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 1206438F / *Space Control Technology*							
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	-	8.506	7.842	91.018	1.100	92.118	82.252	93.800	100.716	124.767	Continuing	Continuing
642611: *Technology Insertion Planning and Analysis*	-	8.506	7.842	91.018	1.100	92.118	82.252	93.800	100.716	124.767	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

This project supports a range of activities including systems engineering, technology planning, development, demonstrations and prototyping, and testing, as well as modeling, simulations and exercises to support development and maturation of tactics and procedures for a responsive and resilient Space Control mission area. This includes technology development and prototyping for Defensive Counterspace (DCS) and Offensive Counterspace (OCS) and the necessary systems engineering for the warfighter to effectively employ such systems.

Specifically supported are DCS and Space Situational Awareness (SSA) activities which include developing on-board and near-board threat warning payloads for monitoring, detecting, identifying, tracking, assessing, verifying, categorizing, and characterizing objects and events in space. Additionally, this activity supports the development of payload prototypes and space defense force packages for protecting U.S. space systems, resources, and operations from enemy attempts to negate, interfere, or destroy them.

Specific OCS activities include disruption, denial, or degradation (and associated Electronic Support) of adversary space systems which may be used for purposes hostile to U.S. national security interests. Rapid Reaction Capabilities in response to immediate warfighter needs in the Space Control mission area are developed within this program.

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 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.

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 1206438F / *Space Control Technology*

B. Program Change Summary ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Previous President's Budget	7.534	7.842	7.988	0.000	7.988
Current President's Budget	8.506	7.842	91.018	1.100	92.118
Total Adjustments	0.972	0.000	83.030	1.100	84.130
• Congressional General Reductions	0.000	0.000			
• 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	1.190	0.000			
• SBIR/STTR Transfer	-0.218	0.000			
• Other Adjustments	0.000	0.000	83.030	1.100	84.130

Change Summary Explanation

FY 2017: $1.190M increase for Defense Force Packaging

FY 2019: $68.247M increase for Experimentation Platforms & Defense Force Packaging and $15.468M increase for BMC2 related development efforts

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Title: Rapid Reaction Branch	8.506	7.842	23.456	1.100	24.556
Description: Develops advanced capabilities for rapid prototyping and integration into space control programs of record and, if requested, to warfighter Urgent Operational Needs (UONs) and Joint Urgent Operational Needs (JUONs). Conducts prototyping, demonstration, testing, and rapid transition of technology and techniques to space control systems.					
FY 2018 Plans: Develop and test advanced prototypes. Expand Signal Processing Lab integration to include industry outreach. Develop, test, train, field and transition advanced QRC capabilities based on COCOM requirements. Integrate relevant GRA Increment 3 technologies. Execute initial testing, to include CONUS and OCONUS activities. Accelerate Strategic Portfolio Review initiatives. As requested, develop, test, train, field and sustain quick reaction capabilities. Continue program office and other related support activities that may include, but are not limited to studies, technical analysis, etc.					
FY 2019 Base Plans:					

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 1206438F / *Space Control Technology*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
Develop, test, train, field, transition and sustain advanced QRC capabilities based on emergent requirements from multiple Combatant Commands. Conduct initial technical development and integration activities against relevant threat systems in preparation for operational requirements. Develop and test advanced prototypes in support of activities within the Space Control Technology portfolio. Integrate relevant GRA Increment 4 technologies. Integrate information assurance early in all developmental efforts. Execute field development & test activities, at CONUS & OCONUS locations, to verify system performance in the operational environment. FY 2019 increase supports mission area growth and required in-house expertise to meet advanced technology readiness objectives. It expands unit manpower, hardware and infrastructure and enables responsive support to multiple combatant command urgent and emergent operational needs. It increases the unit's developmental engineers and adds necessary functional resources (information assurance; configuration management; testing; prototype training; maintenance; logistics) to ensure unit's ability to rapidly develop, test, train, field, transition and sustain relevant warfighting capabilities in response to a significantly more volatile and adaptive threat environment. Continue program office support and other related support activities. Rapidly respond to implement space 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 2019 OCO Plans:*** FY 2019 OCO supports pre-planned product improvements and version upgrades of advanced capabilities deployed to two locations in support of Operation Inherent Resolve ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $16.714M. Justification for this increase is described in plans above.					
Title: Experimentation Platforms & Defense Force Packaging ***Description:*** This effort will acquire, outfit and operate microsat busses with the primary purpose of demonstrating new technologies, flight testing payloads or subsystems, and validating Tactics, Techniques, and Procedures (TTPs) to ensure the delivery of critical space effects throughout all phases of a future space conflict against an adaptive and thinking adversary. It also supports a range of activities developing, prototyping, and fielding a family of on-board and near-board, modular resilience payloads supporting threat warning and protection options for National Security Space High-Value satellites. These payloads will be integrated with enterprise command and control capabilities for tasking, reporting, and response. On-orbit prototype demonstrations will be performed to demonstrate sensor/payload capabilities for high-value satellite force packaging requirements. Systems Engineering will enable the integration, interoperability and compatibility of	-	-	67.562	-	67.562

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 1206438F / *Space Control Technology*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2017	FY 2018	FY 2019 Base	FY 2019 OCO	FY 2019 Total
new space control technology systems and capabilities amongst each other and amongst these new systems and the existing space control enterprise. ***FY 2019 Base Plans:*** Acquire two non-developmental microsat satellites to be flown on a Long Duration Propulsive ESPA platform, available Space Test Program mission or other ridesharing opportunity. Procure and/or integrate experimental payloads or sensors on microsat busses and/or operational assets. Plan and execute microsat on-orbit flight experiments; collect, process, distribute and analyze payload/sensor data; and evaluate the military utility of coalition air, land, sea and space assets against known and projected threats/scenarios in order to prioritize current and future capability gaps and vulnerabilities. Initiate development of selected sensor/response payloads (from mod/sim and analysis efforts) for prototype demonstrations for threat warning and response payloads for high-value satellites. Initiate prototype and operations ground infrastructure design trades and build-out in support space control C2 and space range requirements. Perform risk reduction efforts to define high-value satellite bus requirements for force packaging on-ramps. Define enterprise interfaces and standards with System-of-Systems Model-Based Engineering, and modeling and simulation to determine critical paths and nodes, timing requirements, risks, and opportunities. Define developmental and operational test plans to ensure system performance in contested space and cyber domains. 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, prototyping, etc. ***FY 2018 to FY 2019 Increase/Decrease Statement:*** FY 2019 increased compared to FY 2018 by $67.562M. Justification for this increase is described in plans above					
Accomplishments/Planned Programs Subtotals	8.506	7.842	91.018	1.100	92.118

D. Other Program Funding Summary ($ in Millions)

N/A

Remarks

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 1206438F / *Space Control Technology*

E. Acquisition Strategy

All contracts funded in this program element will be awarded using competitive procedures to the maximum extent possible. SCT program consists of numerous small projects. Space Defense Force Packaging and Experimentation Platforms initiative consists of several interrelated activities that require close coordination and integration, which may reduce the opportunities for independent competitive contracting actions.

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 1206438F / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*	

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
SCT Counterspace Technology Prototyping/ Rapid Reaction Development	Various	Various : Various, NV	-	6.399	Jan 2017	6.605	Jan 2018	22.888	Jan 2019	-		22.888	Continuing	Continuing	-
SCT Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	1.684	Oct 2016	0.730	Oct 2017	-		-		-	Continuing	Continuing	-
SCT Foundational Architecture	C/FFP	TBD : El Segundo, CA	-	-		-		8.804	Feb 2019	-		8.804	Continuing	Continuing	-
SCT Experimentation Platforms Sensors	C/CPIF	Various : Various, CA	-	-		-		5.900	Jan 2019	-		5.900	Continuing	Continuing	-
SCT Experimentation Platforms Microsat Buses	C/FFP	Various : Various, CA	-	-		-		10.800	Jan 2019	-		10.800	Continuing	Continuing	-
SCT OCO Funding P3I	Various	Various : Various	-	-		-		0.000		1.100	Oct 2018	1.100	Continuing	Continuing	-
SCT Modeling & Sim; Payload Analysis and Alternatives	C/Various	Various : Various, CA	-	-		-		12.515	Oct 2018	-		12.515	Continuing	Continuing	-
SCT Sensor Prototype Development	C/Various	Various : Various, CA	-	-		-		16.500	Oct 2018	-		16.500	Continuing	Continuing	-
SCT Ground Infrastructure	Various	Various : Various, CA	-	-		-		0.500	Oct 2018	-		0.500	Continuing	Continuing	-
SCT High-Value Satellite Bus Requirements Definition	Various	Various : Various, CA	-	-		-		0.500	Oct 2018	-		0.500	Continuing	Continuing	-
SCT On-Orbit Test Range Build-out and Test	Various	Various : Various, CA	-	-		-		7.820	Jan 2019	-		7.820	Continuing	Continuing	-
		Subtotal	-	8.083		7.335		86.227		1.100		87.327	Continuing	Continuing	N/A

Remarks

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 1206438F / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

Support ($ 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
Civilian Reimbursable Budget Authority	Various	Space and Missile Systems Center : El Segundo, CA	-	-		-		0.180	Oct 2018	-		0.180	Continuing	Continuing	-
		Subtotal	-	-		-		0.180		-		0.180	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
A&AS	Various	SMC : El Segundo, CA	-	0.423	Jan 2017	0.507	Jan 2018	3.311	Feb 2019	-		3.311	Continuing	Continuing	-
FFRDC	Various	Various : Various, CA	-	-		-		1.000	Oct 2018	-		1.000	Continuing	Continuing	-
Other Support	Various	Various : Various, CA	-	-		-		0.300	Oct 2018	-		0.300	Continuing	Continuing	-
		Subtotal	-	0.423		0.507		4.611		-		4.611	Continuing	Continuing	N/A

	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	-	8.506		7.842		91.018		1.100		92.118	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 1206438F / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

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 1206438F / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

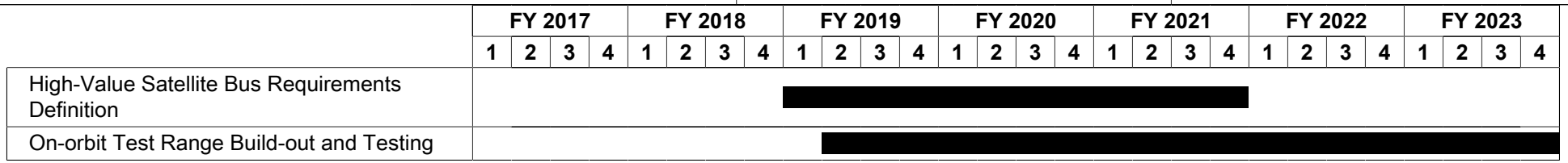

Exhibit R-4A, RDT&E Schedule Details: PB 2019 Air Force		Date: February 2018
Appropriation/Budget Activity 3600 / 4	**R-1 Program Element (Number/Name)** PE 1206438F / *Space Control Technology*	**Project (Number/Name)** 642611 / *Technology Insertion Planning and Analysis*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
RRB				
Rapid Prototyping	1	2017	4	2023
Signal Processing Lab Gov't Reference Architecture (GRA) Dev Inc 3	1	2017	2	2019
Signal Processing Lab GRA (dev) Increment 4	1	2019	4	2021
Signal Processing Lab GRA (dev) Increment 5	3	2021	4	2023
Counterspace Systems Developmental Test (plan/execute/report)	4	2017	3	2018
Capability Integration (Lab)	1	2017	4	2023
Capability tests (execute/report)	1	2017	4	2023
Ongoing capability DT planning/execution	1	2017	4	2023
Experimentation Platforms & Defense Force Packaging				
Award SE&I Contract	2	2019	2	2019
Microsat Satellite Bus Procurement	1	2019	3	2019
Sensor Procurement	1	2019	3	2019
Flight Experiments and Prototype Ops	2	2019	4	2019
Military Utility Assessment	1	2019	4	2019
Database of Architectural Elements	1	2019	4	2019
Modeling & Simulation; Payload Analysis and Alternatives	1	2019	4	2022
Sensor Prototype Development	2	2019	4	2022
Ground Infrastructure	2	2019	4	2023
High-Value Satellite Bus Requirements Definition	1	2019	4	2021
On-orbit Test Range Build-out and Testing	2	2019	4	2023