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 4: *Advanced Component Development & Prototypes (ACD&P)*					R-1 Program Element (Number/Name) PE 1206857F / *Operationally Responsive 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	-	17.976	87.577	366.050	12.395	378.445	42.742	9.044	8.826	8.987	Continuing	Continuing
64A020: *AF Funded ORSSats*	-	17.976	87.577	366.050	12.395	378.445	42.742	9.044	8.826	8.987	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Per the FY2018 NDAA, the Operationally Responsive Space (ORS) Office is now the Space Rapid Capabilities Office (RCO). Its mission is being broadened to expedite developing and fielding operationally focused activities for immediate and near-term needs as directed by the Space RCO Executive Committee. Key operating principles include a short and narrow chain of command, overarching programmatic insight, early and prominent war fighter involvement with small integrated operating teams within a single office. U.S. Strategic Command (USSTRATCOM) has 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. Space RCO projects are optimized for prioritized theater use and/or surge, augmentation and replenishment of traditional space capabilities. The Space RCO 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 Space RCO is ready to develop, test, train, and equip urgent needs of the warfighter as they are identified at any time. First, the urgent needs must be validated by the commander, USSTRATCOM; second, the project must be approved by the Space RCO Executive Committee; third, the project will be executed by the Space RCO. If the effort is initiated during execution year, it will be described in the next year's budget exhibit.

The highest priorities of the Space RCO are development and launch of the ORS-5 USSTRATCOM validated urgent need for space situational awareness; development and launch of the ORS-6 Compact Ocean Wind Vector Radiometer (COWVR) technology demonstration, and the low cost automated manufacturing initiative, ORS-7; and development and launch of the ORS-8 USSTRATCOM validated urgent need for an interim capability addressing weather gap 1 (cloud characterization) and gap 2 (theater weather imagery). The remaining priorities are to satisfy the high priority needs for augmentation and reconstitution, including Missile Warning, Wideband Protected Communication, Narrowband Communication, Data Exfiltration, Space Situational Awareness, Electro-Optical/Infrared (EO/IR) imagery, Blue/Friendly Force Situational Awareness, Maritime Domain Awareness, Positioning, Navigation, and Timing, Remote Access Solar Power, Weather, and Battlefield ISR.

Additional Space RCO efforts include maturing enabling elements which are transitioned as appropriate across the National Space Enterprise and allows the Space RCO to meet the USSTRATCOM specified responsiveness timelines and the 2007 NDAA goal ($40M satellites/$20M launches). 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) and Enterprise Ground Service (EGS) to proliferate common satellite command and control. Additional developments include visionary, tailored, and future Space/Cyber projects to special operations forces (SOF).

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

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 its capabilities. 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 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 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	17.921	87.577	82.805	0.000	82.805
Current President's Budget	17.976	87.577	366.050	12.395	378.445
Total Adjustments	0.055	0.000	283.245	12.395	295.640
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	10.500	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.445	0.000			
• Other Adjustments	-10.000	0.000	283.245	12.395	295.640

Change Summary Explanation

FY2017: +$10.500M Congressional Add to maintain fiscal year funding level; -$10.000M decrease in Other Adjustments because FY 2017 Request for Additional Appropriations (RAA) for ORS-8 initial funding was not appropriated.
FY2019: +$283.245M added for the Space RCO Solar Power project, -$2.755M for inflation adjustment.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Operational Capabilities, Development, Enablers, Integration, and Rapid Assembly, Integration & Test	2.741	0.100	283.245	-	283.245

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Description: These projects are accomplished per the FY2017 congressional add. Execute urgent needs as identified by USSTRATCOM. Integrate space rapid capabilities and concepts, including resiliency, into operations plans of the combatant commands, tactics, techniques and procedures of the military departments, and exercises, demonstrations, and war games. Develop the Space RCO Solar Power project to collect solar energy and provide uninterrupted, assured, and logistically agile power to expeditionary forces operating in unimproved areas such as forward operating bases. Develop proof of concept for Responsive Manufacturing to include development of factory environment, integration with Digital Assurance architecture, transportation and factory flow requirements, standard, high-definition, and machine readable camera requirements. ***FY 2018 Plans:*** Integrate space rapid capabilities and concepts, including resiliency, into operations plans of the combatant commands, tactics, techniques and procedures of the military departments, and exercises, demonstrations, and war games. ***FY 2019 Base Plans:*** Develop space-based solar power collection and transmission capability using light weight, high efficiency solar cells coupled with individual radio frequency transmitters to collect solar energy and provide uninterrupted, assured, and logistically agile power to expeditionary forces operating in unimproved areas such as forward operating bases. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $283.145M. This increase is for the Space RCO Solar Power project.					
Title: Space RCO Executive Committee Projects ***Description:*** Execute prototyping projects, under rapid acquisition authorities inherent to the Space RCO, that address emergent capabilities and respond to Commander, USSTRATCOM-validated requirements and other Space RCO EXCOM approved efforts to meet Joint Force Commander needs identified in year of execution. ***FY 2019 Base Plans:*** Initiate rapid prototyping projects that address emergent capabilities and respond to Commander, USSTRATCOM-validated requirements and other Space RCO EXCOM approved efforts as required to meet	-	-	1.800	-	1.800

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*	

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Joint Force Commander and warfighter needs. These activities may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $1.800M due to this being a new major thrust.					
Title: Space RCO Development ***Description:*** Rapidly exploit and infuse space technological and operational innovations to increase U.S. advantage. ***FY 2018 Plans:*** Execute approved ORS-8 program in support of JFC need #7. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. including the development and launch of the ORS-6 Compact Ocean Wind Vector Radiometer (COWVR) technology demonstration. ***FY 2019 Base Plans:*** Continue to develop ORS-8 as the interim capability addressing weather gap 1 (cloud characterization) and gap 2 (theater weather imagery). Support, as applicable, the Enterprise Ground Service (EGS). Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 decreased compared to FY 2018 by $5.350M. Justification for this decrease is described in plans above.	9.143	79.755	74.405	-	74.405
Title: Space RCO: Cross Cutting ***Description:*** Provide systems engineering and program management support across all the Space RCO activities. Perform modeling, simulation, analysis, and assess alternative concepts and requirements. Support response to USSTRATCOM tasking and future mission development to meet Joint Force Commander (JFC) and warfighter needs. ***FY 2018 Plans:***	6.092	7.722	6.600	-	6.600

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*	

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Continue ongoing systems engineering support of future mission development. Refine Space RCO CONOPS, Enterprise and Architecture, and Systems Engineering Processes. Lead, participate in, and support, as appropriate, the solidification of space doctrine. Continue to support Combatant Commands. Investigate options and implement technology, procedures, and concepts for reducing costs and shortening satellite deployment times. Execute approved ORS-8 program in support of JFC need #7. Complete ORS-7 development and support FY2018 rideshare launch. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc. ***FY 2019 Base Plans:*** Continue ongoing systems engineering support of future mission development. Refine Space RCO CONOPS, Enterprise and Architecture, and Systems Engineering Processes. Lead, participate in, and support, as appropriate, the solidification of space doctrine. Continue to support Combatant Commands. Investigate options and implement technology, procedures, and concepts for reducing costs and shortening satellite deployment times. Execute approved ORS-8 program in support of JFC need #7. Continue program office support and other related support activities. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 Decreased compared to FY 2018 by $1.122M due to creation of new Major Thrust, Space RCO Executive Committee Taskings.					
Title: Space Related Tactical Communications and Cyber Enhancements for SOF ***Description:*** Provides enhanced communication and cyber capabilities to support tactical operations by Quick Reaction Forces (QRF) and Special Operations Forces (SOF). ***FY 2018 Plans:*** N/A ***FY 2019 Base Plans:*** N/A ***FY 2019 OCO Plans:***	0.000	0.000	0.000	12.395	12.395

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
-- Fast Wanderer - Develop enemy location & vulnerability exploitation capability for advanced satellite communication systems & methods. Capability will be integrated into existing SOF satellite exploitation systems and 2-way data dissemination capabilities. -- Tip Association & De-Duplication - Build & integrate a system algorithm with multiple criteria that de-duplicates redundant enemy tip information in real time. Greatly reduces dissemination of duplicate information from one or more sources providing more clarity for SOF entities. -- Resilient Collection Architecture - Provides advanced 2-way cross-communication system, cross-classification, low probability of intercept/exploitation communications. Uses multi-communication (i.e. space, terrestrial, and ground) domains for maximized communication options for SOF. -- SOF Nano Synthetic Aperture Radar - Provides high-resolution ISR from stratospheric aircraft, Unmanned Aerial Systems (UAS), high-altitude balloons; Anti-Access Area Denial capability; immune to cloud cover, severe weather, and adversary counter-measures. -- Kinetic Associated End Game - Build and test an airborne geolocation system for new enemy communications capabilities for kinetic end game. -- Select Spector - Develops and implements prototypes for satellite communications for SOF tactical radio systems providing Low Probability of Intercept communications through jamming environments with the potential for doubling channel capacity. -- Long Intermediate Gap Enhanced Reconnaissance (LINGER) - Build & integrate high altitude/long loiter platform architecture with shared precision geolocation capabilities in real time. -- Special COmms Transport Yield (SCOTY) - Provides robust special comms transport using a custom waveform on commercial Software Defined Radios (SDR). Enables collaborative machine-to-machine interoperability with other sensors. -- SOF ISR Real-Time On Board Processing - Delivers low-power high-capacity lightweight airworthy on-board data processor for exploiting high-bandwidth video and imagery data in real-time, and relaying data to the appropriate operations center for immediate display and analysis. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** N/A					
Accomplishments/Planned Programs Subtotals	17.976	87.577	366.050	12.395	378.445

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 4: *Advanced Component Development & Prototypes (ACD&P)*	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*

D. 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
• RDTE 04 1206422F: *Weather System Follow-On*	82.506	112.088	138.052	-	138.052	122.897	57.275	37.392	38.073	Continuing	Continuing

Remarks

E. Acquisition Strategy

Expeditiously award contracts through Space RCO or partner organizations.

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 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

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
Operational Capabilities, Development, Enablers, and Rapid Assembly, Integration, & Test	Various	Various : Various	-	2.741	Nov 2016	0.100	Mar 2018	-		-		-	Continuing	Continuing	-
Space RCO Solar Power	TBD	TBD : TBD	-	-		-		283.245	Jan 2019	-		283.245	Continuing	Continuing	-
ORS-6 (COWVR)	C/CPFF	Millennium Engineering : Albuquerque, NM	-	0.527	Nov 2016	0.481	Nov 2017	-		-		-	Continuing	Continuing	-
ORS-5 Acquisition	SS/CPFF	MIT/LL : Boston, MA	-	6.515	Oct 2016	4.180	Nov 2017	-		-		-	Continuing	Continuing	-
ORS-5 Launch	C/FPIF	Orbital : Chandler, AZ	-	1.351	Dec 2016	-		-		-		-	Continuing	Continuing	-
ORS-8 (Weather gaps 1&2)	TBD	TBD : TBD	-	0.750	Jun 2017	75.094	Mar 2018	74.405	Oct 2018	-		74.405	Continuing	Continuing	-
Space RCO EXCOM approved projects	C/CPAF	TBD : TBD, NM	-	-		-		1.800	Dec 2018	-		1.800	Continuing	Continuing	-
Modular Bus/Open Manufacturing (ORS-7)	C/CPFF	Raytheon : Tucson, AZ	-	0.445	Nov 2016	0.107	Mar 2018	-		-		-	Continuing	Continuing	-
Develop/modify software/ hardware tools/models (OCO)	C/TBD	Various : Various	-	-		-		0.000		12.395	Dec 2018	12.395	Continuing	Continuing	-
		Subtotal	-	12.329		79.962		359.450		12.395		371.845	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
Advisory & Assistance Services	Various	Various : Various	-	4.431	Dec 2016	5.565	Dec 2017	4.399	Dec 2018	-		4.399	Continuing	Continuing	-
FFRDC	Various	Various : Various	-	1.216	Dec 2016	2.050	Dec 2017	2.201	Dec 2018	-		2.201	Continuing	Continuing	-
		Subtotal	-	5.647		7.615		6.600		-		6.600	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2019 Air Force			Date: February 2018
Appropriation/Budget Activity 3600 / 4	R-1 Program Element (Number/Name) PE 1206857F / *Operationally Responsive Space*	Project (Number/Name) 64A020 / *AF Funded ORSSats*	

	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	-	17.976		87.577		366.050		12.395		378.445	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

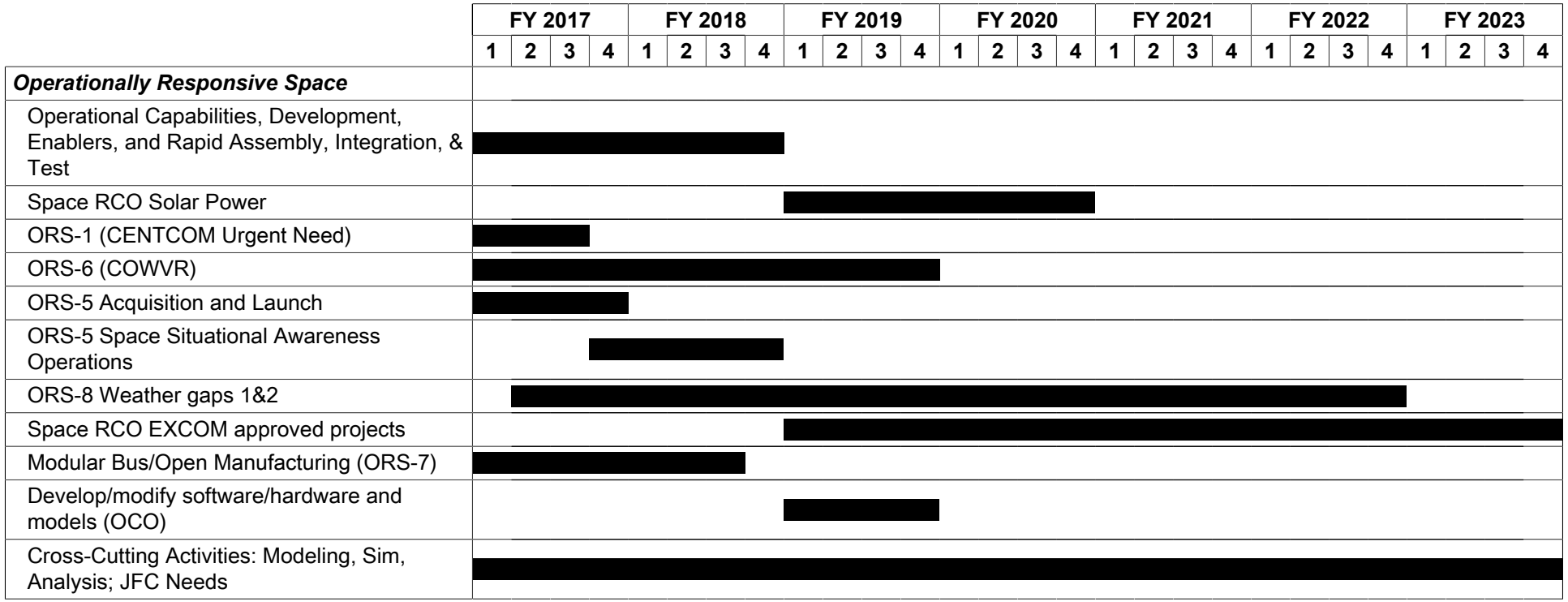

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206857F / *Operationally Responsive Space*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Operationally Responsive Space				
Operational Capabilities, Development, Enablers, and Rapid Assembly, Integration, & Test	1	2017	4	2018
Space RCO Solar Power	1	2019	4	2020
ORS-1 (CENTCOM Urgent Need)	1	2017	3	2017
ORS-6 (COWVR)	1	2017	4	2019
ORS-5 Acquisition and Launch	1	2017	4	2017
ORS-5 Space Situational Awareness Operations	4	2017	4	2018
ORS-8 Weather gaps 1&2	2	2017	4	2022
Space RCO EXCOM approved projects	1	2019	4	2023
Modular Bus/Open Manufacturing (ORS-7)	1	2017	3	2018
Develop/modify software/hardware and models (OCO)	1	2019	4	2019
Cross-Cutting Activities: Modeling, Sim, Analysis; JFC Needs	1	2017	4	2023