CA	-	29.900	Jun 2017	52.618	Jun 2018	76.908	Jun 2019	-		76.908	Continuing	Continuing	56.151
Protected Tactical Service Field Demonstration (PTSFD) (Modem)	Various	Various : various	-	11.683	Jan 2017	6.415	Jan 2018	21.764	Jan 2019	-		21.764	Continuing	Continuing	-
PTSFD (Modem) Contractor 1	C/CPIF	L3 : Camden, NJ	0.000	15.544	Jan 2017	14.869	Jan 2018	5.945	Jan 2019	-		5.945	Continuing	Continuing	35.700
PTSFD (Modem) Contractor 2	C/CPIF	VIASAT : Carlsbad, CA	0.000	17.044	Jan 2017	14.868	Jan 2018	5.575	Jan 2019	-		5.575	Continuing	Continuing	31.400
PTSFD (Modem) Contractor 3	C/CPIF	Raytheon : Marlborough, MA	-	15.044	Jan 2017	14.868	Jan 2018	5.156	Jan 2019	-		5.156	Continuing	Continuing	37.500
PTSFD (Mission Management System simulator)	Various	Aerospace : El Segundo, CA	-	0.323	Jan 2017	1.254	Jan 2018	1.557	Nov 2018	-		1.557	Continuing	Continuing	-
Technical Mission Analysis	MIPR	Aerospace : El Segundo, CA	0.000	14.899	Oct 2016	3.175	Oct 2017	4.756	Nov 2018	-		4.756	Continuing	Continuing	-
Evolved AEHF (E-AEHF)	Various	Various : Various	0.000	2.796	Jan 2017	-		-		-		-	0.000	2.796	-
Protected Tactical Testbed	Various	MIT/LL : Various	0.000	37.224	Jan 2017	10.929	Jan 2018	10.532	Jan 2019	-		10.532	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	Linquest : Los Angeles, CA	0.000	24.149	Jan 2017	14.205	Jan 2018	6.269	Jan 2019	-		6.269	Continuing	Continuing	-
Enterprise Ground Services (EGS)	Various	Various : Various	-	7.071	Jan 2017	-		-		-		-	0.000	7.071	-
		Subtotal	0.000	175.677		133.201		138.462		-		138.462	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : Various	0.000	5.567	Jan 2017	0.167	Jan 2018	0.173	Nov 2018	-		0.173	Continuing	Continuing	-
Other Support	Various	Various : Various	0.000	0.325	Dec 2016	0.050	Dec 2017	0.100	Nov 2018	-		0.100	Continuing	Continuing	-
A&AS	Various	Various : Various	-	9.774	Jan 2017	12.192	Jan 2018	12.771	Jan 2019	-		12.771	Continuing	Continuing	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2017 Cost	FY 2017 Award Date	FY 2018 Cost	FY 2018 Award Date	FY 2019 Base Cost	FY 2019 Base Award Date	FY 2019 OCO Cost	FY 2019 OCO Award Date	FY 2019 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	0.000	15.666		12.409		13.044		-		13.044	Continuing	Continuing	N/A

	Prior Years	FY 2017		FY 2018		FY 2019 Base		FY 2019 OCO		FY 2019 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	0.000	191.343		145.610		151.506		-		151.506	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

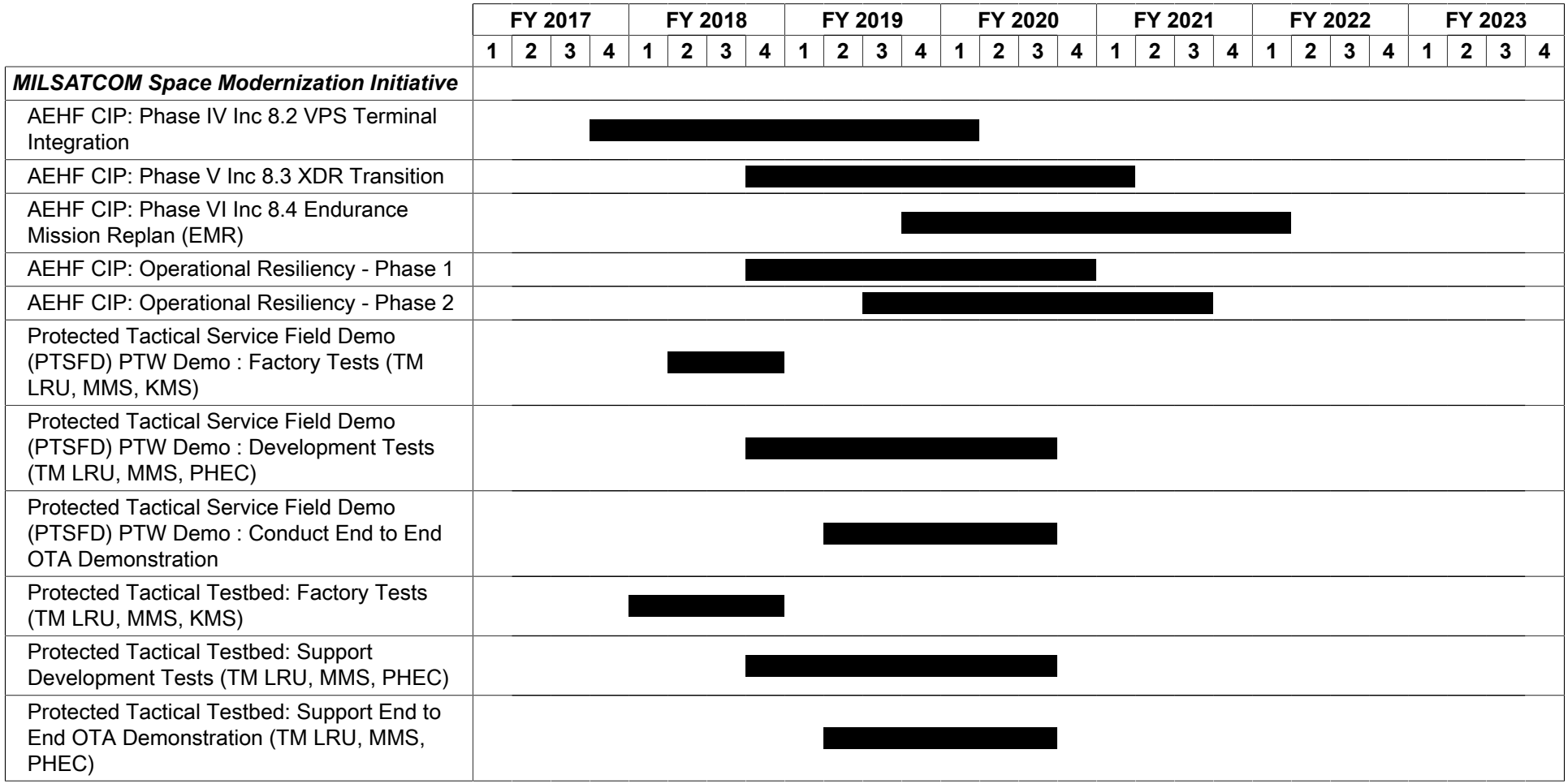

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206431F / *Advanced EHF MILSATCOM (SPACE)*	**Project (Number/Name)** 657104 / *MILSATCOM Space Modernization Initiative (SMI)*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
MILSATCOM Space Modernization Initiative				
AEHF CIP: Phase IV Inc 8.2 VPS Terminal Integration	4	2017	1	2020
AEHF CIP: Phase V Inc 8.3 XDR Transition	4	2018	1	2021
AEHF CIP: Phase VI Inc 8.4 Endurance Mission Replan (EMR)	4	2019	1	2022
AEHF CIP: Operational Resiliency - Phase 1	4	2018	4	2020
AEHF CIP: Operational Resiliency - Phase 2	3	2019	3	2021
Protected Tactical Service Field Demo (PTSFD) PTW Demo : Factory Tests (TM LRU, MMS, KMS)	2	2018	4	2018
Protected Tactical Service Field Demo (PTSFD) PTW Demo : Development Tests (TM LRU, MMS, PHEC)	4	2018	3	2020
Protected Tactical Service Field Demo (PTSFD) PTW Demo : Conduct End to End OTA Demonstration	2	2019	3	2020
Protected Tactical Testbed: Factory Tests (TM LRU, MMS, KMS)	1	2018	4	2018
Protected Tactical Testbed: Support Development Tests (TM LRU, MMS, PHEC)	4	2018	3	2020
Protected Tactical Testbed: Support End to End OTA Demonstration (TM LRU, MMS, PHEC)	2	2019	3	2020