Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force											Date: February 2016	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 0305110F / *Satellite Control Network (SPACE)*							
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	-	18.806	7.861	15.624	0.000	15.624	18.754	17.934	16.004	16.288	Continuing	Continuing
673276: *Satellite Control Network*	-	18.806	7.861	15.624	0.000	15.624	18.754	17.934	16.004	16.288	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The Air Force Satellite Control Network (AFSCN) is a satellite ground terminal network comprised of two communication nodes (Schriever AFB & Vandenberg AFB) and 15 antenna systems. The antennas are distributed around the globe at seven locations -- Vandenberg Tracking Station (VTS), Diego Garcia Station (DGS), Guam Tracking Station (GTS), Hawaii Tracking Station (HTS), New Hampshire Tracking Station (NHS), Thule Tracking Station (TTS) and Telemetry and Commanding Station (TCS) at RAF Oakhanger, England -- to ensure global coverage for 140 satellites in various orbits. The AFSCN conducts an average of 450 satellite contacts per day supporting Positioning, Navigation and Timing (PNT), Intelligence, Surveillance and Reconnaissance (ISR), Missile Warning, Communications, Weather, Launch Vehicle Support, and Research and Development (R&D) in support of Department of Defense (DoD), Intelligence Community (IC), and National Aeronautics and Space Administration (NASA) operations. While most of the 450 satellite contacts/day are routine command and control activities, the AFSCN is also used for satellite emergencies (e.g. tumbling satellite) because its high power antennas are often the only earthbound assets that can contact a non-responsive satellite to re-establish command & control. During FY14 and FY15 the AFSCN supported 28 space vehicle emergencies resulting in the preservation of $8.5B worth of satellites. In addition to routine and emergency satellite operations C2, the AFSCN provides support to launch vehicle and early orbit operations, ensuring worldwide antennas receive telemetry as the rocket travels through the atmosphere and transmit commands to a newly orbiting satellite to initiate early orbit checkout. Finally, the AFSCN provides Factory Compatibility Testing (FCT) to ensure satellites and rockets can communicate via the AFSCN before the satellite is launched. These funds are used to develop next-generation tools to improve the AFSCN and ensure the capability is available to support DoD, Intelligence, and civil users.

REMOTE TRACKING STATION (RTS) BLOCK CHANGE (RBC)- SATELLITE ANOMALY RECOVERY AND SUPPORT UPGRADE; ENHANCED HIGH-POWER AMPLIFIER (EHPA): The Air Force will complete development testing of the Enhanced High Power Amplifier (EHPA) first article. The AFSCN is in jeopardy of losing the emergency high power satellite contact capability due to obsolete parts used in the legacy AFSCN system. The EHPA program will develop a new high power amplifier that resolves the obsolescence issue well into the 2020s. FY16 funds support the transition and operational turnover of the first EHPA.

UNIFIED S-BAND (USB) UPLINK: The Air Force is adjusting the AFSCN for spectrum-sharing with industry and demonstrating the ability to migrate away from the current L-Band uplink / S-Band downlink spectrum to the Unified S-Band (USB) spectrum. RDT&E funds support a first article integration of USB into the AFSCN baseline to begin supporting factory compatibility testing. FY 2016 funding provides S-Band uplink transmitter to enable commanding of satellites using USB frequency in addition to L-Band frequency. USB capability is currently only being implemented on the RBC transportable to allow factory compatibility testing prior to launch of dual band satellites (per revised AFSPC requirement). RBC transportable is made up of 3 portable components: a Core equipment van, an HPA van, and an antenna van.

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ELECTRONIC SCHEDULING AND DISSEMINATION (ESD 3.0): ESD 3.0 is a significant upgrade to the currently fielded version 2.7. The upgrade will allow satellite operators to request contact time with their satellites via the shared AFSCN antennas, automatically deconflict overlapping requests, create a schedule, and publish the schedule in real-time to all users. The Air Force completed the first ESD 3.0 operational confidence test 3Q FY15. Deficiencies from that event are expected to be resolved in FY16. Initial Developmental Testing (DT) is scheduled for 4Q FY16. Operational Testing (OT) and PEO Certification is anticipated in 3Q FY17. Turnover to operations is expected by 4Q FY17.

AFSCN ENHANCEMENT AND DEFICIENCY RESOLUTION: Provides test, cyber security, requirements management, and system architecture support to the AFSCN.

This program is in Budget Activity 7, Operational System Development. BA 7 includes development efforts to upgrade systems that have been fielded and anticipate production funding in the current or subsequent fiscal year.

B. Program Change Summary ($ in Millions)	FY 2015	FY 2016	FY 2017 Base	FY 2017 OCO	FY 2017 Total
Previous President's Budget	20.806	7.879	21.385	0.000	21.385
Current President's Budget	18.806	7.861	15.624	0.000	15.624
Total Adjustments	-2.000	-0.018	-5.761	0.000	-5.761
• Congressional General Reductions	0.000	-0.018			
• 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	-2.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	-5.761	0.000	-5.761

Change Summary Explanation

FY17: -$5.761M for higher Department priorities.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Title: Remote Tracking Station (RTS) Block Change (RBC) - Satellite Anomaly Recovery and Support Upgrade; Enhanced High-Power Amplifier (EHPA):	0.529	5.653	-
Description: RBC development replaces outdated, unique RTS equipment with standardized equipment and technology to reduce failures and enhance sustainability. Provides Advisory and Assistance Services (A&AS) to execute the RBC upgrade effort. Effort accomplished under Satellite Control Network Contract (SCNC).			
FY 2015 Accomplishments:			

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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
Completed EHPA Critical Design Review and some subcontractor integration testing. EHPA Preliminary Design Review completed November 2014 and Critical Design Review completed March 2015. ***FY 2016 Plans:*** Complete Developmental & Operational testing 4Q FY2016. Field First Article/Operational Acceptance of EHPA 1Q FY2017. Effort accomplished under Satellite Control Network Contract (SCNC).			
Title: Unified S-band (USB) uplink ***Description:*** Develop First Article Demonstration of USB uplink transmitter to enable commanding of satellites using USB frequency in addition to the legacy L-band frequency uplink commanding. Also provides Federally Funded Research and Development Center (FFRDC) support. ***FY 2015 Accomplishments:*** Completed Preliminary and Critical Design Reviews; integrated and installed hardware and software. Effort accomplished under SCNC contract. ***FY 2016 Plans:*** Initiate implementation and subsystem integration. Activities include software installation, integration and checkout, vendor acceptance test, software qualification test and contractor system testing. Complete government developmental and operational testing as well as operational acceptance.	0.568	0.554	-
Title: AFSCN Enhancement and Deficiency Resolution ***Description:*** Provide test, cybersecurity, requirements management, and system architecture support to the AFSCN. Also provides FFRDC support and performs AFSCN Systems Engineering and Integration (SE&I) activities. ***FY 2015 Accomplishments:*** Completed developmental testing and initiated operational testing. Conducted the initial ESD 3.0 Operational Test 3Q FY15. Deficiencies identified should be corrected in FY16. ***FY 2016 Plans:*** Provide test, cybersecurity, and work package planning for RBC electronics core activities; monitor RTS performance at RBC sites; continue future requirements development; update AFSCN architecture roadmap. ***FY 2017 Plans:*** Provides cybersecurity solutions and testing in support of 92 Information Operations Squadron (92nd IOS), Space Security and Defense Program (SSDP), Cyber computer network defense (CND), HQ AFSPC Cyber Team, and Red/Blue Team-discovered requirements, monitor, analyze and resolve RTS performance (low/high power signal response and power measurement	0.000	0.000	5.838

Exhibit R-2, RDT&E Budget Item Justification: PB 2017 Air Force	Date: February 2016
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C. Accomplishments/Planned Programs ($ in Millions)	FY 2015	FY 2016	FY 2017
accuracy, inconsistent range performance, and low data rate deficiencies). In addition, develop and document an enterprise architecture (EA) using the views prescribed in the Department of Defense Architecture Framework (DoDAF). Future activities include: AFSCN Test Bed (ATB) upgrades, Range Automation and Multi-band/Phased Array antenna studies, and work package planning for RBC electronics core activities. Further, monitor and analyze RTS performance at RBC sites, continue future requirements development, and update AFSCN architecture roadmap.			
Title: Electronic Scheduling and Dissemination System (ESD) 3.0 ***Description:*** Develop an upgrade for the aging, increasingly-unsustainable resource scheduling system needed to coordinate and manage satellite supports using the AFSCN antennas. Also provides FFRDC support. ***FY 2015 Accomplishments:*** Completed contractor Developmental Testing and initiated government Developmental Testing. Conducted risk-reduction testing with user participation during 3Q FY15. ***FY 2016 Plans:*** Correct critical software deficiency reports (DRs) identified during Initial Developmental Tests and risk-reduction testing. Conduct initial Developmental Testing Phase (DTP) during 4Q FY16. ***FY 2017 Plans:*** Complete DTP and enter Operational Testing Phase in 3Q FY17 to include integrated systems test. After DTP, provide full scale user training and begin initial deployment to include a Force Development Evaluation. Obtain PEO certification and Operational Acceptance.	17.709	1.654	9.786
Accomplishments/Planned Programs Subtotals	18.806	7.861	15.624

D. Other Program Funding Summary ($ in Millions)

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
• OPAF: BA03: Line Item # 836760: *AF Satellite Control Network Space*	54.436	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
• SPAF: BA01: Line Item # AFSCOM:: *AF Satellite Comm System*	0.000	74.673	43.375	0.000	43.375	57.395	44.507	47.924	48.785	Continuing	Continuing

Remarks

Procures the mission critical electronics and telecommunications equipment to upgrade the aging AFSCN Range and Network Operations segments.

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

RDT&E efforts focus on completing upgrades as well as future architectures and studies to ensure the best use of investment funding. The SE&I contractor maintains the DoD Architecture Framework (DoDAF) architecture and requirements baseline for Government approval and may perform studies to determine Government options. Limited RDT&E will be applied to the Consolidated Air Force Satellite Control Network (AFSCN) Modifications, Maintenance, and Operations (CAMMO) contract when sustaining engineering expertise is needed to finalize Government-approved architectures. FFRDC technical depth and breadth will be leveraged to ensure AFSCN modernization efforts are compatible with mission rules and do not pose a risk to safe and cost-effective satellite contacts.

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.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force			Date: February 2016
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305110F / *Satellite Control Network (SPACE)*	**Project (Number/Name)** 673276 / *Satellite Control Network*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Satellite Control Network Contract (SCNC)	Various	Honeywell : Colorado Springs, CO	-	15.913	Dec 2014	2.854	Dec 2015	11.051	Dec 2016	0.000		11.051	Continuing	Continuing	TBD
AFSCN Enterprise Systems Engineering and Integration	C/T&M	TBD : TBD	-	0.000		2.585	Dec 2015	2.198	Dec 2016	0.000		2.198	Continuing	Continuing	TBD
Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA	-	1.157	Oct 2014	1.322	Oct 2015	1.362	Oct 2016	0.000		1.362	Continuing	Continuing	TBD
		Subtotal	-	17.070		6.761		14.611		0.000		14.611	-	-	-

Remarks

Enterprise SE&I contract being competed with contract award planned for FY16.

Support ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
		Subtotal	-	-		-		-		-		-	-	-	-

Test and Evaluation ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Test & Evaluation	C/T&M	Leidos : El Segundo, CA	-	0.930	Oct 2014	0.117	Oct 2015	0.000		0.000		0.000	Continuing	Continuing	TBD
		Subtotal	-	0.930		0.117		0.000		0.000		0.000	-	-	-

Exhibit R-3, RDT&E Project Cost Analysis: PB 2017 Air Force			Date: February 2016
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Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2015 Cost	FY 2015 Award Date	FY 2016 Cost	FY 2016 Award Date	FY 2017 Base Cost	FY 2017 Base Award Date	FY 2017 OCO Cost	FY 2017 OCO Award Date	FY 2017 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp : El Segundo, CA	-	0.806	Oct 2014	0.983	Oct 2015	1.013	Oct 2016	0.000		1.013	Continuing	Continuing	TBD
		Subtotal	-	0.806		0.983		1.013		0.000		1.013	-	-	-

	Prior Years	FY 2015		FY 2016		FY 2017 Base		FY 2017 OCO		FY 2017 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	18.806		7.861		15.624		0.000		15.624	-	-	-

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2017 Air Force		Date: February 2016
Appropriation/Budget Activity 3600 / 7	**R-1 Program Element (Number/Name)** PE 0305110F / *Satellite Control Network (SPACE)*	**Project (Number/Name)** 673276 / *Satellite Control Network*

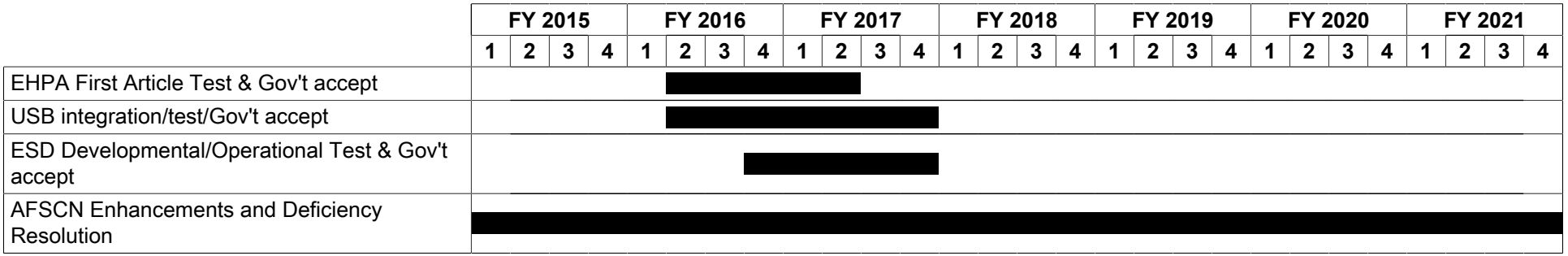

Exhibit R-4A, RDT&E Schedule Details: PB 2017 Air Force		Date: February 2016
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Schedule Details

	Start		End	
Events	**Quarter**	**Year**	**Quarter**	**Year**
EHPA First Article Test & Gov't accept	2	2016	2	2017
USB integration/test/Gov't accept	2	2016	4	2017
ESD Developmental/Operational Test & Gov't accept	4	2016	4	2017
AFSCN Enhancements and Deficiency Resolution	1	2015	4	2021

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