

# UNCLASSIFIED

Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force										Date: February 2015		
Appropriation/Budget Activity 3600: Research, Development, Test & Evaluation, Air Force I BA 5: System Development & Demonstration (SDD)					R-1 Program Element (Number/Name) PE 0605431F I Advanced EHF MILSATCOM (SPACE)							
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
Total Program Element	0.000	261.554	307.898	228.230	-	228.230	257.254	233.187	662.937	674.798	Continuing	Continuing
657103: Advanced MILSATCOM	0.000	185.563	191.358	53.505	-	53.505	21.316	-	-	-	-	451.742
657104: Evolved AEHF MILSATCOM (EAM)	0.000	75.991	116.540	174.725	-	174.725	235.938	233.187	662.937	674.798	Continuing	Continuing
Program MDAP/MAIS Code: 261												
Note Prior Years funds for Advanced EHF MILSATCOM (Space) are in Budget Activity 4, PE 0603430F, Project 644050, Advanced MILSATCOM, and Project 64A030, Evolved AEHF MILSATCOM.												
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).  Space Vehicle-1 (SV-1) launched on 14 August 2010. SV-1 experienced a propulsion anomaly and was raised to its geostationary orbit using alternative orbit raising techniques. SV-1 completed on-orbit test and transitioned to operations in March 2012. SV-2 launched on 4 May 2012, successfully completed on-orbit testing in October 2012, and is under operational control as of 7 November 2012.  With SV-1 and SV-2 launched and Initial Operational Capability (IOC) expected in 2015, the AEHF program has nearly completed its development phase and is now addressing obsolescence, production continuity, supplier stability and industrial base issues. AEHF SV 5-6 are being procured using the Department of Defense (DoD) Efficient Space Procurement (ESP) concept. The ESP concept is a procurement approach which seeks stable production and efficient sub-contractor product management through the block buy of two space vehicles at one time (as described in Advanced EHF MILSATCOM P-40 Exhibit).  In addition, the ESP concept includes use of RDT&E funding for a MILSATCOM Space Modernization Initiative (SMI), to fund engineering activities to reduce future production costs through manufacturing and producibility enhancements, improve capabilities through insertion of new technologies, and replace obsolete parts, crypto and materials. The SV-6 crypto redesign funding is reported in the AEHF (SV 5-6 Subprogram) Acquisition Program Baseline; the remaining SMI efforts are not part of the AEHF Major Defense Acquisition Program. The SMI efforts will provide opportunities for competition to develop potential technology upgrades at the component and system level for future satellites of the current or any follow-on system. SMI efforts will include obsolescence management and mitigation, technology maturation, new components' qualification, subsystem and component prototyping, architecture and system concept studies (to include hosted payloads), and pathfinder efforts to address MILSATCOM capability gaps identified in the Joint Space Communications Layer (JSCL) Initial Capabilities Document (ICD) and the "Resilient Basis for												

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SATCOM in Joint Operations" study, and currently being assessed in the Protected Satellite Communications Services (PSCS) Analysis of Alternatives (AoA). The purpose of the PSCS AoA is to evaluate alternative space and control segment architectures, along with the associated user segment, to address the required protected satellite communications capabilities in the nuclear, contested, and benign operating environments.						
MILSATCOM SMI efforts are funded in Project 657104, Evolved AEHF MILSATCOM (EAM).						
The FY2016 funding request was reduced by \$18.631M to account for the availability of prior execution balances.						
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.						
B. Program Change Summary (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget		265.634	314.378	258.378	-	258.378
Current President's Budget		261.554	307.898	228.230	-	228.230
Total Adjustments		-4.080	-6.480	-30.148	-	-30.148
• Congressional General Reductions		-	-0.680			
• Congressional Directed Reductions		-	-5.800			
• Congressional Rescissions		-	-			
• Congressional Adds		-	-			
• Congressional Directed Transfers		-	-			
• Reprogrammings		2.000	-			
• SBIR/STTR Transfer		-6.080	-			
• Other Adjustments		-	-	-30.148	-	-30.148
Change Summary Explanation						
FY14: +\$2.0M below threshold reprogramming for the Protected Satellite Communications Services (PSCS) Analysis of Alternatives						
FY15: -\$5.8M Congressional Directed Reduction for Evolved AEHF excessive program management services						
FY16: -\$18.631M to account for availability of prior execution balances, -\$10.0M to support higher Air Force priorities, -\$1.517M inflation adjustment						

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force										Date: February 2015		
Appropriation/Budget Activity 3600 / 5					R-1 Program Element (Number/Name) PE 0605431F / Advanced EHF MILSATCOM (SPACE)				Project (Number/Name) 657103 / Advanced MILSATCOM			
COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
657103: Advanced MILSATCOM	-	185.563	191.358	53.505	-	53.505	21.316	-	-	-	-	451.742
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		
Note												
Prior Years funds for Advanced EHF MILSATCOM (Space) are in PE 0603430F, Project 644050, Advanced MILSATCOM, Budget Activity 4.												
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).												
Space Vehicle-1 (SV-1) launched on 14 August 2010. SV-1 experienced a propulsion anomaly and was raised to its geostationary orbit using alternative orbit raising techniques. SV-1 completed on-orbit test and transitioned to operations in March 2012. SV-2 launched on 4 May 2012, successfully completed on-orbit testing in October 2012, and is under operational control as of 7 November 2012.												
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 17 June 2013, the Air Force shall transition the AEHF and EPS KMA from the Electronic Key Management System (EKMS) to the KMI by Dec 2017. 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 December 2017.												
B. Accomplishments/Planned Programs (\$ in Millions)									FY 2014	FY 2015	FY 2016	
Title: AEHF SVs 1-2, Mission Control Segment (MCS)									6.520	-	-	
Description: Maintain AEHF MILSATCOM satellites, MCS, and cryptography												
FY 2014 Accomplishments: Funded System Development and Demonstration (SDD) contract Incentive Fee, continued program office support and related activities, and conducted studies/analyses.												
FY 2015 Plans: N/A												
FY 2016 Plans:												

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force			Date: February 2015			
Appropriation/Budget Activity 3600 / 5		R-1 Program Element (Number/Name) PE 0605431F / Advanced EHF MILSATCOM (SPACE)		Project (Number/Name) 657103 / Advanced MILSATCOM		
B. Accomplishments/Planned Programs (\$ in Millions)				FY 2014	FY 2015	FY 2016
N/A						
<p><b>Title:</b> AEHF Interim Contractor Support (ICS)</p> <p><b>Description:</b> Funds ICS for first two AEHF satellites, MCS, Cryptography, and AEHF Calibration Facility (ACF) until Initial Operational Capability (IOC) declaration</p> <p><b>FY 2014 Accomplishments:</b> Conducted ICS for all on-orbit AEHF satellite support, MCS, AEHF Key Management Architecture (KMA) and ACF sustainment.</p> <p><b>FY 2015 Plans:</b> Continue ICS for AEHF satellites' on-orbit support, MCS, AEHF KMA, and ACF leading to a 3QFY2015 IOC.</p> <p><b>FY 2016 Plans:</b> N/A</p>				117.818	116.929	-
<p><b>Title:</b> AEHF Key Management Infrastructure (KMI) transition</p> <p><b>Description:</b> 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.</p> <p><b>FY 2014 Accomplishments:</b> Developed and conducted systems engineering, integration and test of the Protected SATCOM Key Management Architecture (PKMA). SPO transferred funds to NSA for the development of the PKMA centralized elements, and to enable testing and integration of the AEHF Local Key Management functionality within the KMI client with the AEHF system. SPO initiated PKMA integration activities with the AEHF prime contractor, Lockheed Martin.</p> <p><b>FY 2015 Plans:</b> Continue KMI transition. Funds transferred to NSA to complete initial development of Protected SATCOM Key Management Architecture (PKMA) centralized elements except for critical factory components (FY 2016). Continue testing with AEHF Local Key Management functionality, with the KMI client, and AEHF system. Start execution of developmental test and evaluation events. Develop and coordinate transition and test plans with AEHF prime contractor, Lockheed Martin, and EPS CAPS contractor, Northrop Grumman Information Systems.</p> <p><b>FY 2016 Plans:</b></p>				61.225	74.429	53.505

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force										Date: February 2015		
Appropriation/Budget Activity 3600 / 5				R-1 Program Element (Number/Name) PE 0605431F / Advanced EHF MILSATCOM (SPACE)				Project (Number/Name) 657103 / Advanced MILSATCOM				
B. Accomplishments/Planned Programs (\$ in Millions)										FY 2014	FY 2015	FY 2016
Continue KMI transition. Funds transferred to NSA to complete initial development of Protected SATCOM Key Management Architecture (PKMA) centralized elements and continue testing with AEHF Local Key Management functionality with the KMI client and AEHF system. Plan and execute operational acceptance tests, AEHF factory tests and EPS factory tests.												
Accomplishments/Planned Programs Subtotals										185.563	191.358	53.505
C. Other Program Funding Summary (\$ in Millions)												
Line Item	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost	
• MPAF: BA05: Line Item # ADV555: Advanced EHF	328.350	298.462	333.366	-	333.366	650.718	57.300	29.527	31.427	16.000	5,705.673	
• RDT&E: BA05: PE 0605433F: Wideband Global SATCOM (Space)	11.674	16.328	8.660	-	8.660	18.320	20.266	-	-	-	309.173	
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 will perform 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 will incorporate 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 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 L-3 Communications and General Dynamics.												
E. Performance Metrics												
Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.												

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force** **Date:** February 2015

<b>Appropriation/Budget Activity</b> 3600 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0605431F / <i>Advanced EHF MILSATCOM (SPACE)</i>	<b>Project (Number/Name)</b> 657103 / <i>Advanced MILSATCOM</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2014</b>		<b>FY 2015</b>		<b>FY 2016 Base</b>		<b>FY 2016 OCO</b>		<b>FY 2016 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Crypto Interim Contractor Support	MIPR	Cryptologic Sys Group : San Antonio, TX	0.000	10.100	Mar 2014	10.200	Mar 2015	-		-		-	-	20.300	-
AEHF SVs 1-2 and MCS Interim Contractor Support	SS/CPIF	Lockheed Martin : Sunnyvale, CA	0.000	104.432	Dec 2013	103.129	Dec 2014	-		-		-	-	207.561	207.561
GFP - AEHF Calibration Facility (ACF)	Various	Lincoln Labs : Lexington, MA	0.000	3.286	Dec 2013	-		-		-		-	-	3.286	-
New KMI component development	MIPR	NSA : Ft Meade, MD	0.000	54.800	Dec 2013	53.389	Dec 2014	38.656	Dec 2015	-		38.656	7.745	154.590	-
Install/Integrate/Test new AEHF KMI components	SS/CPIF	Lockheed Martin : Sunnyvale, CA	0.000	3.979	Sep 2014	5.825	Dec 2014	5.438	Dec 2015	-		5.438	1.656	16.898	16.898
Install/Integrate/Test new EPS KMI components	SS/CPAF	Northrop Grumman Information Systems : Redondo Beach, CA	0.000	-		8.315	Feb 2015	4.576	Dec 2016	-		4.576	3.785	16.676	16.676
Test new KMI hardware/software	MIPR	AFLCMC : San Antonio, TX	0.000	1.946	Apr 2014	6.400	Aug 2014	4.800	Aug 2015	-		4.800	8.100	21.246	-
<b>Subtotal</b>			0.000	178.543		187.258		53.470		-		53.470	21.286	440.557	-

**Remarks**

FY14 funds transferred from PE 0603430F, Project 644050.

<b>Support (\$ in Millions)</b>				<b>FY 2014</b>		<b>FY 2015</b>		<b>FY 2016 Base</b>		<b>FY 2016 OCO</b>		<b>FY 2016 Total</b>			
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Subtotal</b>			-	-		-		-		-		-	-	-	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2016 Air Force												<b>Date:</b> February 2015			
<b>Appropriation/Budget Activity</b> 3600 / 5						<b>R-1 Program Element (Number/Name)</b> PE 0605431F / <i>Advanced EHF MILSATCOM (SPACE)</i>				<b>Project (Number/Name)</b> 657103 / <i>Advanced MILSATCOM</i>					

  

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2014</b>		<b>FY 2015</b>		<b>FY 2016 Base</b>		<b>FY 2016 OCO</b>		<b>FY 2016 Total</b>				
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
Development Test and Evaluation support	Various	Various : Various,	0.000	0.250	Dec 2013	-		-		-		-		-	0.250	-
<b>Subtotal</b>			0.000	0.250		-		-		-		-		-	0.250	-

  

<b>Remarks</b> FY14 funds transferred from PE 0603430F, Project 644050.																
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<b>Management Services (\$ in Millions)</b>				<b>FY 2014</b>		<b>FY 2015</b>		<b>FY 2016 Base</b>		<b>FY 2016 OCO</b>		<b>FY 2016 Total</b>				
<b>Cost Category Item</b>	<b>Contract Method &amp; Type</b>	<b>Performing Activity &amp; Location</b>	<b>Prior Years</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost</b>	<b>Award Date</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
AEHF FFRDC (PMA)	RO	The Aerospace Corporation : El Segundo, CA	0.000	1.742	Dec 2013	1.404	Dec 2014	-		-		-		-	3.146	-
Business Operating Support Services & Acquisition Mission Support (PMA)	Various	Various : Various,	0.000	5.028	Dec 2013	2.696	Dec 2014	0.035	Dec 2015	-		0.035		0.030	7.789	-
<b>Subtotal</b>			0.000	6.770		4.100		0.035		-		0.035		0.030	10.935	-

  

<b>Remarks</b> FY14 funds transferred from PE 0603430F, Project 644050.																
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			<b>Prior Years</b>	<b>FY 2014</b>		<b>FY 2015</b>		<b>FY 2016 Base</b>		<b>FY 2016 OCO</b>		<b>FY 2016 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>
<b>Project Cost Totals</b>			0.000	185.563		191.358		53.505		-		53.505	21.316	451.742	-

  

<b>Remarks</b> Prior Years funds for Advanced EHF MILSATCOM (Space) are in PE 0603430F, Project 644050, Advanced MILSATCOM, Budget Activity 4.																
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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2016 Air Force			<b>Date:</b> February 2015		
<b>Appropriation/Budget Activity</b> 3600 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0605431F / <i>Advanced EHF MILSATCOM (SPACE)</i>			<b>Project (Number/Name)</b> 657103 / <i>Advanced MILSATCOM</i>

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
Deliver Ground Segment Software Increment 7.5 (eXtended Data Rate capability to International Partners)	■																											
Award Cryptologic & Cyber Systems Division (CCSD) PKMA contract				■																								
Award LM PKMA Integration and Test Contract					■																							
Award NG PKMA Integration and Test Contract						■																						
Multiservice Operational Test and Evaluation (MOT&E)				■																								
Initial Operational Capability (IOC) objective						■																						
PKMA development complete										■																		
Operations Transition to PKMA													■															
Operations Acceptance of PKMA															■													



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2016 Air Force			<b>Date:</b> February 2015
<b>Appropriation/Budget Activity</b> 3600 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0605431F / <i>Advanced EHF MILSATCOM (SPACE)</i>	<b>Project (Number/Name)</b> 657103 / <i>Advanced MILSATCOM</i>	

## Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Deliver Ground Segment Software Increment 7.5 (eXtended Data Rate capability to International Partners)	1	2014	1	2014
Award Cryptologic & Cyber Systems Division (CCSD) PKMA contract	4	2014	4	2014
Award LM PKMA Integration and Test Contract	1	2015	1	2015
Award NG PKMA Integration and Test Contract	2	2015	2	2015
Multiservice Operational Test and Evaluation (MOT&E)	4	2014	1	2015
Initial Operational Capability (IOC) objective	3	2015	3	2015
PKMA development complete	3	2016	3	2016
Operations Transition to PKMA	2	2017	2	2017
Operations Acceptance of PKMA	4	2017	4	2017

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COST (\$ in Millions)	Prior Years	FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total	FY 2017	FY 2018	FY 2019	FY 2020	Cost To Complete	Total Cost
657104: Evolved AEHF MILSATCOM (EAM)	-	75.991	116.540	174.725	-	174.725	235.938	233.187	662.937	674.798	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

Prior Years funds for Advanced EHF MILSATCOM (Space) are in PE 0603430F, Project 64A030, Evolved AEHF MILSATCOM, Budget Activity 4.

**A. Mission Description and Budget Item Justification**

This project funds the MILSATCOM Space Modernization Initiative (SMI) and Protected Satellite Communications Services (PSCS) efforts. The SMI and PSCS strategy is to evolve current and future Protected MILSATCOM systems and develop a more affordable and resilient MILSATCOM enterprise that will be capable of meeting near term and emerging MILSATCOM requirements. The SMI strategy is to continue to invest in developing the Protected Tactical Waveform (PTW) technologies, mature the Protected Tactical testbed, demonstrate resilient and affordable wideband protected technologies that will evolve current and future protected MILSATCOM systems and leverage commercial technologies that are capable of meeting MILSATCOM requirements. Other SMI efforts include reducing parts/obsolescence risk to future AEHF space vehicles, explore viable self protection technologies such as Space Situational Awareness sensors, expand the commercial transponder coverage and evaluate other potential technologies that are capable of meeting current and future SATCOM operations.

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

	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
<b>Title:</b> AEHF SV-6 Flight Crypto & Future AEHF Parts Obsolescence Mitigation  <b>Description:</b> AEHF SV-6 flight cryptographic equipment redesign effort and future AEHF parts obsolescence mitigation effort. Included in PNO 261.  <b>FY 2014 Accomplishments:</b> Continued efforts for the SV 6 flight crypto development and mitigation of identified parts obsolescence that may affect the future stability of the AEHF product line, particularly the payload.  <b>FY 2015 Plans:</b> Complete the SV-6 flight crypto effort and complete the AEHF parts/obsolescence effort.  <b>FY 2016 Plans:</b> N/A	14.391	20.000	-
<b>Title:</b> AEHF Capabilities Insertion Program (CIP)  <b>Description:</b> 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; these efforts are included in PNO	19.434	41.826	32.116

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Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0605431F / Advanced EHF MILSATCOM (SPACE)	Project (Number/Name) 657104 / Evolved AEHF MILSATCOM (EAM)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
261. Develop software to increase current AEHF terminal data rates with adaptive coding algorithms. Explore possible Space Situational Awareness (SSA) technologies for current and future space systems.  <b>FY 2014 Accomplishments:</b> Awarded a contract and began the first phase of software development to improve the AEHF ground Mission Control Segment (MCS); included validation of a refactored software baseline and CIP design adequacy assessments. Completed a working prototype version of adaptive coding that can be integrated with Navy's Navy Multiband Terminal (NMT) and the Army SMART-T terminals. Once fully functional, adaptive coding will increase these terminal data rates up to 800%.  <b>FY 2015 Plans:</b> Complete Phase I of the MCS software development. Award Phase II contract to execute software development of capability improvements; includes Internal Process Reviews (IPRs) to assess design suitability and implementation of functionality to deliver increased system capacity. Conduct early assessment of hosted SSA sensor capabilities.  <b>FY 2016 Plans:</b> Complete Phase II development to improve system capacity. Award and begin executing phase III contract to deliver capability improvements and other upgrades; includes accommodating a larger user population through improved resource utilization efficiencies. Continue assessment of hosted SSA sensor capabilities leading to a potential integration of sensors onto production AEHF space vehicles.				
<b>Title:</b> Protected MILSATCOM "Design for Affordability" and Protected Testbed  <b>Description:</b> Perform design for affordability studies, demonstrations, and technology risk reduction on critical technology elements for the space payload, terminals and networking segments, with a focus on the Protected Tactical Waveform (PTW) and continue to develop the Protected Tactical testbed for the Protected Tactical demonstration efforts.  <b>FY 2014 Accomplishments:</b> Awarded the Protected Broad Agency Announcement (BAA) Phase III contract, validated and completed the Protected BAA Phase II results, completed last Protected BAA Phase III test, conducted and completed the PTW compatibility and contractor developed modem tests, and completed the PTW modem over-the-air demonstrations.  <b>FY 2015 Plans:</b> Conduct PTW component level demonstrations over wideband systems using existing fielded terminals with newly designed contractor provided PTW brassboard modems, mature the PTW technology, generate PTW modem test reports, and continue to develop the PTW documents. Design and mature the Protected Tactical Testbed components, mission management segments,		42.166	20.409	32.85

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Exhibit R-2A, RDT&E Project Justification: PB 2016 Air Force		Date: February 2015		
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 0605431F / Advanced EHF MILSATCOM (SPACE)	Project (Number/Name) 657104 / Evolved AEHF MILSATCOM (EAM)		
B. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
key management areas, and conduct PTW modem over the air (OTA) test with contractor modems and test newly developed hardware and software components for PTW.  <b>FY 2016 Plans:</b> Conduct Protected Testbed PDR, CDR and intersegment compatibility testing. Expand on the terminal and space/ground prototype to provide the ground functionality required for protected tactical waveform. Continue to build ground hub test vectors, demo contractor developed PTW modems, conduct interim network test, conduct OTA PTW testing to verify contractor developed software and hardware, continue to enhance the Protected Tactical Testbed that supports PTW functional interface testing with operational wideband systems and acquire operational wideband terminals.				
<b>Title:</b> Protected Tactical Demonstration  <b>Description:</b> Previously funded in the Protected MILSATCOM "Design for Affordability" effort, the Protected Tactical Demonstration 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 verified by NSA. The Protected Tactical Demonstration will produce 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.  <b>FY 2014 Accomplishments:</b> N/A  <b>FY 2015 Plans:</b> Award contracts, develop and deliver government designed Protected Tactical Waveform (PTW) modem requirements, design and build MMS simulator and requirements, develop space payload requirements and wideband system hub segments, conduct SDR and prepare for PDR.  <b>FY 2016 Plans:</b> Review system/functional requirements and conduct the PDR and CDR in Phase I. Continue to mature all contractors developed prototype PTW terminal modems and ECUs; continue to mature and test MMS simulator; integrate contractor PTW modems into wideband terminals; demo and test the MMS simulator with the ground hub; continue to develop interface control documents for ECUs and other protected tactical components. Conduct other risk reduction tests with PTW and MMS simulator.		-	23.795	95.435
<b>Title:</b> Evolved AEHF (E-AEHF)		-	10.510	14.323

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2016 Air Force								<b>Date:</b> February 2015			
<b>Appropriation/Budget Activity</b> 3600 / 5				<b>R-1 Program Element (Number/Name)</b> PE 0605431F / <i>Advanced EHF MILSATCOM (SPACE)</i>				<b>Project (Number/Name)</b> 657104 / <i>Evolved AEHF MILSATCOM (EAM)</i>			

  

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016</b>
<p><b>Description:</b> The Evolved AEHF (E-AEHF) provides nuclear survivable, protected military satellite communications (MILSATCOM) to eXtended Data Rate (XDR) users only. E-AEHF supports strategic mission requirements such as Presidential National Voice Conferencing (PNVC), Nuclear Command and Control (NC2) strategic networks, terminal report back, and Emergency Action Message (EAM) dissemination.</p> <p><b>FY 2014 Accomplishments:</b> N/A</p> <p><b>FY 2015 Plans:</b> Define system/payload definitions and conduct trade analysis on various XDR systems.</p> <p><b>FY 2016 Plans:</b> Research and determine system technical requirements and associated spacecraft/payload requirements. Continue research with industry to maximize affordability and develop a requirements plan for XDR backwards compatibility.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	75.991	116.540	174.725

  

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<b>Line Item</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016 Base</b>	<b>FY 2016 OCO</b>	<b>FY 2016 Total</b>	<b>FY 2017</b>	<b>FY 2018</b>	<b>FY 2019</b>	<b>FY 2020</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
• MPAF: BA05: Line Item # ADV555: <i>Advanced EHF</i>	328.350	298.462	333.366	-	333.366	650.718	57.300	29.527	31.427	16.000	5,705.673
<b>Remarks</b>											
<b>D. Acquisition Strategy</b>											
MILSATCOM SMI includes parts obsolescence redesign and incremental capability upgrades for potential future block buys contracted with current Prime contractor team. Enterprise studies, system design for affordability, and risk reduction efforts for next generation capabilities will include full and open competition efforts.											
<b>E. Performance Metrics</b>											
Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.											

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 5						R-1 Program Element (Number/Name) PE 0605431F / Advanced EHF MILSATCOM (SPACE)				Project (Number/Name) 657104 / Evolved AEHF MILSATCOM (EAM)					
Product Development (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
AEHF SV-6 Flight Crypto and Future Parts Obsolescence Mitigation	Various	Various : Various,	0.000	14.391	Dec 2013	20.000	Dec 2014	-		-		-	-	34.391	-
AEHF Capabilities Insertion Program (CIP)	SS/ Various	Lockheed Martin : Sunnyvale, CA	0.000	14.325	Jun 2014	41.826	Jan 2015	24.243	Jan 2016	-		24.243	Continuing	Continuing	56.151
Protected MILSATCOM "Adaptive Coding"	Various	MIT/LL : Various,	0.000	1.899	Jan 2014	-		-		-		-	-	1.899	-
Protected MILSATCOM "Design for Affordability" Phase 3 BAA #1	C/FFP	The Boeing Company : El Segundo, CA	0.000	5.995	Feb 2014	-		-		-		-	-	5.995	5.995
Protected MILSATCOM "Design for Affordability" Phase 3 BAA #2	C/FFP	Loral : Palo Alto, CA	0.000	4.400	Feb 2014	-		-		-		-	-	4.400	4.400
Protected MILSATCOM "Design for Affordability" Phase 3 BAA #3	C/FFP	Raytheon : Marlborough, MA	0.000	3.981	Feb 2014	-		-		-		-	-	3.981	3.981
Protected MILSATCOM "Design for Affordability" Phase 3 BAA #4	C/FFP	L3 COM - West : Salt Lake City, UT	0.000	3.374	Feb 2014	-		-		-		-	-	3.374	3.374
Protected Tactical Demonstration (Modem)	TBD	TBD : TBD,	0.000	-		1.500	Sep 2015	74.300	Jan 2016	-		74.300	Continuing	Continuing	-
Protected Tactical Demonstration (Mission Management System simulator)	Various	Various : Various,	0.000	-		15.960	Oct 2014	16.350	Jan 2016	-		16.350	Continuing	Continuing	-
Evolved AEHF (E-AEHF)	Various	Various : Various,	0.000	-		3.339	Jun 2015	9.839	Jan 2016	-		9.839	Continuing	Continuing	-
Protected Testbed	Various	MIT/LL : Various,	0.000	7.030	Dec 2013	14.128	Dec 2014	22.531	Jan 2016	-		22.531	Continuing	Continuing	-
Subtotal			0.000	55.395		96.753		147.263		-		147.263	-	-	-
Remarks AEHF CIP contract target value is based on FY14-15 funds. FY16 and out are not on contract yet.															

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 5						R-1 Program Element (Number/Name) PE 0605431F / Advanced EHF MILSATCOM (SPACE)				Project (Number/Name) 657104 / Evolved AEHF MILSATCOM (EAM)					
Support (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Enterprise Systems Engineering and Integration	C/Various	Linquest : Los Angeles, CA	0.000	4.030	Dec 2013	4.516	Dec 2014	6.128	Jan 2016	-		6.128	Continuing	Continuing	-
Subtotal			0.000	4.030		4.516		6.128		-		6.128	-	-	-
Test and Evaluation (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
Subtotal			-	-		-		-		-		-	-	-	-
Management Services (\$ in Millions)				FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total			
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC to support MILSATCOM Enterprise (PMA)	Various	Various : Various,	0.000	10.832	Jan 2014	10.800	Jan 2015	10.800	Jan 2016	-		10.800	Continuing	Continuing	-
Program Office Support & Other Related Activities (PMA)	Various	Various : Various,	0.000	0.160	Dec 2013	0.100	Dec 2014	0.100	Dec 2015	-		0.100	Continuing	Continuing	-
Business Operating Support Services & Acquisition Mission Support (PMA)	Various	Various : Various,	0.000	5.574	Dec 2013	4.371	Dec 2014	10.434	Jan 2016	-		10.434	Continuing	Continuing	-
Subtotal			0.000	16.566		15.271		21.334		-		21.334	-	-	-
			Prior Years	FY 2014		FY 2015		FY 2016 Base		FY 2016 OCO		FY 2016 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals			0.000	75.991		116.540		174.725		-		174.725	-	-	-

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis:</b> PB 2016 Air Force							<b>Date:</b> February 2015			
<b>Appropriation/Budget Activity</b> 3600 / 5			<b>R-1 Program Element (Number/Name)</b> PE 0605431F / <i>Advanced EHF MILSATCOM (SPACE)</i>			<b>Project (Number/Name)</b> 657104 / <i>Evolved AEHF MILSATCOM (EAM)</i>				
	<b>Prior Years</b>	<b>FY 2014</b>	<b>FY 2015</b>	<b>FY 2016 Base</b>	<b>FY 2016 OCO</b>	<b>FY 2016 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Remarks</b> Prior Years funds for Advanced EHF MILSATCOM (Space) are in PE 0603430F, Project 64A030, Evolved AEHF MILSATCOM, Budget Activity 4.										



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2016 Air Force			<b>Date:</b> February 2015		
<b>Appropriation/Budget Activity</b> 3600 / 5		<b>R-1 Program Element (Number/Name)</b> PE 0605431F / <i>Advanced EHF MILSATCOM (SPACE)</i>			<b>Project (Number/Name)</b> 657104 / <i>Evolved AEHF MILSATCOM (EAM)</i>

	FY 2014				FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020			
	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
Award Phase 3 options for Protected MILSATCOM "Design for Affordability"																												
Award AEHF CIP contract - Phase I																												
Outbrief Protected AoA																												
Initiate Evolved AEHF system definitions																												
Award AEHF CIP contract - Phase II																												
Award Protected Tactical Demonstration (Modem)																												
Award AEHF CIP contract - Phase III																												
Initiate Protected Tactical Service (PTS) Risk Reduction and System Definition (RRSD)																												
Initiate Evolved AEHF RRSD																												
Award PTS contract																												
Conduct Protected Tactical End to End Over the Air Demonstration																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2016 Air Force			<b>Date:</b> February 2015
<b>Appropriation/Budget Activity</b> 3600 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0605431F / <i>Advanced EHF MILSATCOM (SPACE)</i>	<b>Project (Number/Name)</b> 657104 / <i>Evolved AEHF MILSATCOM (EAM)</i>	

## Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Award Phase 3 options for Protected MILSATCOM "Design for Affordability"	2	2014	2	2014
Award AEHF CIP contract - Phase I	3	2014	3	2014
Outbrief Protected AoA	3	2015	3	2015
Initiate Evolved AEHF system definitions	3	2015	3	2015
Award AEHF CIP contract - Phase II	3	2015	3	2015
Award Protected Tactical Demonstration (Modem)	4	2015	4	2015
Award AEHF CIP contract - Phase III	3	2016	3	2016
Initiate Protected Tactical Service (PTS) Risk Reduction and System Definition (RRSD)	2	2017	2	2017
Initiate Evolved AEHF RRSD	2	2017	2	2017
Award PTS contract	4	2018	4	2018
Conduct Protected Tactical End to End Over the Air Demonstration	3	2019	3	2019