Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force											Date: February 2019	
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 / *Space Rapid Capabilities Office*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	84.235	298.445	33.742	17.885	51.627	35.929	8.826	8.987	9.149	Continuing	Continuing
64A020: *AF Funded ORSSats*	-	84.235	298.445	33.742	17.885	51.627	35.929	8.826	8.987	9.149	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

PE 1206857F, Space Rapid Capabilities Office, changed from Operationally Responsive Space

A. Mission Description and Budget Item Justification

Per the FY 2018 NDAA, the Operationally Responsive Space (ORS) Office is now the Space Rapid Capabilities Office (Space RCO). Its mission is being broadened to expedite developing and fielding operationally focused capabilities for immediate and near-term needs as directed by the Space RCO Board of Directors. 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/protect critical space capabilities to reserve "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 is ready to develop, test, train, and equip war fighter needs as they are identified at any time. First, the requirements must be validated by the commander, USSTRATCOM, acting through U.S. Space Command; second, the project must be approved by the Space RCO Board of Directors (BoD); 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 Space RCO is supporting the Electro-Optical/Infrared Weather Systems (EWS) capability addressing weather gap 1 (cloud characterization) and gap 2 (theater weather imagery). ORS-8, which was to have been a gap-filler between the new EWS program of record, has been cancelled due to the Defense Meteorological Satellite Program's (DMSP) end-of-life extending beyond the EWS potential launch date. The EWS launch date in 2024 will provide coverage of gaps 1 and 2 after DMSP's end-of-life. The Office is also developing 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. 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 developments include visionary, tailored, and future Space/Cyber projects to special operations forces (SOF) as well as to plan, develop, test and transition advanced technologies into space system prototypes and capabilities to meet known and emerging threats. Conduct architecture studies, modeling and stimulation, technical development, integration and test activities in preparation for transition of critical technologies into prototype or space program of record.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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 / *Space Rapid Capabilities Office*

The FY2020 funding request was reduced by $9.0 million to account for the availability of prior year execution balances.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space RCO weapon system capabilities. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392F and 1206398F.

As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is $14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

This effort is in Budget Activity 4, Advanced Component Development and Prototypes (ACD&P), because 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 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	87.577	378.445	42.742	0.000	42.742
Current President's Budget	84.235	298.445	33.742	17.885	51.627
Total Adjustments	-3.342	-80.000	-9.000	17.885	8.885
• Congressional General Reductions	-1.027	0.000			
• Congressional Directed Reductions	0.000	-105.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	25.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	-0.007	0.000			
• SBIR/STTR Transfer	-2.308	0.000			
• Other Adjustments	0.000	0.000	-9.000	17.885	8.885

Congressional Add Details ($ in Millions, and Includes General Reductions)	FY 2018	FY 2019
Project: 64A020: *AF Funded ORSSats*		
Congressional Add: *Blackjack*	-	25.000
Congressional Add Subtotals for Project: 64A020	-	25.000
Congressional Add Totals for all Projects	-	25.000

Change Summary Explanation

FY 2019: Congress deleted -$105 million from Space Solar Power as early to need, but without prejudice.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force		Date: February 2019
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 / *Space Rapid Capabilities Office*	

FY 2020: $9.000M reduction to account for the availability of prior year execution balances.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Title: Operational Capabilities, Development, Enablers, Integration, and Rapid Assembly, Integration & Test ***Description:*** 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. ***FY 2019 Plans:*** Developing 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 2020 Base Plans:*** N/A ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 decreased compared to FY 2019 by $178.245M. Justification for this decrease is completion of Space-based Solar Power effort with FY 2019 funding.	0.488	178.245	0.000	-	0.000
Title: Space RCO Board of Directors (BoD) Projects ***Description:*** Execute 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 BoD approved efforts to meet Joint Force Commander needs identified in year of execution. ***FY 2019 Plans:*** Initiate rapid prototyping projects that address emergent capabilities and respond to Commander, USSTRATCOM-validated requirements and other Space RCO BoD approved efforts as required to meet Joint Force Commander and warfighter needs. These activities may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2020 Base Plans:***	0.000	0.500	0.100	-	0.100

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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 / *Space Rapid Capabilities Office*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Continue to initiate rapid acquisition projects that address emergent capabilities and respond to Commander, USSTRATCOM-validated requirements and other Space RCO BoD approved efforts as required to meet Joint Force Commander and warfighter needs. These activities may include, but are not limited to studies, technical analysis, experimentation, prototyping, etc. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 decreased compared to FY 2019 by $0.400M. Justification for the decrease is fewer project initiations.					
Title: Space RCO Development ***Description:*** Rapidly exploit and infuse space technological and operational innovations to increase U.S. advantage. ***FY 2019 Plans:*** Continuing to support the Electro-Optical/Infrared Weather Systems (EWS) capability addressing weather gap 1 (cloud characterization) and gap 2 (theater weather imagery). Continue to study the potential of beginning the theater installation of ORS-9 as a tactically persistent ISR response architecture. Continuing program office support and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2020 Base Plans:*** Continue to support the EWS capability addressing weather gap 1 (cloud characterization) and gap 2 (theater weather imagery). Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. The FY2020 funding request was reduced by $9.0 million to account for the availability of prior year execution balances. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 decreased compared to FY 2019 by $44.815M. Justification for this decrease is described in plans above.	72.902	69.557	24.742	-	24.742
Title: Space RCO: Cross Cutting ***Description:*** Provide systems engineering, program management support and civilian pay 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.	10.845	12.748	8.900	-	8.900

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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 / *Space Rapid Capabilities Office*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
FY 2019 Plans: Continuing ongoing systems engineering support of future mission development. Refining Space RCO CONOPS, Enterprise and Architecture, and Systems Engineering Processes. Continuing to lead, participate in, and support, as appropriate, the solidification of space doctrine. Continuing to support Combatant Commands. Investigating options and implementing technology, procedures, and concepts for reducing costs and shortening satellite deployment times. Activities may include, but are not limited to program office support, facilities, and studies. ***FY 2020 Base Plans:*** Continue ongoing systems engineering support of future mission development as well as Program Office support and potentially including Civilian pay. 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. Activities may include, but are not limited to program office support, facilities, and studies. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 decreased compared to FY 2019 by $3.848M. Justification for this increase is described in plans above.					
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 2019 Plans:*** - Fast Wanderer - Developing enemy location & vulnerability exploitation capability for advanced satellite communication systems & methods. Capability is being integrated into existing SOF satellite exploitation systems and 2-way data dissemination capabilities. -- Tip Association & De-Duplication - Building & integrating 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 - Providing 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.	0.000	12.395	0.000	17.885	17.885

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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 / *Space Rapid Capabilities Office*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
-- SOF Nano Synthetic Aperture Radar - Providing 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 - Building and testing an airborne geolocation system for new enemy communications capabilities for kinetic end game. -- Select Spector - Developing and implementing 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) - Building & integrating high altitude/long loiter platform architecture with shared precision geolocation capabilities in real time. -- Special COmms Transport Yield (SCOTY) - Providing 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 - Delivering 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 2020 Base Plans:*** N/A ***FY 2020 OCO Plans:*** - ARAGORN - Extends limited comm capability in forward locations - cost is $950K - IC CHAT - PKI capability for network chatting for deployed users with limited comm - cost is $620K - Ka Band AIRCRAFT GEOLOCATION (KAG) - Improving SATCOM tracking and locating of enemy asset - $2.34M - EW SENSOR INTEGRATION (EWSI) - Adds additional customer sensors to JICD 4.2 fabric - cost is $1.25M - AVALON - Determine feasibility of space-enabled cyber operations capability generation - cost is $950K - CASIO - Improving geolocation capabilities for sensors and merged into COTS radios - cost is $975K - SIDEWINDER - BANK of DETECTORS - Providing integration of deployed					

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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 / *Space Rapid Capabilities Office*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
sensors into an operational architecture - cost is $1.8M - Advanced TTL Handsets - Enabling operators to efficiently communicate regarding sensitive operations - cost is $3M - Denied GPS Capabilities - Providing backup capability in GPS-denied areas - cost is $2.5M - Friendly Force Tracking (FFT) Ground equipment - Create newer FFT devices needed to accept covert waveforms - cost is $3.5M ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 OCO increased compared to FY 2019 OCO by $5.490M. Justification for this increase is described in plans above.					
Accomplishments/Planned Programs Subtotals	84.235	273.445	33.742	17.885	51.627

	FY 2018	FY 2019
Congressional Add: Blackjack	-	25.000
FY 2019 Plans: Blackjack objectives are to demonstrate the military utility of lower cost payloads, leverage commercial architectures, and demonstrate on-orbit data processing and autonomy. Funds are being used to support DARPA in developing payload concepts to Preliminary Design Review, understanding of commercial networks, and initial ground capabilities.		
Congressional Adds Subtotals	-	25.000

D. Other Program Funding Summary ($ in Millions)

N/A

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 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206857F / *Space Rapid Capabilities Office*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Operational Capabilities, Development, Enablers, and Rapid Assembly, Integration, & Test	Various	Various : Various	-	0.488	Mar 2018	-		-		-		-	Continuing	Continuing	-
Space RCO Solar Power	TBD	TBD : TBD	-	-		178.245	Feb 2019	-		-		-	Continuing	Continuing	-
ORS-5 Operations	SS/CPFF	MIT/LL : Boston, MA	-	4.180	Nov 2017	-		-		-		-	Continuing	Continuing	-
Support EO/IR Weather Systems	TBD	TBD : TBD	-	61.719	Jun 2019	69.057	Apr 2019	24.742	Nov 2019	-		24.742	Continuing	Continuing	-
Space RCO BoD approved projects	C/CPAF	Various : Various, NM	-	-		0.500	Jul 2019	0.100	Dec 2019	-		0.100	Continuing	Continuing	-
ORS-7 Modular Bus/Open Manufacturing	C/CPFF	Raytheon : Tucson, AZ	-	0.053	Mar 2018	-		-		-		-	0.000	0.053	12.200
Develop/modify software/ hardware tools/models (OCO)	C/TBD	Various : Various	-	-		12.395	May 2019	0.000		17.885	Dec 2019	17.885	Continuing	Continuing	-
ORS-9 Persistence Response Architecture	Various	Various : Various	-	6.950	Aug 2018	0.500	May 2019	-		-		-	Continuing	Continuing	-
Blackjack	MIPR	DARPA : Various	-	-		25.000	Jan 2019	-		-		-	Continuing	Continuing	-
		Subtotal	-	73.390		285.697		24.842		17.885		42.727	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
A&AS	Various	Various : Various	-	8.537	Dec 2017	8.651	Dec 2018	6.432	Dec 2019	-		6.432	Continuing	Continuing	-
FFRDC	Various	Various : Various	-	2.308	Dec 2017	4.097	Dec 2018	2.468	Dec 2019	-		2.468	Continuing	Continuing	-
		Subtotal	-	10.845		12.748		8.900		-		8.900	Continuing	Continuing	N/A

	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	84.235		298.445		33.742		17.885		51.627	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force			Date: February 2019
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	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206857F / *Space Rapid Capabilities Office*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

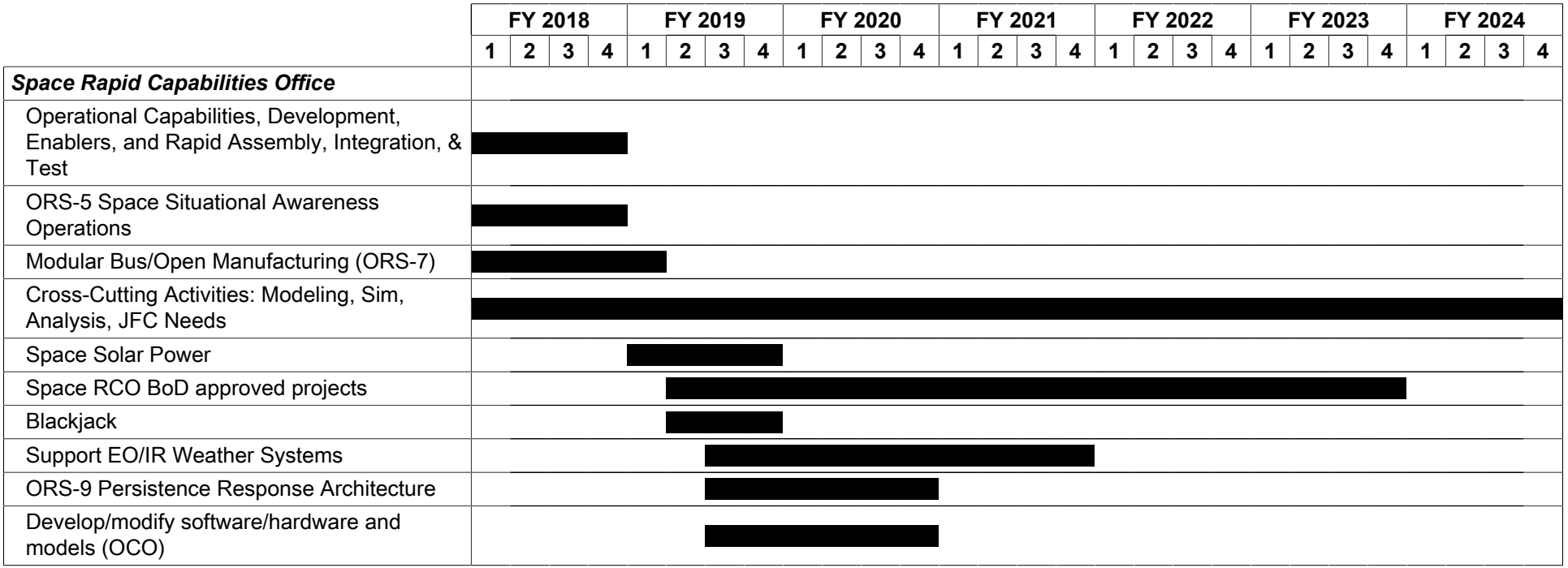

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206857F / *Space Rapid Capabilities Office*	**Project (Number/Name)** 64A020 / *AF Funded ORSSats*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Space Rapid Capabilities Office				
Operational Capabilities, Development, Enablers, and Rapid Assembly, Integration, & Test	1	2018	4	2018
ORS-5 Space Situational Awareness Operations	1	2018	4	2018
Modular Bus/Open Manufacturing (ORS-7)	1	2018	1	2019
Cross-Cutting Activities: Modeling, Sim, Analysis, JFC Needs	1	2018	4	2024
Space Solar Power	1	2019	4	2019
Space RCO BoD approved projects	2	2019	4	2023
Blackjack	2	2019	4	2019
Support EO/IR Weather Systems	3	2019	4	2021
ORS-9 Persistence Response Architecture	3	2019	4	2020
Develop/modify software/hardware and models (OCO)	3	2019	4	2020