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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2017 Air Force **Date:** February 2016

<b>Appropriation/Budget Activity</b> 3600: <i>Research, Development, Test &amp; Evaluation, Air Force I BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 0605432F / <i>Polar MILSATCOM (SPACE)</i>
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COST (\$ in Millions)	Prior Years	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
Total Program Element	101.401	99.788	71.867	50.815	0.000	50.815	24.487	0.000	0.000	0.000	0.000	348.358
657105: <i>Polar Satellite Communications</i>	101.401	99.788	71.867	50.815	0.000	50.815	24.487	0.000	0.000	0.000	0.000	348.358
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-	-	-

**Program MDAP/MAIS Code:** 121

**Note**  
Additional Prior Years funds for Polar MILSATCOM (SPACE) are in PE 0603432F, Project 644052 Polar Satellite Communications, Budget Activity 4.

**A. Mission Description and Budget Item Justification**  
This program element acquires the Polar Military Satellite Communications (MILSATCOM) system that provides protected communications (anti-jam and low probability of intercept and detection) for users in the north polar region.

Through FY05, Polar Satellite Communications funded three low data rate (LDR) Milstar packages on three classified host satellites as an expedited, interim solution for protected connectivity requirements in the north polar region (i.e., Interim Polar System (IPS)). Two satellites with hosted packages are required to provide the necessary 24-hour coverage. The third package went into operations in November 2008 to sustain the 24-hour coverage.

In FY06, the DoD began funding the next generation Polar Satellite Communications capability with two more polar packages via the same host vehicle type (i.e., Enhanced Polar System (EPS)). The host spacecraft and the polar communications packages required design modifications that replaced obsolete components and took advantage of the more capable Advanced Extremely High Frequency (AEHF) technology including the eXtended Data Rate (XDR) waveform. The EPS Capability Development Document (CDD), approved by the Joint Requirements Oversight Council in September 2006, is based on a two-package, hosted XDR program with operational availability in CY15 and CY17. EPS is comprised of four segments: Payload, Ground Control, Gateway, and Terminal (acquired by each Service's Terminal Program Office). Milestone B review was completed 2 April 2014.

The Polar MILSATCOM 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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017 Base</b>	<b>FY 2017 OCO</b>	<b>FY 2017 Total</b>
Previous President's Budget	103.245	72.084	51.320	0.000	51.320
Current President's Budget	99.788	71.867	50.815	0.000	50.815
Total Adjustments	-3.457	-0.217	-0.505	0.000	-0.505
• Congressional General Reductions	0.000	-0.217			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-3.457	0.000			
• Other Adjustments	0.000	0.000	-0.505	0.000	-0.505

**Change Summary Explanation**

FY17: -\$0.505M inflation adjustment

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2015</b>	<b>FY 2016</b>	<b>FY 2017</b>
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<b>Title:</b> EPS	99.788	71.867	50.815
<b>Description:</b> Develop and acquire EPS MILSATCOM which consists of 1) two Extremely High Frequency payloads, using AEHF's eXtended Data Rate (XDR) waveform, on hosted spacecraft, 2) a standalone Control and Planning Segment (CAPS) to provide command and control and XDR mission planning capability, and 3) one gateway to provide connectivity between polar and mid-latitude users through the Global Information Grid.			
<b>FY 2015 Accomplishments:</b> Completed Payload #1 checkout, making it available for on-orbit testing. Continued to integrate Payload #2 onto host satellite. Continued Gateway segment installation. Continued developing, integrating, testing and installing CAPS to verify full functionality with other segments.			
<b>FY 2016 Plans:</b> Complete Integration & Test, complete Gateway installation and Installation Qualification Test at Clear AFS and Camp Roberts, and finalize system installation for CAPS at Schriever AFB. Execute factory intersegment testing between CAPS, payload, and the terminals. Execute EPS Key Management Architecture testing. Execute CAPS to Mission Ground Station (MGS) intersegment testing. Execute payload on-orbit intersegment testing between CAPS, Telemetry and Command Terminal (T&C-T), Payload, Gateway and the polar user terminals.			
<b>FY 2017 Plans:</b>			

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2015	FY 2016	FY 2017
Complete test activities for Lead Developmental Test Organization (LDTO) part 1. Execute end-to-end system functionality testing with Payload #1. Execute Payload #2 on-orbit testing.			
<b>Accomplishments/Planned Programs Subtotals</b>	99.788	71.867	50.815

<b>D. Other Program Funding Summary (\$ in Millions)</b>											
Line Item	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total	FY 2018	FY 2019	FY 2020	FY 2021	Cost To Complete	Total Cost
• None: None	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	-	-

**Remarks**

**E. Acquisition Strategy**

The Enhanced Polar System (EPS) is the follow-on to the currently operational Interim Polar System (IPS) and is a component of the Extremely High Frequency SATCOM architecture providing secure, protected communications to worldwide users. The EPS acquisition consists of four segments (Payload, Ground Control, Gateway, and Terminal) acquired by separate procurement actions. Each EPS payload and its integration onto classified host satellites is funded by the EPS program while the development and integration is performed by the host organization. The MILSATCOM System Directorate will procure the Ground Control and Planning Segment. The Ground Gateway segment, funded by the EPS program, will be organically developed by the Navy's Space and Naval Warfare Systems Center Pacific (SSC-Pacific). The MILSATCOM System Directorate is the prime systems integrator for the EPS payload, ground control, and gateway segments. The Terminals that will use EPS will be acquired by each Service's Terminal Program Office.

**F. 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 2017 Air Force** **Date:** February 2016

<b>Appropriation/Budget Activity</b> 3600 / 5	<b>R-1 Program Element (Number/Name)</b> PE 0605432F / <i>Polar MILSATCOM (SPACE)</i>	<b>Project (Number/Name)</b> 657105 / <i>Polar Satellite Communications</i>
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<b>Product Development (\$ in Millions)</b>				<b>FY 2015</b>		<b>FY 2016</b>		<b>FY 2017 Base</b>		<b>FY 2017 OCO</b>		<b>FY 2017 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</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>			
Control and Planning Segment	C/CPIF	Northrop Grumman Information Systems : Redondo Beach, CA	52.969	51.438	Nov 2014	31.636	Nov 2015	12.551	Nov 2016	0.000		12.551	2.276	150.870	148.600
Gateway architecture development	MIPR	Space and Naval Warfare Systems Command (SPAWAR) Systems Center - Pacific : San Diego, CA	17.586	12.779	Nov 2014	9.145	Nov 2015	9.802	Nov 2016	0.000		9.802	2.719	52.031	75.454
EPS Design/Development Contract	SS/CPAF	NGAS : Redondo Beach, CA	0.665	4.340	Nov 2014	2.000	Nov 2015	7.333	Nov 2016	0.000		7.333	3.761	18.099	606.693
T&C-T Development	MIPR	Lincoln Labs : Boston, MA	1.082	2.025	Nov 2014	3.070	Nov 2015	2.134	Nov 2016	0.000		2.134	5.500	13.811	-
Technical Mission Analysis	Various	Various : Various	0.000	1.795	Nov 2014	8.358	Nov 2015	5.739	Nov 2016	0.000		5.739	3.886	19.778	-
Enterprise SE&I	Various	Various : Various	9.505	10.957	Nov 2014	10.486	Nov 2015	7.014	Nov 2016	0.000		7.014	3.459	41.421	-
<b>Subtotal</b>			81.807	83.334		64.695		44.573		0.000		44.573	21.601	296.010	-

<b>Support (\$ in Millions)</b>				<b>FY 2015</b>		<b>FY 2016</b>		<b>FY 2017 Base</b>		<b>FY 2017 OCO</b>		<b>FY 2017 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</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>Subtotal</b>			-	-		-		-		-		-	-	-	-

<b>Test and Evaluation (\$ in Millions)</b>				<b>FY 2015</b>		<b>FY 2016</b>		<b>FY 2017 Base</b>		<b>FY 2017 OCO</b>		<b>FY 2017 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</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>			
Planning/Management Support for T&E	MIPR	Various : Various	0.463	0.816	Nov 2014	0.000		0.000		0.000		0.000	0.000	1.279	-
<b>Subtotal</b>			0.463	0.816		0.000		0.000		0.000		0.000	0.000	1.279	-



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**Exhibit R-4, RDT&E Schedule Profile: PB 2017 Air Force** **Date:** February 2016

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	FY 2015				FY 2016				FY 2017				FY 2018				FY 2019				FY 2020				FY 2021			
	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
Payload #1 available for test	■																											
Gateway Site Install					■																							
Field CAPS					■																							
Launch Payload #2									■																			
Conduct MOT&E													■															
IOC/FOC declaration																	■											

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**Exhibit R-4A, RDT&E Schedule Details:** PB 2017 Air Force **Date:** February 2016

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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
Payload #1 available for test	2	2015	2	2015
Gateway Site Install	3	2015	4	2015
Field CAPS	1	2016	4	2016
Launch Payload #2	2	2017	1	2018
Conduct MOT&E	1	2018	2	2018
IOC/FOC declaration	3	2018	3	2018

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