Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force											Date: April 2022	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*					R-1 Program Element (Number/Name) PE 1203110SF / *Satellite Control Network (SPACE)*							
COST ($ in Millions)	**Prior Years**	**FY 2021**	**FY 2022**	**FY 2023 Base**	**FY 2023 OCO**	**FY 2023 Total**	**FY 2024**	**FY 2025**	**FY 2026**	**FY 2027**	**Cost To Complete**	**Total Cost**
Total Program Element	-	58.509	36.810	42.199	0.000	42.199	49.499	46.224	44.508	38.436	Continuing	Continuing
673276: *Satellite Control Network*	-	58.509	36.810	42.199	0.000	42.199	49.499	46.224	44.508	38.436	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2022, PE 1203040SF, Defense Cyber Operations - Space efforts were transferred from PE 1203110SF Satellite Control Network (SPACE), Budget Activity 07 due to the creation of a new Program Element for Defense Cyber Operations - Space.

The Satellite Control Network (SCN), formerly known as the Air Force Satellite Control Network (AFSCN), is a satellite ground terminal network comprised of two communication nodes (Schriever SFB & Vandenberg SFB) 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 over 170 satellites in various orbits operating in a congested and contested environment. The SCN conducts an average of 450+ satellite contacts per day supporting Positioning, Navigation and Timing (PNT), Intelligence, Surveillance and Reconnaissance (ISR), Missile Warning and Missile Defense, Communications, Weather, Launch Vehicle Support, and Research and Development (R&D) for Department of Defense (DoD), Intelligence Community (IC), and National Aeronautics and Space Administration (NASA) operations. While most of the 450+ daily satellite contacts are routine command and control (C2) activities, the SCN is also used during satellite emergencies (e.g. a tumbling satellite) because its high-power antennas are often the only terrestrial assets that can re-establish contact with a non-responsive satellite. During each Fiscal Year, the SCN typically supports multiple space vehicle emergencies, resulting in the preservation of over 4B worth of satellites. In addition to routine and emergency satellite operations C2, the SCN provides support to launch and early orbit operations, ensuring worldwide telemetry during launch vehicle ascent, staging, and orbital insertion, and data transmit and receive for new satellites completing early orbit checkout. During each Fiscal Year, the SCN supports multiple launches delivering an average of 14B worth of satellites to their operational orbits. Finally, the SCN provides Factory Compatibility Testing (FCT) to ensure satellites and launch vehicles can communicate via the SCN before the satellite is launched.

These funds are utilized to meet evolving future space demands for Ground Enterprise Next (GEN), to include transmit, receive and data transport to ensure capabilities are available to support DoD, IC, and civil users. This includes efforts to provide more capable ground-based antennas, augment the existing SCN with Federal and commercial antennas to both diversify space-ground link resources and increase capacity for spacecraft communication, modernize satellite scheduling, and develop infrastructure network solutions for long-haul terrestrial communications compatible with Air Force and Space Force missions. Other activities include identifying shared/ common platform, infrastructure and data layer solutions to support open frameworks and architectures across the enterprise ground portfolio. Funds are also used for requirements management, system planning, enterprise analysis and architecture support, Systems Engineering and Integration (SE&I), cyber security, test, system enhancement and deficiency resolution, and system resiliency.

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF / *Satellite Control Network (SPACE)*

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach to increase innovation and resiliency, leveraging international, commercial, and mission partnerships, and managing program /project priorities according to an integrated unclassified /classified enterprise space architecture. Expanding the appropriate acquisition authorities and contract mechanisms to deliver capability sooner, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or re-purpose existing capabilities.

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

This program is in Budget Activity 7, Operational System Development because this budget activity includes development efforts to upgrade systems that have been fielded or have received approval for full rate production and anticipate production funding in the current or subsequent fiscal year.

B. Program Change Summary ($ in Millions)	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total
Previous President's Budget	60.480	36.810	0.000	0.000	0.000
Current President's Budget	58.509	36.810	42.199	0.000	42.199
Total Adjustments	-1.971	0.000	42.199	0.000	42.199
• 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	0.000	0.000			
• SBIR/STTR Transfer	-1.971	0.000			
• Other Adjustments	0.000	0.000	42.199	0.000	42.199

Change Summary Explanation

FY 2023: The FY 2022 President's Budget submittal did not reflect FY 2023 through FY 2026 funding. Therefore, an explanation of the change between the two budget positions for FY 2023 cannot be made in a relevant manner.

C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
Title: SCN Enhancements and Deficiency Resolution	2.416	2.586	4.634
Description: Provides system enhancements, deficiency resolution, test, cyber security, requirements management, and system architecture support to the SCN utilizing enterprise developed technologies or capabilities, when applicable. Additionally, the SCN is investigating multiple cyber defense tools for integration onto the SCN baseline.			

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF *I Satellite Control Network (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
FY 2022 Plans: Refine architecture design and planning to utilize automated scheduling and ground resource management capabilities. Start initial automated scheduling implementation and infrastructure upgrade activities and changes. 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. ***FY 2023 Plans:*** Continue to deliver enhancements and deficiency resolution in fielded SCN systems. Address user priorities to support mission needs. Facilitate automation, efficiency and resiliency improvements for SCN and related ground resources. Activities may include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 increased due to a increase in scope of work with Air Force SCN Scheduling Tool (AST) deployment and Enterprise Resource Management (ERM) development.			
Title: Satellite Operations Transmit and Receive	17.709	7.933	18.303
Description: Provides enterprise transmit, receive and resource management solutions to enable continuous satellite operations (SATOPS) from benign to contested, degraded and operationally-denied environments as part of GEN efforts. Provides updates to SCN legacy system capability shortfalls. These updates include modernization of current scheduling, resource management, and development execution for future integrated and automated resource management and scheduling services. Additionally, the SCN will integrate with multiple enterprise cyber defense tools for as part of the baseline. ***FY 2022 Plans:*** Release Enterprise Resource Management (ERM), initially called Advanced Planning and Scheduling System (APSS), request for prototype proposal. Continue AFSCN Scheduling Tool (AST) phased deployments. Continue 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. ***FY 2023 Plans:*** Continue the phased modernization of capabilities supporting data transmit, receive and transport for both the current and evolving future demand. Adaptably address user priorities to responsively support mission needs. Award initial Enterprise Resource Management (ERM) contract and begin development of ERM ground resource integration, management, and automation capabilities. Complete AST phased deployments and finish transitioning SCN Scheduling onto AST. Implement necessary studies to identify shared platform, infrastructure, and data layer solutions that will inform future concepts and activities in support of enterprise open frameworks and architectures as well as risk reduction activities, technical analysis for common			

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF *I Satellite Control Network (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
platform, infrastructure and data layers for ground and communication systems to build upon. Activities may include, but are not limited to, program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 increased due to planned start of ERM.			
Title: Satellite C2 Augmentation Services ***Description:*** Provides both Federal and commercial satellite C2 services to augment SCN capabilities. Augmented services are planned to be deployed in a phased approach to address early integration and security concerns while providing increased C2 diversity and capacity to reduce the risk of congestion on the SCN. ***FY 2022 Plans:*** Continue Federal Augmentation and Commercial Augmentation Services (CAS) development activities. Start development work for Federal Augmentation integration into SCN. Continue 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. ***FY 2023 Plans:*** Continue Federal Augmentation and Commercial Augmentation Services activities. Implement Operational Test and Operational Acceptance for initial Federal missions. Continue on-boarding and support to missions utilizing CAS. Continue development work for integration of augmentation services into ERM. Continue 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. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 decreased due to reduction in planned development and integration work pending USSF policy updates regarding which satellite systems will use CAS.	26.848	21.644	13.481
Title: Defensive Cyberspace Operations - Space (DCO-S) ***Description:*** Funding supports cyber hardening and Defensive Cyberspace Operations for Space (DCO-S) activities for the space enterprise. Provides space enterprise defensive cyber solutions to counter advanced persistence cyber threats, through rapid fielding of operational prototypes using agile development methods. This effort implements a combined Development/Security/Operations (DevSecOps) framework which incorporates methodologies, technologies, and tools to deeply embed security best practices into the modern software development workflow and tool-chain. This effort will institute four product lines: Manticore (detect), Pegasus (protect), Chimera (identify), and Kraken (respond). The	5.516	0.000	0.000

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF *I Satellite Control Network (SPACE)*

C. Accomplishments/Planned Programs ($ in Millions)	FY 2021	FY 2022	FY 2023
DCO-S capabilities are developed and deployed as an agile program, leveraging a DevSecOps framework to facilitate rapid and timely fielding to operations. ***FY 2022 Plans:*** N/A ***FY 2023 Plans:*** N/A ***FY 2022 to FY 2023 Increase/Decrease Statement:*** N/A			
Title: Enterprise Systems Engineering and Integration (SE&I) ***Description:*** SE&I manages the government controlled system and subsystem level baseline requirements including analysis of future changes to the fielded baseline. SE&I provides "government as the integrator" engineering support to ensure multiple separate modernizations and the sustainment baselines are synchronized. SE&I will develop and recommend investment strategies to keep the SCN operating well beyond the Future Years Defense Plan. ***FY 2022 Plans:*** Continue Program Office support and independent SE&I efforts as required to integrate development and modernization across the SCN. Provide systems and subsystem level definition, baseline, architecture, integration planning and support for the SCN and augmented services. Additionally, SE&I provides support to SSC initiatives supporting Ground Enterprise Next (GEN) activities. Continue to support implementation of 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. ***FY 2023 Plans:*** Continue Program Office support and SE&I efforts as required to integrate development and modernization across the SCN. Provide systems and subsystem level definition, baseline, architecture, integration planning, test, and support for the SCN and augmentation services. Additionally, SE&I will provide support to SSC initiatives supporting GEN activities. Continue to support implementation of 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. ***FY 2022 to FY 2023 Increase/Decrease Statement:*** FY 2023 increased due to an increase in anticipated requirements.	6.020	4.647	5.781
Accomplishments/Planned Programs Subtotals	58.509	36.810	42.199

Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force	Date: April 2022
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development*	**R-1 Program Element (Number/Name)** PE 1203110SF *I Satellite Control Network (SPACE)*

D. Other Program Funding Summary ($ in Millions)

Line Item	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	FY 2024	FY 2025	FY 2026	FY 2027	Cost To Complete	Total Cost
• SPAF 01 1203110F: *Satellite Control Network (SPACE)*	53.326	43.655	51.414	-	51.414	52.079	52.912	53.957	55.364	Continuing	Continuing

Remarks

N/A

E. Acquisition Strategy

DT&E efforts focus on completing upgrades as well as future architectures and studies to ensure the best use of investment funding.

SCN acquisition strategy is evolving from completing obsolescence, resiliency, and cyber security upgrades for existing satellite C2 network assets to future planning for the evolution of the SCN, Ground Enterprise Next (GEN), and data transmit, receive and transport architectures to increase efficiency and resiliency of SATOPS operations. This evolution will integrate the commercial and federal augmentation services with the SCN to create a comprehensive system for Advanced Planning and Scheduling System (APSS), now known as Enterprise Resource Management (ERM). ERM request for prototype proposal (RPP) planned for release in FY22.

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 SCN Modifications, Maintenance, and Operations (CAMMO) contract when sustaining engineering expertise is needed to finalize Government-approved architectures. Federally Funded Research and Development Corporation technical depth and breadth will be leveraged to ensure SCN modernization efforts are compatible with mission rules and do not pose a risk to safe and cost-effective satellite contacts.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force			Date: April 2022
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203110SF / *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 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Satellite Ops Transmit and Receive - Scheduling	Various	Stottler-Henke : Colorado Springs, CO : TBD	-	4.162	Jan 2021	2.444	Jan 2022	4.709	Jan 2023	-		4.709	Continuing	Continuing	-
SCN Enhancements and Deficiency Resolution	Various	Various : Colorado Springs, CO : TBD	-	2.416	May 2021	2.586	May 2022	4.634	May 2023	-		4.634	Continuing	Continuing	-
Satellite Ops Transmit and Receive - Enterprise Resource Management	C/TBD	TBD; TBD : TBD	-	-		-		5.400	Jan 2023	-		5.400	Continuing	Continuing	-
C2 Augmentation (CAS)	Various	TBD; TBD : TBD	-	26.848	Oct 2020	21.644	Mar 2022	13.481	Oct 2022	-		13.481	Continuing	Continuing	-
Defensive Cyberspace Operations for Space (DCO-S)	Various	Various : Colorado Springs, CO : TBD	-	5.516	Dec 2020	-		-		-		-	Continuing	Continuing	-
Enterprise Systems Engineering and Integration (SE&I)	SS/CPIF	ENSCO : Colorado Springs, CO : TBD	-	6.020	Nov 2020	4.647	Nov 2021	5.781	Nov 2022	-		5.781	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp : El Segundo, CA : TBD	-	6.960	Apr 2021	1.504	Jan 2022	2.331	Jan 2023	-		2.331	Continuing	Continuing	-
		Subtotal	-	51.922		32.825		36.336		-		36.336	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Aerospace Corp, : El Segundo, CA : TBD	-	0.903	Apr 2021	0.930	Jan 2022	0.947	Jan 2023	-		0.947	Continuing	Continuing	-
A&AS	Various	TBD:TBD : TBD	-	5.684	Apr 2021	3.055	Jan 2022	4.916	Jan 2023	-		4.916	Continuing	Continuing	-
		Subtotal	-	6.587		3.985		5.863		-		5.863	Continuing	Continuing	N/A

	Prior Years	FY 2021 Cost	FY 2021 Award Date	FY 2022 Cost	FY 2022 Award Date	FY 2023 Base Cost	FY 2023 Base Award Date	FY 2023 OCO Cost	FY 2023 OCO Award Date	FY 2023 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	58.509		36.810		42.199		-		42.199	Continuing	Continuing	N/A

Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force			Date: April 2022
Appropriation/Budget Activity 3620F / 7	R-1 Program Element (Number/Name) PE 1203110SF / *Satellite Control Network (SPACE)*	Project (Number/Name) 673276 / *Satellite Control Network*	

	Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203110SF / *Satellite Control Network (SPACE)*	**Project (Number/Name)** 673276 / *Satellite Control Network*

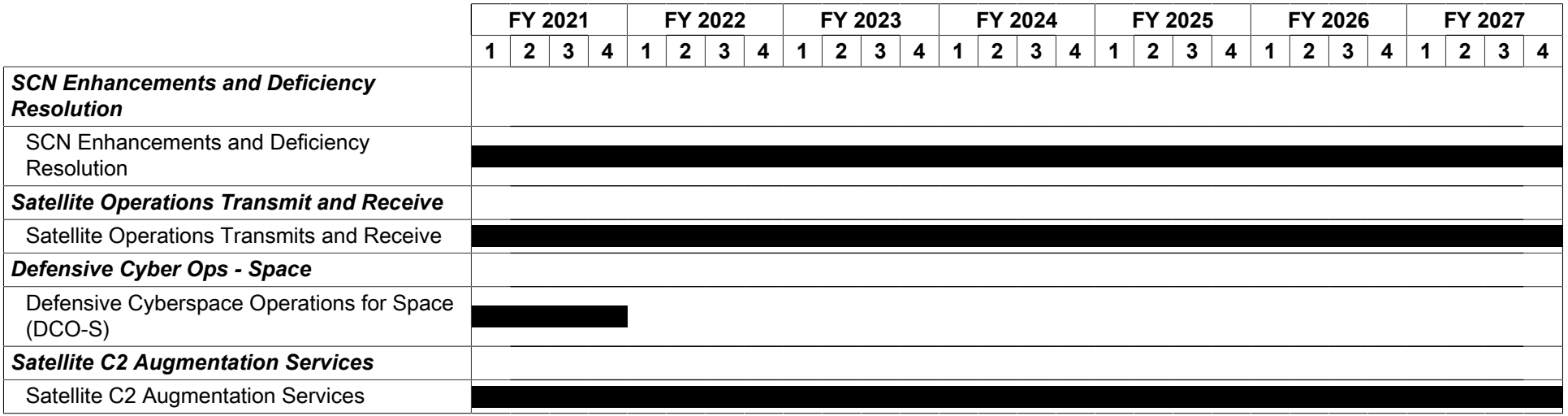

Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force		Date: April 2022
Appropriation/Budget Activity 3620F / 7	**R-1 Program Element (Number/Name)** PE 1203110SF / *Satellite Control Network (SPACE)*	**Project (Number/Name)** 673276 / *Satellite Control Network*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
SCN Enhancements and Deficiency Resolution				
SCN Enhancements and Deficiency Resolution	1	2021	4	2027
Satellite Operations Transmit and Receive				
Satellite Operations Transmits and Receive	1	2021	4	2027
Defensive Cyber Ops - Space				
Defensive Cyberspace Operations for Space (DCO-S)	1	2021	4	2021
Satellite C2 Augmentation Services				
Satellite C2 Augmentation Services	1	2021	4	2027