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Exhibit R-2, RDT&E Budget Item Justification: PB 2016 Air Force **Date:** February 2015

Appropriation/Budget Activity					R-1 Program Element (Number/Name)							
3600: <i>Research, Development, Test & Evaluation, Air Force I BA 4: Advanced Component Development & Prototypes (ACD&P)</i>					PE 0604857F <i>I Operationally Responsive Space</i>							
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	-	10.000	20.000	6.457	-	6.457	-	-	-	-	Continuing	Continuing
64A020: <i>AF Funded ORSSats</i>	-	10.000	20.000	6.457	-	6.457	-	-	-	-	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

The successful integration of space-based capabilities into the core of U.S. national security operations has resulted in dramatically increased demand for and dependence upon space capabilities. As a result, U.S. Strategic Command (USSTRATCOM) identified three needs: 1) to rapidly augment existing space capabilities when needed to expand operational capability; 2) to rapidly reconstitute/replenish critical space capabilities to preserve "continuity of operations" capability; 3) to rapidly exploit and infuse space technological or operational innovations to increase U.S. advantage. Operationally Responsive Space projects were optimized for prioritized theater use and/or surge, augmentation and replenishment of traditional space capabilities. The ORS Concept of Operations (CONOPS) drives the need for satellites featuring high degrees of modularity, standard interface vehicles, and the use of plug and play payloads and buses.

The Air Force will continue to maintain ORS-1, launched 29 Jun 2011 to respond to U.S. Central Command's (USCENTCOM's) urgent need, validated by USSTRATCOM, to provide intelligence, surveillance, and reconnaissance (ISR) for theater warfighters. The additional ORS Office efforts of maturing enabling elements will be transitioned as appropriate to other space programs including Global Positioning System, Advanced EHF Milsatcom, Space Based Infrared System, Space Control Technology, and the rest of the space architecture.

ORS projects provide a broad range of capabilities directly supporting warfighter needs. Potential missions include communications, data exfiltration; blue/friendly-force situational awareness; maritime domain awareness; positioning, navigation, and timing; weather; missile warning; and battlefield ISR. The highest priorities of the ORS Office are the completion of the ORS-2 Modular Space Vehicle (MSV) Bus development, launch of the ORS-4 Super Strypi mission, development and launch of the ORS-5 space situational awareness mission, and the low cost automated manufacturing initiative. The ORS-3 enabler launch mission was successfully conducted in November 2013, demonstrating responsive launch and range capabilities. The remaining priorities for the ORS office are to satisfy the high priority needs for augmentation and reconstitution, such as Missile Warning, Wideband Protected Communication, Narrowband Communication, Space Situational Awareness, and Electro-Optical/Infrared (EO/IR) imagery.

Capabilities are being developed to systematically mature the ORS enabling elements to meet the USSTRATCOM specified responsiveness timelines and the \$60M 2007 NDAA cost target. This includes authenticating commercial space parts, confirming automated assembly lines, validating digital mission assurance processes, developing a modular open system architecture employing plug and play standards, and providing assembly, integration & test in the Rapid Response Space Works. It also includes integrating with the Multi-Mission Satellite Operations Center (MMSOC) to proliferate common satellite command and control.

ORS is working with the University of Hawaii's (U of H) Hawaii Space Flight Laboratory and Sandia National Laboratory on the Super Strypi small launch vehicle to orbit the U of H's HiakaSat environmental monitoring satellite.

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This program is in Budget Activity 04, Advanced Component Development and Prototypes, because the efforts are necessary to evaluate integrated technologies, representative modes or prototype systems in a high fidelity and realistic operating environment.						
B. Program Change Summary (\$ in Millions)		FY 2014	FY 2015	FY 2016 Base	FY 2016 OCO	FY 2016 Total
Previous President's Budget		10.000	-	-	-	-
Current President's Budget		10.000	20.000	6.457	-	6.457
Total Adjustments		-	20.000	6.457	-	6.457
• Congressional General Reductions		-	-			
• Congressional Directed Reductions		-	-			
• Congressional Rescissions		-	-			
• Congressional Adds		-	20.000			
• Congressional Directed Transfers		-	-			
• Reprogrammings		-	-			
• SBIR/STTR Transfer		-	-			
• Other Adjustments		-	-	6.457	-	6.457
Congressional Add Details (\$ in Millions, and Includes General Reductions)						
Project: 64A020: AF Funded ORSSats						
Congressional Add: ORS: Tier-1 (1)						
Congressional Add: Rapid AI&T (Tier-2) (1)						
Congressional Add: ORS: Tier-3 (1)						
Congressional Add: ORS: Cross Cutting						
Congressional Add Subtotals for Project: 64A020						
Congressional Add Totals for all Projects						
Change Summary Explanation						
FY2015: +\$20.0M Congressional add for program increase.						
FY2016: +6.457M to continue the ORS program.						
C. Accomplishments/Planned Programs (\$ in Millions)				FY 2014	FY 2015	FY 2016
Title: ORS: Tier-1				-	-	0.350

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2014	FY 2015	FY 2016
Description: Rapidly augment existing space capabilities when needed to expand operational capability, using existing deployed assets. FY 2016 Plans: Execute urgent needs as identified by USSTRATCOM. Continue to support combatant command (COCOM) war games. Support the integration of MMSOC compatibility with the Naval Research Lab's Neptune Common Ground Architecture, and demonstrate using the Army's Kestrel Eye Satellite program. Support the Space and Naval Warfare Systems Command (SPAWAR) program with small satellite capabilities to satisfy naval weather requirements.				
Title: Rapid AI&T (Tier-2) Description: Develop capability for Assembly Integration & Test/Rapid Response Space Works (RRSW). FY 2016 Plans: Continue developing the Rapid Response Space Works and its capability for rapid assembly integration and test, using the modular space vehicle bus.		-	-	0.655
Title: ORS: Tier-3 Description: Rapidly exploit and infuse space technological or operational innovations to increase U.S. advantage. FY 2016 Plans: Continue development of the ORS-5 program. Begin a space based space surveillance follow-on system and a weather satellite system in conjunction with Space and Missile Systems Center program offices. Continue working ORS-4 technical issues and launch date.		-	-	3.500
Title: ORS: Cross Cutting Description: Provide systems engineering and program management support across all the ORS activities. Perform modeling, simulation, analysis, and assess alternative concepts and requirements. FY 2016 Plans: Continue ORS-1 Mission Operations and Lessons Learned studies. Continue ongoing systems engineering support of future mission development. Refine ORS CONOPS, Enterprise and Architecture, and Systems Engineering Processes. Lead, participate in, and support, as appropriate, the solidification of space doctrine.		-	-	1.952
Accomplishments/Planned Programs Subtotals		-	-	6.457

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		FY 2014	FY 2015
Congressional Add: ORS: Tier-1 (1)		0.100	0.100
FY 2014 Accomplishments: Coordinated integration of ORS Tier-1 solutions, experiments and demonstrations into Joint Force Commander (JFC) and Component exercises and operations in order to establish visibility and socialization of ORS concepts and solutions. Developed CONOPs for JFC use of assets. Supported JFC wargames.			
FY 2015 Plans: Incorporating ORS Resilient Space Layer (RSL) in three wargames: Advanced Concept Event-15 (ACE-15), Futures Wargame-15, and the Space Futures Wargame-15. Demonstrate the Commercial Integration of Global Android-based Relay System for Force Tracking (CIGARS-FT) project during the Army's Technical Support and Operational Analysis (TSOA).			
Congressional Add: Rapid AI&T (Tier-2) (1)		0.067	0.690
FY 2014 Accomplishments: Characterized ORS-2 Bus capability and limitations for expanded payload options.			
FY 2015 Plans: Continue developing the Rapid Response Space Works and its capability for rapid assembly integration and test, using the modular space vehicle bus.			
Congressional Add: ORS: Tier-3 (1)		8.413	16.500
FY 2014 Accomplishments: Continued the ORS-5 mission to develop the USSTRATCOM validated, ORS Executive Committee approved payload for space situational awareness and provide a risk reduction pathfinder for the Space Based Space Surveillance Follow-On program. Continued the ORS-4 Super Strypi launcher (employing an Autonomous Flight Safety System) to launch a 300Kg microsatellite class space vehicle; includes the development of a new rail launcher, and installation of a new launch pad at the Pacific Missile Range Facility (PMRF), the University of Hawaii's HiakaSat primary payload and an additional 11 CubeSats flying as secondary payloads.			
FY 2015 Plans: Perform ORS-5 System Capability Demonstration 1 and Preliminary Design Review (PDR) milestones. ORS-4 launch date was originally scheduled for Jan 2015, but first stage motor complications have caused a delay. The restoration of the first stage motor is expected to delay the launch until mid-2016. Define open manufacturing requirements, factory environment, integration with Digital Assurance architecture, transportation and factory flow requirements, standard, high-definition, and machine readable camera requirements. Responsive Space Parts/Spacecraft Design to include Next Generation Space Hot Shot Design. Digital Assurance integration to Spacecraft object build and flight software iteration.			
Congressional Add: ORS: Cross Cutting		1.420	2.710

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										FY 2014	FY 2015
FY 2014 Accomplishments: Continued systems engineering and program management Independent Verification & Validation (IV&V) for ORS rapid Assembly, Integration and Test (AI&T) capability and the MSV. Continued ongoing systems engineering support of future mission development. Continued ORS-1 Mission Operations and Lessons Learned studies. Conducted Modeling and Simulations for Mission Evaluations. Refined ORS CONOPS, Enterprise and Architecture, and Systems Engineering Processes. Led, participated in, and supported, as appropriate, the solidification of space doctrine.											
FY 2015 Plans: Continue systems engineering and program management Independent Verification & Validation (IV&V) for ORS rapid Assembly, Integration and Test (AI&T) capability and the MSV. Continue ongoing systems engineering support of future mission development. Continue ORS-1 Mission Operations and Lessons Learned studies. Conduct Modeling and Simulations for Mission Evaluations. Refine ORS CONOPS, Enterprise and Architecture, and Systems Engineering Processes. Lead, participate in, and support, as appropriate, the solidification of space doctrine.											
Congressional Adds Subtotals										10.000	20.000

D. Other Program Funding Summary (\$ in Millions)

<u>Line Item</u>	<u>FY 2014</u>	<u>FY 2015</u>	<u>FY 2016 Base</u>	<u>FY 2016 OCO</u>	<u>FY 2016 Total</u>	<u>FY 2017</u>	<u>FY 2018</u>	<u>FY 2019</u>	<u>FY 2020</u>	<u>Cost To Complete</u>	<u>Total Cost</u>
• RDTE: BA04: 0603438F: <i>Space Control Technology</i>	2.000	-	-	-	-	-	-	-	-	-	-
• RDTE: BA04: 0604858F: <i>Tech Transition Program</i>	3.000	3.000	3.000	-	3.000	3.000	3.000	3.000	-	-	-
• RDTE: BA05: 0604441F: <i>Space Based Infrared System (SBIRS) High EMD</i>	2.000	2.000	2.000	-	2.000	2.000	2.000	2.000	-	-	-
• RDTE: BA07: 0603423F: <i>Global Positioning System III - Operational Control Segment</i>	1.500	1.500	1.500	-	1.500	1.500	1.500	1.500	-	-	-

Remarks

E. Acquisition Strategy
Expediently award contracts through ORS Office or partner organizations.

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Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force</i> / BA 4: <i>Advanced Component Development & Prototypes (ACD&P)</i>	R-1 Program Element (Number/Name) PE 0604857F / <i>Operationally Responsive Space</i>	
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 2016 Air Force												Date: February 2015			
Appropriation/Budget Activity 3600 / 4						R-1 Program Element (Number/Name) PE 0604857F / <i>Operationally Responsive Space</i>				Project (Number/Name) 64A020 / <i>AF Funded ORSSats</i>					
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
Tier 1 operational capabilities, development, and integration	Various	Various : Various,	-	0.100	Dec 2014	0.100	Mar 2015	0.350	Dec 2015	-		0.350	Continuing	Continuing	TBD
Rapid AI&T (Tier-2, RRSW)	C/CPFF	Millennium Engineering : Arlington, VA	-	0.067	Jun 2014	0.690	Jun 2015	0.655	Dec 2015	-		0.655	Continuing	Continuing	TBD
ORS-5 (Tier 3)	SS/CPFF	MIT/LL : Boston, MA	-	2.759	Feb 2015	9.950	Mar 2015	2.350	Feb 2016	-		2.350	Continuing	Continuing	TBD
MSV Modular Bus/Open Manufacturing (Tier 3)	C/CPFF	Raytheon : Tucson, AZ	-	1.500	Apr 2015	-		-		-		-	Continuing	Continuing	500.000
Space Common Data Link (Tier 3)	C/CPFF	L3 Comm. : Salt Lake, UT	-	-		-		-		-		-	Continuing	Continuing	TBD
Responsive Launch Capability (ORS-3)(Tier-3)	C/FPIF	Orbital : Chandler, AZ	-	-		-		-		-		-	Continuing	Continuing	TBD
Responsive Launch Capability (ORS-4)(Tier-3)	SS/CPFF	U. of HI : Honolulu, HI	-	3.954	Jul 2014	6.350	Jul 2015	0.950	Dec 2015	-		0.950	Continuing	Continuing	TBD
Subtotal			-	8.380		17.090		4.305		-		4.305	-	-	-
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
Systems Eng. and Technical Asst. (Tier 3)	C/T&M	GSA : San Antonio, TX	-	0.200	Oct 2014	0.200	Oct 2015	0.200	Jun 2016	-		0.200	Continuing	Continuing	TBD
Perform modeling, simulation, analysis, and assess alternative concepts/requirements (Cross Cutting)	Various	Various : Various,	-	0.660	Jun 2014	1.455	Mar 2015	1.000	Jan 2016	-		1.000	Continuing	Continuing	TBD
Subtotal			-	0.860		1.655		1.200		-		1.200	-	-	-

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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
PMA/Contract Services	Various	Various : Various,	-	0.760	Sep 2014	1.255	Apr 2015	0.952	Dec 2015	-		0.952	Continuing	Continuing	TBD
Subtotal			-	0.760		1.255		0.952		-		0.952	-	-	-

			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			-	10.000		20.000		6.457		-		6.457	-	-	-

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Exhibit R-4, RDT&E Schedule Profile: PB 2016 Air Force			Date: February 2015		
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	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
TacSat-4 launch and ops																												
Tier-1 Operational Capabilities Development and Integration																												
ORS-1 (CENTCOM Urgent Need)																												
Rapid AI&T (RRSW, Tier 2)																												
ORS-5 Space Situational Awareness																												
MSV Modular Bus/Open Manufacturing																												
C2 & TPED Enablers																												
ORS-3 Enabler Mission																												
ORS-4 Super Strydi																												
Cross-Cutting Activities: Modeling, Sim, Analysis; JFC Needs																												

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Exhibit R-4A, RDT&E Schedule Details: PB 2016 Air Force			Date: February 2015
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Schedule Details

Events	Start		End	
	Quarter	Year	Quarter	Year
TacSat-4 launch and ops	1	2014	1	2015
Tier-1 Operational Capabilities Development and Integration	1	2014	4	2016
ORS-1 (CENTCOM Urgent Need)	1	2014	4	2015
Rapid AI&T (RRSW, Tier 2)	1	2014	4	2014
ORS-5 Space Situational Awareness	3	2014	3	2018
MSV Modular Bus/Open Manufacturing	1	2014	4	2015
C2 & TPED Enablers	1	2014	4	2014
ORS-3 Enabler Mission	1	2014	1	2014
ORS-4 Super Strydi	1	2014	3	2016
Cross-Cutting Activities: Modeling, Sim, Analysis; JFC Needs	1	2014	4	2016