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**Exhibit R-2, RDT&E Budget Item Justification:** PB 2024 Air Force **Date:** March 2023

<b>Appropriation/Budget Activity</b> 3620F: <i>Research, Development, Test &amp; Evaluation, Space Force I BA 5: System Development &amp; Demonstration (SDD)</i>	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
Total Program Element	-	123.074	96.940	372.827	0.000	372.827	470.054	456.360	465.691	482.513	Continuing	Continuing
656565: <i>Ground Based SDA</i>	-	0.000	0.000	214.739	0.000	214.739	254.116	287.802	293.689	304.298	0.000	1,354.644
65A006: <i>Space Based SDA</i>	-	123.074	96.940	115.636	0.000	115.636	165.084	156.205	159.395	165.154	0.000	981.488
65A037: <i>Ground Based Optical Sensor</i>	-	0.000	0.000	42.452	0.000	42.452	50.854	12.353	12.607	13.061	Continuing	Continuing

**Note**

In FY 2024, Project 656565, Deep Space Advanced Radar Concept efforts were transferred from PE 1206425SF, Space Situation Awareness Systems, Project 640290, Deep Space Advanced Radar Concept in order to properly align the budget activity to current efforts.

In FY 2024, Project 65A037, Ground Based Optical Sensor System efforts were transferred from PE 1203940SF, Space Situation Awareness Operations, Project 65A037, Ground Based Optical Sensor System in order to properly align the budget activity to current efforts.

**A. Mission Description and Budget Item Justification**

Space Domain Awareness (SDA) is one of five core competencies of the Space Force and is the effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain that could affect space operations and thereby impact the security, safety, economy, or environment of our nation. As the foundation for space control, SDA encompasses surveillance of all space objects and activities; detailed surveillance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering indications and warning on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities.

This program element develops new network sensors and improved information integration capabilities across the space surveillance network (SSN) while companion program element 1203940SF fields, upgrades, operationalizes, operates, and maintains Space Force sensors and information integration capabilities within the SSN. Activities funded in this program element (1206425SF) also support efforts such as engineering studies and analyses, architectural engineering studies, trade studies, technology needs forecasting, modernization initiatives, systems engineering, system development, and test & evaluation, and may include prototyping and technology demonstration.

Deep Space Advanced Radar Capability (DARC) is a ground-based, SDA radar system to detect, track, and maintain custody of deep space objects 24/7, through the solar exclusion gap. DARC will augment the SSN as an additional sensor with increased capacity and capability for deep space object custody, providing full global coverage.

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<p>The total cost of the DARC Site 1 Middle Tier of Acquisition effort is 844.62M, including RDT&amp;E and procurement of prototype units. DARC Site 1 is not fully funded across the Future Years Defense Program. The Department of the Air Force is assessing all options to address the funding shortfalls for MTA programs including additional funding in a future budget request, performance trades based on technical maturity, or transition to alternative pathways.</p> <p>The Space-Based Space Surveillance (SBSS) Block 10 satellite was launched September 2010 with a design life through 2017 and an extended operational capability now expected through 2030. The SBSS Follow-On (SBSS FO) program will develop and deliver a system to continue providing space object surveillance from space beyond SBSS Block 10 End-of-Life. The United States Space Force (USSF) and National Reconnaissance Office (NRO) have signed a Memorandum of Agreement partnering SBSS FO with an NRO program based on overlapping requirements. The new partner program is called Space Based SDA. Space Based SDA will develop and deliver a system to continue providing space object surveillance from space. The United States Space Force (USSF) and National Reconnaissance Office (NRO) have partnered on the Space Based SDA program to meet overlapping requirements. Space Based SDA enables timely detection and custody of on orbit threats in order to protect US High Value Assets in space in support of the National Defense Strategy.</p> <p>Space Based SDA requirements are based on a Statement of Capabilities and upon the current Space Domain Awareness (SDA) Initial Capabilities Document architectural requirements focused on protecting High Value Assets. Space Based SDA will provide the capability to search, detect, and track objects from a space-based sensor for timely custody and event detection. Surveillance from space augments and overcomes existing ground sensor limitations with timely 24-hour above-the-weather collection of satellite metric data only possible with a space-based sensor. This data is communicated to operators at the Combined Space Operations Center (CSpOC), National Space Defense Center (NSDC), and other classified users. This program element includes efforts related to Space Based SDA, its integration into the broader space superiority architecture, and analysis and experimentation to ensure space-based space surveillance capabilities against the evolving threat.</p> <p>Ground Based Optical Sensor System (GBOSS) includes an upgrade to the Ground-based Electro-Optical Deep Space Surveillance (GEODSS) system that enables GEODSS to monitor small, closely-spaced, and advanced threats in low, mid, high, and geostationary orbits. The upgraded system will discover currently undetectable space threats, reduce an adversary's tactical surprise and deliver the data required to support accurate, timely, actionable SDA. This facilitates decision-making within the compressed timelines dictated by the realities of the congested, contested, competitive space domain. The program delivers a combination of performance upgrades to existing GEODSS sites, including advanced data exploitation and rapid data dissemination, and will incorporate coalition data, commercial data and/or new GEODSS sites to provide a global capability to positively ID an adversary committing an orbital attack. The program includes updates to the GEODSS image processing and optical subsystems that will enhance the sensitivity and search rate, and fields new multi-spectral advanced technology sensors supporting extended operations, high-fidelity characterization, enhanced indications and warnings (I&amp;W), and attribution.</p> <p>This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space and Ground Based SDA and Ground Based Optical system capability. The use of such program funds would be in addition to the civilian pay expenses budgeted in program elements 1206392SF and 1206398SF. For Space Based SDA in PY 0.220M was expended for civilian pay expenses in this program element, and in CY 0.225M is forecasted for civilian pay expenses in this program element.</p> <p>This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.</p>		

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<b>B. Program Change Summary (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>
Previous President's Budget	127.026	105.140	115.879	0.000	115.879
Current President's Budget	123.074	96.940	372.827	0.000	372.827
Total Adjustments	-3.952	-8.200	256.948	0.000	256.948
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	-7.900			
• 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	-3.952	0.000			
• Other Adjustments	0.000	-0.300	256.948	0.000	256.948

**Change Summary Explanation**

FY 2023: -0.300M FFRDC reduction for Project 65A006, Space Based SDA.

FY 2024: +215.192M transferred from PE 1206425SF, Space Situation Awareness Systems, Project 640290, Deep Space Advanced Radar Concept, BA 04 efforts, in order to align the budget activity to current efforts, continue Site 1 design and development activities, purchases, construction and integration, and begin efforts for Sites 2 and 3.

FY 2024: +20.578M increase for Project 65A037, Ground Based Optical Sensor to fund program cybersecurity and Engineering and Manufacturing Design requirements.

FY 2024: +21.828M transferred from PE 1203940SF, Space Situation Awareness Operations, Project 65A037, Ground Based Optical Sensor, BA 05 efforts, in order to properly align the budget activity to current efforts, install the GEODSS Enhanced Tower upgrade at White Sands Missile Range (WSMR) and Maui and incorporate coalition and commercial data to mitigate optical sensor coverage gaps.

FY 2024: -2.319M to realign funding to APPN 3410, PE 1207804SF (SAG 13C), for fiscal policy compliance as Space Systems Command (SSC) establishes Headquarters functions and a Chief Information Office (CIO) for integrated cybersecurity.

FY 2024: +1.669M inflation increase for non-pay and non-fuel purchases.

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**Exhibit R-2A, RDT&E Project Justification:** PB 2024 Air Force **Date:** March 2023

<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 656565 / <i>Ground Based SDA</i>
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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
656565: <i>Ground Based SDA</i>	-	0.000	0.000	214.739	0.000	214.739	254.116	287.802	293.689	304.298	0.000	1,354.644
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY 2024, Project 656565, Deep Space Advanced Radar Concept efforts were transferred from PE 1206425SF, Space Situation Awareness Systems, Project 640290, Deep Space Advanced Radar Concept in order to properly align the budget activity to current efforts.

**A. Mission Description and Budget Item Justification**

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This program element develops new network sensors and improved information integration capabilities across the space surveillance network (SSN) while companion program element 1203940SF fields, upgrades, operationalizes, operates, and maintains Space Force sensors and information integration capabilities within the SSN. Activities funded in this program element (1206425SF) also support efforts such as engineering studies and analyses, architectural engineering studies, trade studies, technology needs forecasting, modernization initiatives, systems engineering, system development, and test & evaluation, and may include prototyping and technology demonstration.

Deep Space Advanced Radar Capability (DARC) is a ground-based, SDA radar system to detect, track, and maintain custody of deep space objects 24/7, through the solar exclusion gap. DARC will augment the SSN as an additional sensor with increased capacity and capability for deep space object custody, providing full global coverage.

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 repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver DARC 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.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force	<b>Date:</b> March 2023
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<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 656565 / <i>Ground Based SDA</i>
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The total cost of the DARC Rapid Prototype Middle Tier of Acquisition (MTA) effort is 844.6M. DARC Site 1 is not fully funded across the Future Years Defense Program. The Department of the Air Force is assessing all options to address the funding shortfalls for MTA programs including additional funding in a future budget request, performance trades based on technical maturity, or transition to alternative pathways.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2022	FY 2023	FY 2024
<p><b>Title:</b> DARC Site 1 Operational Capability</p> <p><b>Description:</b> The DARC MTA activity will develop, test, and deliver one DARC site with a current estimated completion date of CY 2025. It will also provide a foundation for up to two more future sites located strategically around the world to provide global deep space radar capability to support SDA. The system will be responsive to regularly scheduled and un-scheduled tasks to locate, identify, characterize deep space objects and report the results to Battle Management Command and Control locations and SSN.</p> <p><b>FY 2023 Plans:</b> N/A</p> <p><b>FY 2024 Plans:</b> Continue Site 1 design and development activities including design reviews, hardware purchases, software development and integration, and construction. Continue construction of Site 1 including roads, buildings, utilities, foundation, and installation of all antenna structures. Perform additional site development efforts such as the construction of facility-support and site infrastructure to include backup generator buildings, fuel storage (tank farms), electrical substations for power site distribution, wastewater treatment/septic &amp; leach, non-potable water storage/fire protection distribution (site &amp; buildings), water treatment (potable) and physical security equipment to meet protection level 3 (PL3) requirements. Finalize plans for and begin implementing physical security for Site 1, to include any required equipment such as site perimeter fencing, and standalone fencing for both antenna arrays and site main power station to meet site safety requirements. Begin preparation for and install of fiber optics (COMM) as well as connection to existing and/or new infrastructure such as power grid, backup generators, and main water line.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> FY 2024 increased due to transfer of DARC effort to Budget Activity 05.</p>	-	0.000	174.239
<p><b>Title:</b> DARC Sites 2 and 3 Operational Capability</p> <p><b>Description:</b> The program will develop, test, and deliver DARC sites 2 and 3 with a current estimated completion date of CY 2027. The system will be responsive to regularly scheduled and un-scheduled tasks to locate, identify, characterize deep space objects and report the results to Battle Management Command and Control locations and SSN.</p> <p><b>FY 2023 Plans:</b> N/A</p> <p><b>FY 2024 Plans:</b></p>	-	0.000	40.500

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p>Begin Site 2 design and development activities including design reviews (Preliminary Design Review/Critical Design Review), hardware purchases, software development and integration, and construction. Initiate various pre-construction activities in preparation for full site construction. Finalize plans for and begin implementing physical security for Site 2, to include any required equipment such as site perimeter fencing, and standalone fencing for both antenna arrays and site main power station to meet site safety requirements. Begin preparation for and install of fiber optics (COMM) as well as connection to existing and/or new infrastructure such as power grid, backup generators, and main water line. Complete purchases for all long-lead facility equipment for Site 2 as rapidly as possible in order to minimize schedule, these will have been initiated in parallel with completing required Environmental Analysis.</p> <p>Begin Site 3, Environmental Impact Assessment (EIA), Federal Aviation Agency (FAA) airspace negotiations and the security posture evaluation.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b> FY 2024 increased due to start of Sites 2 and 3 activities.</p>				
<b>Accomplishments/Planned Programs Subtotals</b>		-	0.000	214.739
<b>C. Other Program Funding Summary (\$ in Millions)</b>				
N/A				
<b>Remarks</b>				
<b>D. Acquisition Strategy</b>				
<p>Project utilizes existing DoD engineering and study contracts and activities to conduct science and technology development and data analysis activities. Preliminary/critical design effort for the technology maturation and prototype commenced in FY 2017. A Broad Agency Announcement (BAA) was used to award seven Integrated System Engineering Team (ISET) contracts which allow for organizations to participate, advise the government, and gain insight into the prototype design and build. In May of 2019, DARC was designated as an MTA under Section 804 of the 2016 National Defense Authorization Act (NDAA). In 2020, DARC was directed to pursue a Rapid Prototyping Middle Tier Acquisition program for Site 1. The DARC Site effort will be executed through two separate contract elements: The Prime System Integrator (PSI) was awarded to Northrop Grumman Inc. via a single, competitive award through the Space Enterprise Consortium (SpEC) Other Transaction Authority (OTA) agreement and third-party software development through multiple SpEC OTA agreements. The Space Force intends to develop and field two additional DARC sites to culminate in a final operational system of three global sites to ensure SDA coverage. A follow-on MTA pathway strategy based on the success of the Site 1 rapid prototype and an MTA transition plan are being developed for Sites 2 and 3 in accordance with DoDI 5000.80.</p>				

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force												Date: March 2023				
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)								
3620F / 5				PE 1206425SF / Space Situation Awareness Systems				656565 / Ground Based SDA								
<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
DARC System Development Site 1	C/CPIF	Northrop Grumman : Colorado Springs, CO	-	-		-		147.642	Nov 2023	-		147.642	Continuing	Continuing	-	
DARC System Development Site 2/3	C/TBD	TBD : TBD	-	-		-		40.500	Feb 2024	-		40.500	Continuing	Continuing	-	
DARC Technical Mission Analysis	Various	Various : Various	-	-		-		6.381	Jan 2024	-		6.381	Continuing	Continuing	-	
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		7.482	Oct 2023	-		7.482	Continuing	Continuing	-	
<b>Subtotal</b>			-	-		-		202.005		-		202.005	Continuing	Continuing	N/A	
<b>Test and Evaluation (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
DARC Test Support	Various	Various : Various	-	-		-		1.932	Feb 2024	-		1.932	Continuing	Continuing	-	
<b>Subtotal</b>			-	-		-		1.932		-		1.932	Continuing	Continuing	N/A	
<b>Management Services (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 Total				
Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Award Date	Cost	Cost To Complete	Total Cost	Target Value of Contract	
A&AS	Various	Various : Various	-	-		-		8.347	Nov 2023	-		8.347	Continuing	Continuing	-	
FFRDC	RO	MITRE Corp : Colorado Springs, CO	-	-		-		2.355	Nov 2023	-		2.355	Continuing	Continuing	-	
Other Support	Various	Various : Colorado Springs, CO	-	-		-		0.100	Oct 2023	-		0.100	Continuing	Continuing	-	
<b>Subtotal</b>			-	-		-		10.802		-		10.802	Continuing	Continuing	N/A	

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2024 Air Force</b>							<b>Date: March 2023</b>				
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	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>		
<b>Project Cost Totals</b>	-	-	-	214.739	-	214.739	Continuing	Continuing	N/A		

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2024 Air Force		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 656565 / <i>Ground Based SDA</i>

	FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
	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><i>Prototype Risk Reduction Build and Test</i></b>																												
Site 1 Software Development																												
Site 1 MTA Development																												
Site 1 Construction																												
Site 1 MTA Completion (Operational Leave Behind Capability)																												
Sites 2 and 3 Contract Award																												
Site 2 Development & Construction																												
Site 2 Completion (Operational Capability)																												
Site 3 Environmental Assessment																												
Site 3 Development & construction																												
Site 3 Completion (Operational Capability)																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Air Force		<b>Date:</b> March 2023
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Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Prototype Risk Reduction Build and Test</i></b>				
Site 1 Software Development	1	2024	2	2024
Site 1 MTA Development	1	2024	1	2025
Site 1 Construction	1	2024	1	2025
Site 1 MTA Completion (Operational Leave Behind Capability)	4	2025	4	2025
Sites 2 and 3 Contract Award	1	2024	1	2024
Site 2 Development & Construction	2	2024	3	2027
Site 2 Completion (Operational Capability)	3	2027	3	2027
Site 3 Environmental Assessment	1	2024	4	2024
Site 3 Development & construction	2	2024	1	2028
Site 3 Completion (Operational Capability)	1	2028	1	2028

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COST (\$ in Millions)	Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	FY 2025	FY 2026	FY 2027	FY 2028	Cost To Complete	Total Cost
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Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**A. Mission Description and Budget Item Justification**

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Space Based SDA will develop and deliver a system to continue providing space object surveillance from space. The United States Space Force (USSF) and National Reconnaissance Office (NRO) have partnered on the Space Based SDA program to meet overlapping requirements. Space Based SDA enables timely detection and custody of on orbit threats in order to protect US High Value Assets in space in support of the National Defense Strategy.

Space Based SDA requirements are based on a Statement of Capabilities and upon the current Initial Capabilities Document architectural requirements focused on protecting High Value Assets. Space Based SDA will provide the capability to search, detect, and track objects from a space-based sensor for timely custody and event detection. Surveillance from space augments and overcomes existing ground sensor limitations with timely 24-hour above-the-weather collection of satellite metric data only possible with a space-based sensor. This data is communicated to operators at the Combined Space Operations Center (CSPOC), National Space Defense Center (NSDC), and other classified users. This project includes efforts related to Space Based SDA, its integration into the broader space superiority architecture, and analysis and experimentation to ensure space-based space surveillance capabilities against the evolving threat.

This project also evaluates affordable Space-Based SDA replenishment options to provide system resiliency and situational awareness necessary to operate in the contested space domain studies through technical analysis, risk reduction experiments, affordable prototyping, and partnership with Air Force Research Laboratory (AFRL). In addition, this program leverages opportunities for space-based commercial, international partnerships, and hosted payloads to support the SDA mission.

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,

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force		<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 65A006 / <i>Space Based SDA</i>		
<p>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 repurpose existing capabilities.</p> <p>This program element may include necessary civilian pay expenses required to manage, execute, and deliver Space Based SDA 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. For Space Based SDA in PY 0.220M was expended for civilian pay expenses in this program element, and in CY 0.225M is forecasted for civilian pay expenses in this program element.</p>				
<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p><b>Title:</b> Space-Based Space Domain Awareness (SDA)</p> <p><b>Description:</b> SDA includes effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain.</p> <p>Performs space-based SDA analysis, research, and development for the SILENTBARKER system in partnership with the NRO.</p> <p><b>FY 2023 Plans:</b> Conduct Pre-Ship Review (PSR) in preparation for launch of the first increment. SILENTBARKER launch of the first increment in addition to on-orbit support to prepare for Initial Operational Capability (IOC). Continue development of SILENTBARKER expansion assets to increase coverage for deep-space SDA. Conduct Critical Design Review (CDR) for expansion effort. Continue implementation and operationalize ground mission data processing and data dissemination efforts in support of Space-Based SDA ground requirements. Continue technology enhancements to ensure space-based space surveillance capabilities against the evolving threat for future upgrades, extensions, and augmentations through analysis, prototyping, and experimentation.</p> <p>Additionally, FY 2023 funding will continue planning for Space-Based SDA hosted payloads and affordable replenishment activities and allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. In addition will leverage future low-cost replenishment opportunities for SDA space-based commercial, international partnerships, and AFRL partnerships to include cislunar. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and affordable prototyping, integration and test of command and control (C2), resiliency measures and mission partner interfaces, space test/ combat range events, and office support, etc.</p> <p><b>FY 2024 Plans:</b> Provide on-orbit support for SILENTBARKER Baseline in order to meet Initial Operational Capability (IOC). Continue development of SILENTBARKER Expansion increment to meet Full Operational Capability (FOC) for deep-space SDA. Continue implementation of mission data processing and data dissemination efforts supporting SILENTBARKER and other SDA prototyping efforts.</p>		123.074	96.940	115.636

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 65A006 / <i>Space Based SDA</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
<p>Continue technology enhancements and prototyping efforts for space-based space domain surveillance against evolving threats, to include: future upgrades, extension and augmentations through analysis, demonstration, and experimentation. Prepare and conduct SDA hosted payload integration on a commercial host for launch in FY 2025. Additionally, FY 2024 funding will continue prototype efforts for SDA Hosted Payload (HP) efforts for a second prototype payload and expanded payload characterization tests. FY 2024 funding supports the launch and experiment operations for the AFRL and SSC partnership prototype programs such as the Oracle-M Defense Deep Space Sentinel (D2S2) satellites, enabling critical low-cost space based experimentation, expanding USSF SDA operations in Cislunar to counteract evolving threat activity. FY 2024 will continue activities for implementation of system resiliency and situational awareness necessary to operate in the contested space domain environment. In addition, FY 2024 will leverage opportunities for SDA space-based commercial, international partnerships, and AFRL partnerships. Activities may include, but are not limited to: studies, technical analysis, risk reduction, pre-acquisition activities, affordable prototyping, integration and test of command and control (C2), resiliency measures, mission partner interfaces, space test/combat range events and office support, etc.</p> <p><b><i>FY 2023 to FY 2024 Increase/Decrease Statement:</i></b> FY 2024 funding increased because the annually allocated amounts fluctuate per the 50/50 cost sharing USSF-NRO Interagency Agreement.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	123.074	96.940	115.636

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

N/A

**Remarks**

**D. Acquisition Strategy**

The Acquisition Strategy was approved to minimize the space-based SDA gap post-SBSS Block 10. SILENTBARKER anticipates Initial Launch Capability in FY 2023. The SBSS FO Materiel Development Decision was approved by the Milestone Decision Authority (MDA) on April 5, 2016. The Acquisition Strategy Panel was completed with the MDA on August 29, 2016. To satisfy the SDA architecture needs, the SBSS FO program requirements combined with an NRO program and were updated in the December 2017 SILENTBARKER Statement of Capabilities. The Space Force is partnered with the NRO on SILENTBARKER space segment and telemetry, tracking, and commanding (TT&C) program segments in order to further National Security Space objectives. Mutual investment for the non-recurring engineering (NRE) cost enables the potential for a larger initial constellation buy and lower unit costs. SILENTBARKER expansion contract was awarded Jun 2021 to extend capabilities past IOC.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 65A006 / <i>Space Based SDA</i>
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<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
Space Based SDA Development	MIPR	Various : Various	-	100.761	Dec 2021	80.982	Dec 2022	94.073	Dec 2023	-		94.073	Continuing	Continuing	-
Space Based SDA Technical Mission Analysis	Various	Various : Various	-	0.900	Nov 2021	0.831	Nov 2022	1.500	Nov 2023	-		1.500	Continuing	Continuing	-
Space Based SDA Enterprise SE&I	Various	Various : Various	-	1.600	Nov 2021	0.900	Nov 2022	1.450	Nov 2023	-		1.450	Continuing	Continuing	-
Space Based SDA SBIR/ STTR	Allot	TBD : TBD	-	-		-		4.029	Oct 2023	-		4.029	Continuing	Continuing	-
<b>Subtotal</b>			-	103.261		82.713		101.052		-		101.052	Continuing	Continuing	N/A

<b>Support (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
Space Based SDA Civilian Reimbursable Budget Authority	RO	SSC : El Segundo, CA	-	0.220	Dec 2021	0.225	Dec 2022	0.225	Dec 2023	-		0.225	Continuing	Continuing	-
<b>Subtotal</b>			-	0.220		0.225		0.225		-		0.225	Continuing	Continuing	N/A

<b>Management Services (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
Space Based SDA FFRDC	RO	Aerospace Corp : Los Angeles, CA	-	0.900	Nov 2021	0.831	Nov 2022	0.900	Nov 2023	-		0.900	Continuing	Continuing	-
Space Based SDA A&AS	Various	Various : Various	-	18.373	Jan 2022	12.831	Jan 2023	13.119	Jan 2024	-		13.119	Continuing	Continuing	-
Space Based SDA Other Support	Various	Various : Various	-	0.320	Mar 2022	0.340	Mar 2023	0.340	Mar 2024	-		0.340	Continuing	Continuing	-
<b>Subtotal</b>			-	19.593		14.002		14.359		-		14.359	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2024 Air Force</b>								<b>Date: March 2023</b>			
<b>Appropriation/Budget Activity</b> 3620F / 5				<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>				<b>Project (Number/Name)</b> 65A006 / <i>Space Based SDA</i>			
	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>		
<b>Project Cost Totals</b>	-	123.074	96.940	115.636	-	115.636	Continuing	Continuing	N/A		

**Remarks**  
 The Space Based SDA SILENTBARKER project has very minimal organic Space Force resources. The FY 2024 Management Services includes support to parallel efforts for both the SILENTBARKER Baseline and Expansion, including Space Force contributions for prepare for SILENTBARKER launch, check out, and on-orbit support as well as design reviews for SILENTBARKER Expansion. Additionally, non-recurring engineering investments require increased assistance and advisory services to enable integration of data products between intelligence community and Space Force infrastructure until integration is mature and stable.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2024 Air Force		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 65A006 / <i>Space Based SDA</i>

FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027				FY 2028			
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>SILENTBARKER Baseline</b>	
Technology Development, Engineering and Manufacturing Development, Production	
Test Readiness Review (TRR)	
Pre-Ship Review	
Available for Launch	
On-orbit Support	
<b>SILENTBARKER Expansion</b>	
Technology Development, Engineering and Manufacturing Development, Production	
System Requirements Review (SRR)	
Critical Design Review (CDR)	
Available for Launch	
On-orbit Support	
<b>HP Launch</b>	
Contract Award	
Phase 3 Demo #1	
Phase 3 Demo #2	
HP Launch	
<b>Prototyping Super-Synchronous Small Satellite Space Surveillance System S6/ Defense Deep Space Sentinel - Oracle M (D2S2)</b>	
AFRL Tech Demo Prototyping Add Oracle M (D2S2)	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Air Force		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 65A006 / <i>Space Based SDA</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>SILENTBARKER Baseline</b>				
Technology Development, Engineering and Manufacturing Development, Production	1	2022	2	2023
Test Readiness Review (TRR)	4	2022	4	2022
Pre-Ship Review	1	2023	2	2023
Available for Launch	3	2023	3	2023
On-orbit Support	3	2023	4	2027
<b>SILENTBARKER Expansion</b>				
Technology Development, Engineering and Manufacturing Development, Production	1	2022	2	2026
System Requirements Review (SRR)	1	2022	1	2022
Critical Design Review (CDR)	1	2023	1	2023
Available for Launch	3	2026	3	2026
On-orbit Support	3	2026	4	2028
<b>HP Launch</b>				
Contract Award	1	2022	1	2022
Phase 3 Demo #1	2	2023	2	2026
Phase 3 Demo #2	3	2023	3	2026
HP Launch	1	2025	1	2025
<b>Prototyping Super-Synchronous Small Satellite Space Surveillance System S6/ Defense Deep Space Sentinel - Oracle M (D2S2)</b>				
AFRL Tech Demo Prototyping Add Oracle M (D2S2)	2	2024	2	2024

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force										<b>Date:</b> March 2023		
<b>Appropriation/Budget Activity</b> 3620F / 5					<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>				<b>Project (Number/Name)</b> 65A037 / <i>Ground Based Optical Sensors Systems</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024 Base</b>	<b>FY 2024 OCO</b>	<b>FY 2024 Total</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>FY 2028</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
65A037: <i>Ground Based Optical Sensor</i>	-	0.000	0.000	42.452	0.000	42.452	50.854	12.353	12.607	13.061	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY 2024, Project 65A037, Ground Based Optical Sensor System efforts were transferred from PE 1203940SF, Space Situation Awareness Operations, Project 65A037, Ground Based Optical Sensor System in order to properly align the budget activity to current efforts.

**A. Mission Description and Budget Item Justification**

Space Domain Awareness (SDA) is one of five core competencies of the Space Force and is the effective identification, characterization, and understanding of any factor, passive or active, associated with the space domain that could affect space operations and thereby impact the security, safety, economy, or environment of our nation. As the foundation for space control, SDA encompasses surveillance of all space objects and activities; detailed surveillance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering indications and warning on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities.

This program element develops new network sensors and improved information integration capabilities across the space surveillance network (SSN) while companion program element 1203940SF fields, upgrades, operationalizes, operates, and maintains Space Force sensors and information integration capabilities within the SSN. Activities funded in this program element (1206425SF) also support efforts such as engineering studies and analyses, architectural engineering studies, trade studies, technology needs forecasting, modernization initiatives, systems engineering, system development, and test & evaluation, and may include prototyping and technology demonstration.

Ground Based Optical Sensor System (GBOSS) includes an upgrade to the Ground-based Electro-Optical Deep Space Surveillance (GEODSS) system which monitors small, closely-spaced, and advanced threats in low, mid, high, and geostationary orbits. The upgraded system will discover currently undetectable space threats, reduce an adversary's tactical surprise and deliver the data required to support accurate, timely, actionable SDA. This facilitates decision-making within the compressed timelines dictated by the realities of the congested, contested, competitive space domain. The program delivers a combination of performance upgrades to existing GEODSS sites, including advanced data exploitation and rapid data dissemination, and will incorporate coalition data, commercial data and/or new GEODSS sites to provide a global capability to positively ID an adversary committing an orbital attack. The program includes updates to the GEODSS image processing and optical subsystems that will enhance the sensitivity and search rate, and fields new multi-spectral advanced technology sensors supporting extended operations, high-fidelity characterization, enhanced indications and warnings (I&W), and attribution.

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

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force	<b>Date:</b> March 2023
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<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 65A037 / <i>Ground Based Optical Sensors Systems</i>
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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.

**B. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2022	FY 2023	FY 2024
<p><b>Title:</b> Ground Based Optical Sensor System (GBOSS)</p> <p><b>Description:</b> GBOSS provides a global, ground-based, optical sensor capability for Space Domain Awareness (SDA). The program implements advanced capabilities that may leverage coalition data, commercial data, and sophisticated exploitation algorithms to enhance system response and resiliency to operate in the contested space domain based on aggressive threats by our pacing-competitors, China and Russia. Ground Based Optical Sensor improves sensitivity, search rate, tracking of non-cooperative launches, precise tagging of clustered objects, detection of closely spaced dim objects, attribution of orbital attackers and delivers foundational technology to support data exploitation for advanced indications and warnings. This effort includes upgrading existing sensors, dissemination of all data to DoD and IC stakeholders via the Unified Data Library (UDL), and may field Ground Based Optical Sensor-enhanced GEODSS capabilities to new locations in accordance with USSF Leadership direction. The program will also acquire new advanced technology sensors to improve persistence and advanced multi-spectral data collection, enabling high-fidelity characterization and rapid attribution. The program will collaborate with Combined Space Operations Center (CSpOC), National Space Defense Center (NSDC), and National Air and Space Intelligence Center (NASIC) efforts to ensure enterprise data fusion and dissemination supporting Enterprise Space Battle Management Command, and Control (ESBMC2).</p> <p><b>FY 2023 Plans:</b> N/A</p> <p><b>FY 2024 Plans:</b> Complete the installation, contractor verification testing, and developmental testing of the GEODSS Enhanced Tower (GET) upgrade at the WSMR GEODSS site. Prepare for deployment of GET materials needed to upgrade the Maui GEODSS site. Incorporate coalition and commercial data to mitigate the Atlantic Optical Gap. Incorporate commercial data to help mitigate optical sensor coverage gaps over the Atlantic and Indo-Pacific regions.</p> <p>FY 2024 funding will allow the program office to continue developing and fielding a resilient system necessary to operate in the contested space domain. Activities may include, but are not limited to: integration and test of command and control (C2) and mission partner interfaces, implementation of advanced data exploitation algorithms that may include pattern of life (PoL), advanced indications and warnings (I&amp;W), enhanced defensive cyber operations resiliency measures, space test/combat range events, studies, technical analysis, risk reduction experiments, prototyping and program office support, etc.</p> <p><b>FY 2023 to FY 2024 Increase/Decrease Statement:</b></p>	-	0.000	42.452

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2024 Air Force		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 65A037 / <i>Ground Based Optical Sensors</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2022</b>	<b>FY 2023</b>	<b>FY 2024</b>
FY 2024 increased due to transfer of GBOSS effort from PE 1203940SF, Space Situation Awareness Operations.			
<b>Accomplishments/Planned Programs Subtotals</b>	-	0.000	42.452

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

N/A

**Remarks**

**D. Acquisition Strategy**

This program began in FY 2018 to address ground-based optical SDA gaps and shortfalls. The acquisition strategy, approved in March 2018, accelerates the development and fielding of the solution, minimizing the time to address the requirements in light of current and emerging threats. Initial Technology Maturation & Risk Reduction (TMRR) activities were executed using existing defense, intelligence, and lab contracts. Engineering & Manufacturing Development (EMD) activities are being executed on the Maintenance of Space Situational Awareness Integrated Capabilities (MOSSAIC) contract awarded through full and open competition.

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**Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force** **Date:** March 2023

<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 65A037 / <i>Ground Based Optical Sensors</i>
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<b>Product Development (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
GBOSS Design, development and life extension	C/CPIF	L3 Harris : Colorado Springs, CO	-	-		-		32.768	Nov 2023	-		32.768	Continuing	Continuing	-
GBOSS Test and Training Materials Development	Various	Various : Various	-	-		-		1.000	Nov 2023	-		1.000	Continuing	Continuing	-
GBOSS Technical Mission Analysis	RO	Various : Various	-	-		-		2.630	Nov 2023	-		2.630	Continuing	Continuing	-
SBIR/STTR	Allot	Not specified. : TBD	-	-		-		1.479	Oct 2023	-		1.479	Continuing	Continuing	-
<b>Subtotal</b>			-	-		-		37.877		-		37.877	Continuing	Continuing	N/A

<b>Management Services (\$ in Millions)</b>				FY 2022		FY 2023		FY 2024 Base		FY 2024 OCO		FY 2024 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			
A&AS	Various	Various : Various	-	-		-		2.200	Nov 2023	-		2.200	Continuing	Continuing	-
FFRDC	RO	Various : Various	-	-		-		2.300	Nov 2023	-		2.300	Continuing	Continuing	-
Other Support	C/CPAF	Various : Various	-	-		-		0.075	Nov 2023	-		0.075	Continuing	Continuing	-
<b>Subtotal</b>			-	-		-		4.575		-		4.575	Continuing	Continuing	N/A

			Prior Years	FY 2022	FY 2023	FY 2024 Base	FY 2024 OCO	FY 2024 Total	Cost To Complete	Total Cost	Target Value of Contract
<b>Project Cost Totals</b>			-	-	-	42.452	-	42.452	Continuing	Continuing	N/A

**Remarks**



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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2024 Air Force		<b>Date:</b> March 2023
<b>Appropriation/Budget Activity</b> 3620F / 5	<b>R-1 Program Element (Number/Name)</b> PE 1206425SF / <i>Space Situation Awareness Systems</i>	<b>Project (Number/Name)</b> 65A037 / <i>Ground Based Optical Sensors Systems</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>GBOSS Development</i></b>				
GET Engineering and Manufacturing Development (EMD)	1	2024	2	2026
Installation and Test at White Sands Missile Range	1	2024	4	2024
Operational Acceptance at White Sands Missile Range	1	2025	1	2025
Installation and Test at Maui	1	2025	4	2025
Operational Acceptance at Maui	1	2026	1	2026
Commercial Data	1	2024	4	2028