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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2023 Air Force **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3620F: <i>Research, Development, Test &amp; Evaluation, Space Force / BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 1203040SF / DCO-Space
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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	-	0.000	2.150	28.162	0.000	28.162	28.249	13.808	13.878	13.912	Continuing	Continuing
673070: <i>Defensive Cyber Ops - Space</i>	-	0.000	2.150	28.162	0.000	28.162	28.249	13.808	13.878	13.912	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 Appropriation for Space Force and Program Element for Defense Cyber Operations - Space. This is not a new start.

Defensive Cyberspace Operations (DCO-S) provides defensive cyber capabilities that protect the network enclaves of USSF mission systems, to include their associated computer systems, software applications and sensitive operational information against unauthorized intrusion, corruption, and/or destruction. The emphasis of the program is directed toward defensive cyberspace capabilities, computer and network systems security, damage assessment and recovery, cyber threat recognition, attribution, and mitigation, and active response methodologies in response to evolving threats and changes to cyber environment. These areas of emphasis are realized through research and development, test and acquisition in the areas of proactive defense, defensive counter cyberspace, cyberspace intelligence, surveillance and reconnaissance, command and control situational awareness, persistent network operations, as well as decision support, recovery, and digital forensics.

These efforts implement a combined Development/Security/Operations (DEVSECOPS) framework, which incorporates methodologies, technologies, and tools to deeply embed security best practices into the modern development workflow and tool-chain. This effort institutes two product lines: Manticore (Detect & Identify) and Kraken (Protect & Respond). It will endeavor to identify shared/common platform, infrastructure, and data layer solutions to support open frameworks and architectures across the enterprise ground portfolio. The DCO-S capabilities are developed, produced and deployed as an agile program, leveraging a DEVSECOPS framework to facilitate rapid and timely fielding to operations.

These developments deploy both out-of-band (Manticore) and in-band (Kraken) cyber defense tool suites to Space Delta 6 (Cyber Ops) protecting the following mission sets: Protected Communications, Missile Warning, Military Strategic Communications (MILSATCOM), Position Navigation and Timing (PNT), Ballistic Missile Command and Control, Space Domain Awareness (SDA), Nuclear Command Control and Communications (NC3), and Command and Control Satellite Operations (C2 Sat Ops).

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.

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This program element may include necessary civilian pay expenses required to manage, execute, and deliver weapon system capability. The use of such programs funds would be in addition to the civilian pay expenses budgeted in program element 0605827F, 0605828F, 0605829F, 0605831F, 0605832F, 0605833F, 0605898F, 0606398F. In FY 2021 0.000M was expended for civilian pay expenses in this program element, and in FY 2022 0.000M is forecasted for civilian pay expenses in this program element.

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>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>
Previous President's Budget	0.000	2.150	0.000	0.000	0.000
Current President's Budget	0.000	2.150	28.162	0.000	28.162
Total Adjustments	0.000	0.000	28.162	0.000	28.162
• 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	0.000	0.000			
• Other Adjustments	0.000	0.000	28.162	0.000	28.162

**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.

<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<b>Title:</b> Defensive Cyberspace Operations - Space (DCO-S)	0.000	2.150	28.162
<b>Description:</b> 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.			
<b>FY 2022 Plans:</b>			

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<b>C. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<p>Extended Manticore (Identify &amp; Detect) and Kraken (Protect &amp; Respond) product lines by purchasing hardware devices and renewed software licensing, which allowed external monitoring of mission system networks for purposes of protecting sensitive operational information against unauthorized intrusion, corruption, and/or destruction.</p> <p><b>FY 2023 Plans:</b> Develop and integrate Manticore (Identify &amp; Detect) and Kraken (Protect &amp; Respond) DCO-S capabilities to new mission areas; build, test and deliver new features to keep pace with growing threat demands. Deploy both out-of-band (Manticore) and in-band (Kraken) cyber defense tool suites to Space Delta 6 (Cyber Ops). Additional DCO-S mission systems will be on-boarded to protect the following mission sets: Protected Communications, Missile Warning, Military Strategic Communications (MILSATCOM), Position Navigation and Timing (PNT), Ballistic Missile Command and Control, Space Domain Awareness (SDA), Nuclear Command Control and Communications (NC3), and Command and Control Satellite Operations (C2 Sat Ops).</p> <p>Increase systems engineering and accreditation support to develop cyber technology risk reduction, test and accreditation plans and perform modeling and analysis for common platform, infrastructure and data layers that ground and communication systems can build upon. Perform Security Test and Evaluation (ST&amp;E) and issue fact-based risk assessments for developed DCO-S capabilities to promote the fielding of interoperable systems with optimum security features, countermeasures and safeguards in place. Explore using existing state-of-the-art commercial defensive applications to inform and drive improvements to military cyber defense capabilities that will protect infused sensor and artificially intelligent systems, as part of the Joint All Domain Command Control initiative.</p> <p>Employ modern testing methodologies based on industry best practices; embed the 47th Test Squadron into the Continuous Integration / Continuous Deployment framework and provide persistent cybersecurity test support and cybersecurity assessments of applications and environments. FFRDC and other management services provide mission assurance oversight to ensure capabilities meet operational need.</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2022 to FY 2023 Increase/Decrease Statement: FY 2023 increased due to Strategic Cybersecurity Program (SCP) guidance for significant expansion of DCO-S, technology insertion, development, analysis, test and deployment to include four additional mission areas.</p>				
<b>Accomplishments/Planned Programs Subtotals</b>		0.000	2.150	28.162
<b>D. Other Program Funding Summary (\$ in Millions)</b>				
N/A				

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**Appropriation/Budget Activity**  
3620F: *Research, Development, Test & Evaluation, Space Force I BA 7: Operational Systems Development*

**R-1 Program Element (Number/Name)**  
PE 1203040SF / *DCO-Space*

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

**Remarks**  
Program funding increased from 2.150M appropriated in FY 2022 to 28.162M in FY 2023 and similar in FY 2024 per SCP guidance to fund four additional space mission systems and associated development.

**E. Acquisition Strategy**

Currently, DCO-S is being acquired as an enterprise architecture prototype. The latest DCO-S acquisition strategy, committed to using a modular contracting strategy for fast, agile and adaptable approaches in order to successfully develop defensive cyber applications and deploy them to the space enterprise and next generation systems. These efforts implement a combined Development/Security/Operations (DEVSECOPS) framework which incorporates methodologies, technologies, and tools to deeply embed security best practices into the modern development workflow and tool-chain. We plan to leverage new prototyping techniques, previous Government investments in Federally Funded Research and Development Center (FFRDC) and efforts from Government labs as part of those development activities. This meets the highly dynamic cyber domain, with rapidly adapting adversaries and shifting priorities, in which the PMO operates. DCO-S is determined to equip the space enterprise with cyber services that increase mission system cyber resiliency, agility, and defense in support of the mission and warfighters. Defensive Cyber Operations is an immediate need to negate the realized threat on space systems today.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203040SF / DCO-Space	<b>Project (Number/Name)</b> 673070 / Defensive Cyber Ops - Space
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<b>Product Development (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
DCO-S Suite Development	TBD	TBD : TBD	-	-		-		8.997	Nov 2022	-		8.997	Continuing	Continuing	-
Product Line Integration	TBD	TBD : TBD	-	-		2.150	May 2022	8.379	Nov 2022	-		8.379	Continuing	Continuing	-
Systems Engineering/ Accreditation	TBD	TBD : TBD	-	-		-		3.375	Nov 2022	-		3.375	Continuing	Continuing	-
Technical Mission Analysis	RO	Various : TBD	-	-		-		1.751	Jan 2023	-		1.751	Continuing	Continuing	-
SE&I	TBD	TBD : TBD	-	-		-		1.824	Nov 2022	-		1.824	Continuing	Continuing	-
<b>Subtotal</b>			-	-		2.150		24.326		-		24.326	Continuing	Continuing	N/A

<b>Test and Evaluation (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
Developmental Test	TBD	TBD : TBD	-	-		0.000		0.478	Dec 2022	-		0.478	Continuing	Continuing	-
<b>Subtotal</b>			-	-		0.000		0.478		-		0.478	Continuing	Continuing	N/A

<b>Management Services (\$ in Millions)</b>				FY 2021		FY 2022		FY 2023 Base		FY 2023 OCO		FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost			
FFRDC	RO	Various : TBD	-	-		-		2.000	Nov 2022	-		2.000	Continuing	Continuing	-
A&AS	C/Various	Various : TBD	-	-		-		1.077	Nov 2022	-		1.077	Continuing	Continuing	-
Other	Various	Various : TBD	-	-		-		0.281	Oct 2022	-		0.281	Continuing	Continuing	-
<b>Subtotal</b>			-	-		-		3.358		-		3.358	Continuing	Continuing	N/A

			Prior Years	FY 2021	FY 2022	FY 2023 Base	FY 2023 OCO	FY 2023 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	-	2.150	28.162	-	28.162	Continuing	Continuing	N/A

**Remarks**

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**Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force** **Date:** April 2022

<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203040SF / DCO-Space	<b>Project (Number/Name)</b> 673070 / Defensive Cyber Ops - Space
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FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
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

<b>DCO-S</b>	
DCO-S Product Line Development and Integration	
DCO-S Deployment to additional sites SBIRS and RGS	
DCO-Deployments to additional sites AEHF and GPS sites	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>DCO-S</b>				
DCO-S Product Line Development and Integration	1	2022	4	2027
DCO-S Deployment to additional sites SBIRS and RGS	1	2023	4	2024
DCO-Deployments to additional sites AEHF and GPS sites	1	2023	4	2024