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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 I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>
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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	-	68.070	64.763	80.903	0.000	80.903	79.710	54.549	55.781	56.866	Continuing	Continuing
673940: <i>Space Data Fusion</i>	-	0.000	64.763	58.252	0.000	58.252	55.882	31.161	31.708	32.839	Continuing	Continuing
673941: <i>Unified Data Library (UDL)</i>	-	0.000	0.000	19.507	0.000	19.507	19.889	20.267	20.851	20.743	Continuing	Continuing
67A017: <i>Sensor Service Life Extension Program</i>	-	68.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.070
67A018: <i>SF Weather Services Research</i>	-	0.000	0.000	3.144	0.000	3.144	3.939	3.121	3.222	3.284	Continuing	Continuing

**Note**  
 This program, BA 7, PE 1203940SF, project , Space Weather Analysis and Forecast System (SWAFS), is a new start.

In FY 2023, a portion of program 1203940SF, Space Situational Awareness Operations, Project 673940, Space Data Fusion, was transferred to program 1203940SF, Project 673941, Unified Data Library (UDL), for transparency.

In FY 2023, a portion of AF program 0305111F, Project 672738, Weather Service, was transferred to program 1203940SF, Project 67A018, SF Weather Services Research, in order to align ground-based space sensing projects to the USSF.

**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 fields, upgrades, operationalizes, operates, and maintains Space Force sensors and information/data integration capabilities within the SDA network while companion program element 1206425SF, Space Situational Awareness Systems, develops new network sensors and associated information integration capabilities across the network. Activities funded in this program (1203940SF) focus on surveillance of objects in earth orbit to aid tasks including satellite tracking; space object identification; tracking and cataloging; satellite attack warning; notification of satellite flyovers to U.S. forces; space treaty monitoring; and technical intelligence gathering. As a whole, this program upgrades, modifies, modernizes, operationalizes, fields, operates, and maintains sensors and information integration capabilities for an integrated, end-to-end SDA architecture that provides critical national security space solutions on tactical operational timelines.

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<b>Appropriation/Budget Activity</b> 3620F: <i>Research, Development, Test &amp; Evaluation, Space Force I BA 7: Operational Systems Development</i>	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	
<p>The Space Data Fusion project (673940) develops and/or upgrades SDA data/data exploitation capabilities, to include Space Surveillance Telescopes, TAPOUT, and provides Service Life Extension Programs (SLEPs) and pre-planned product improvement efforts to operational SDA capability. In FY 2023, this project includes Global Sensor Watch (GSW) efforts that support the SDA activities outlined above.</p> <p>The Unified Data Library project (673941) supports integration, exploitation, and delivery of data sources for command and control and battle management of space forces. UDL will continue to develop the library by on-boarding new data sets, expand data services, expand defensive cyber operations capabilities, add non-metric data to the SDA marketplace, continue to expand local area network capability to share Space Surveillance Network (SSN) data in a cyber-secure manner, purchase commercial data and services to support USSPACECOM operations, allow optimized data flow for use of existing SDA capability, and provide access to new commercial SDA innovations that will enable the broader SDA mission.</p> <p>The Sensor SLEP project (67A017) includes efforts to upgrade, operationalize, and extend the life of operational SDA sensors and to develop and expand SDA data/data exploitation capability. SLEPs extend the serviceable life of assets and maintain critical capability by replacing aging and increasingly unsustainable components with modern and sustainable equipment. Sensor SLEP efforts may include SDA sensor, SDA communications, and SDA data/data exploitation, prototyping and technology demonstrations.</p> <p>The SF Weather Services Research project (67A018) funds the operational development necessary to acquire, sustain, and modernize Air Force Weather Service (AFWS) capabilities in support of the 2018 National Defense Strategy. AFWS provides timely, accurate, resilient, and relevant environmental information to enable global battlespace situational awareness for Air Force (AF), Army, Special Operations Forces (SOF), Space Force (USSF), combatant commands, the Intelligence Community (IC), and other government agencies. AFWS provides climate impacts and assessments, as well as space and terrestrial weather sensing, forecasting, and weather analytic capabilities, at home station and deployed, in order to deliver critical environmental intelligence in support of decision makers to gain the asymmetric advantage during the full spectrum of air and space combat operations.</p> <p>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.</p> <p>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 elements 1206392SF and 1206398SF.</p> <p>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.</p>		

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<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	69.809	64.763	0.000	0.000	0.000
Current President's Budget	68.070	64.763	80.903	0.000	80.903
Total Adjustments	-1.739	0.000	80.903	0.000	80.903
• 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	-1.739	0.000			
• Other Adjustments	0.000	0.000	80.903	0.000	80.903

**Congressional Add Details (\$ in Millions, and Includes General Reductions)**

**Project:** 67A017: *Sensor Service Life Extension Program*  
 Congressional Add: *Commercial Space Domain Awareness*

	<b>FY 2021</b>	<b>FY 2022</b>
Congressional Add Subtotals for Project: 67A017	25.000	-
Congressional Add Totals for all Projects	25.000	-

**Change Summary Explanation**

FY 2021: -1.739 reduction for SBIR.  
 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.

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 3620F / 7					<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>				<b>Project (Number/Name)</b> 673940 / <i>Space Data Fusion</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
673940: <i>Space Data Fusion</i>	-	0.000	64.763	58.252	0.000	58.252	55.882	31.161	31.708	32.839	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

GSW provides an integrated, end-to-end, SDA tip & cue capability that implements a survivable architecture providing overlapping, assured, and viable surveillance options for executing event response, SDA data processing at multiple classification levels, and automated, worldwide, cross-sensor tipping & cueing. Efforts directly enable support for Space Command & Control (C2) by developing & deploying advanced software algorithms to identify, acquire, characterize, and maintain custody of both space objects of interest and new foreign launches; developing & deploying advanced data analytics, machine learning, & artificial intelligence capabilities for rapid indication & warning; enhancing space environmental monitoring solutions; integrating and optimizing access to coalition, commercial, academic, intelligence community (IC) & Missile Defense Agency sensors to better support the broader space enterprise; supporting USSPACECOM operations and training exercises; leading trials, testing and training campaigns to test & optimize capabilities in support of the broader space kill chain; enhancing sensor performance to close the solar exclusion gap by leveraging modern technology and commercial & IC sensors for greater space domain coverage; and improving legacy communication paths to enable a more complete space enterprise capability.

The Space Data Fusion effort develops the UDL to support integration, exploitation and delivery of SDA data sources for C2 and battle management of space forces. It focuses on enabling data sharing, establishing the data architecture required to aggregate multi-sensor data for broader use at different clearance levels, transforming any-source data into normalized, usable information via data exploitation tools, followed by data hand off to Battle Management Command and Control mission systems to support actual space operations. Space Data Fusion/UDL efforts include purchasing commercial SDA data and services in support of US Space Command (USSPACECOM) operations. This program is complementary and performed in parallel with program PE 1206425SF, Space Situational Awareness Systems, which develops new network sensors and improved information integration capabilities across the network.

The Space Surveillance Telescope (SST) provides rapid un-cued search, detection and tracking of dim objects in deep space, collecting data on all viewable objects in the Indo-Pacific region. As a combined program with Australia's Department of Defense, per the 2013 US Secretary of Defense (USSECDEF) and the Australian Defence Minister (AUSMINDEF) SST Partnership Memorandum of Understanding (MOU), SST improves detection and characterization of friendly and enemy military space activities; improves orbital safety of flight during maneuver, separation, conjunction assessment, and proximity operations; and improves support to defensive and offensive counterspace operations.

TAPOUT is a Low Earth Orbit (LEO) tactical SDA system which consists of a Hardware Layer, a Data Layer, and an Application layer. The planned Hardware Layer is the result of 2 years of prototyping, analysis, and collaboration with industry. 16 sites have been identified to field daytime/nighttime capable ground based EO sensors which will be remotely commanded and controlled through the Data and Application layers. The Data Layer consists of multi-source and multi-INT data feeds which are aggregated at a classified level where predictive threat warning occurs. The Application Layer consists of a series of Threat Warning and C2 applications at multiple classification levels which enable monitoring, and tactical command and control of the network.

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 673940 / <i>Space Data Fusion</i>
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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 may include necessary civilian pay expenses required to manage, execute, and deliver the 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. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2021	FY 2022	FY 2023
<p><b>Title:</b> Global Sensor Watch (GSW)</p> <p><b>Description:</b> GSW provides an integrated SDA architecture to deliver a resilient, high capacity, sensitive, timely, and comprehensive global ground and space-based network of sensors that cover the geocentric and cislunar orbital regimes. GSW is a survivable, automated cross-sensor tip and cue capability that provides overlapping, assured, and viable surveillance options for executing event response, and SDA data processing at multiple classification levels. In order to ensure the successful implementation of a survivable, overlapping, assured, and viable architecture, GSW includes the necessary sensor communication upgrades to ensure data transport/throughput, compatibility, and effects-based tactical tasking/response functionality. To do this, GSW enables highly available, non-stovepiped sensor planning, tasking, response, and data collection, as well as processed information/products/results to be stored, shared, and integrated for warfighting and analysis.</p> <p>GSW will continue coordination with Japanese Ministry of Defense (JMOD) on the development of classified C2 and SDA data sharing between a Japanese Space Operations Center (SpOC) and the U.S. Combined Space Operations Center (CSpOC). This will align Japanese sensors and United States Government (USG) and non-USG assets to provide critical national security space solutions on tactical operational timelines.</p> <p><b>FY 2022 Plans:</b> GSW will upgrade sensor communications to existing systems, including radar sites at Eglin Air Force Base, Florida, and the Ground-Based Radar in Kwajalein (GBR-K), through the Sensor Comm Upgrade (SCU) effort to facilitate GSW tip and cue operations. Modernize legacy sensor message formats and protocols for greater accuracy; support USSPACECOM operations and test activities to vet new SDA capability deliveries and concepts of operations for optimizing legacy SDA sensor operations; establish a SDA tip and cue sensor test asset; continue integration of GSW tip and cue software at existing radar sites; continue automation of manual SDA processes; develop classified C2 and SDA sharing with Japanese Space Operations Center (JSpOC);</p>	0.000	45.904	58.252

**UNCLASSIFIED**

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>		<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<p>align USG and non-USG assets to provide critical national security space solutions on tactical operational timelines; and accomplish satellite tracking, space object identification (SOI), tracking, and cataloging of data collected from Japanese assets.</p> <p>Additionally, FY 2022 funding will allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and 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 2023 Plans:</b> Complete and operationalize GSW sensor comm upgrades for the first and second sites. Begin third phase of GSW software development for incorporating non-traditional data sources. GSW will continue to upgrade sensor communications to existing systems, including radar sites at Eglin Air Force Base, Florida, Upgraded Early Warning Radars (UEWR), Millstone Radar Site Massachusetts, Reagan Test site assets, to facilitate GSW tip and cue operations. Modernize legacy sensor message formats and protocols for greater accuracy; support USSPACECOM operations and test activities to vet new SDA capability deliveries and concepts of operations for optimizing legacy SDA sensors operations; establish a SDA tip and cue sensor test asset; continue integration of GSW tip and cue software at existing radar sites; continue automation of manual SDA processes; develop classified C2 and SDA sharing with Japanese Space Operations Center (JSpOC) and expand Security Cooperation activities with mission partners in Canada and the United Kingdom; align USG and non-USG assets to provide critical national security space solutions on tactical operational timelines; and accomplish satellite tracking, space object identification (SOI), tracking, and cataloging of data collected from global assets. TAPOUT will 1) begin operations immediately with existing sensors, 2) begin procuring and fielding TAPOUT sensors, especially long lead items that require early purchase orders to meet the 24 month FOC timeline, 3) improve external network interfaces, 4) enhance existing TAPOUT Threat Warning capabilities and tactical messaging, and 5) provide training.</p> <p>Additionally, FY 2023 funding will allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and 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 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 increased due to increased cadence of SCU efforts that requires significant investments in terms of hardware and communications equipment.</p>				
<b>Title:</b> Space Data Fusion/Unified Data Library (UDL)		0.000	17.059	0.000

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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<p><b>Description:</b> Space Data Fusion develops Unified Data Library (UDL) capabilities to support integration, exploitation, and delivery of data sources for command and control and battle management of space forces. UDL will continue to develop the library by onboarding new data sets, expand data services, expand defensive cyber operations capabilities, add non-metric data to the SDA marketplace, continue to expand local area network capability to share Space Surveillance Network (SSN) data in a cyber-secure manner, and purchase commercial data and services to support USSPACECOM operations, allow optimized data flow for use of existing SDA capability, and provide access to new commercial SDA innovations that will enable the broader SDA mission.</p> <p><b>FY 2022 Plans:</b> Expanded UDL infrastructure to support increased number of customers and operations across multiple security environments by initiating an Enterprise Support structure that allows for the UDL to be "franchised" and proliferated at different classification levels, yet still supported by a common source of system administration for all UDL instances located at any classification level. Purchased commercial data to support SDA marketplace and provide limited resources to procure commercial SDA services. All commercial SDA related funding resulted in the timely provision of accurate data and information to government customers. Funded defensive cyber operations capability, to include persistent red team analysis of broader UDL architecture. Overall, funds covered cloud hosting cost, data service development, security, system administration, data on boarding, US Space Force related exercise support, cross domain solution services and integration of the legacy communications architecture with the UDL. Additionally, FY 2022 funding allowed the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities included but not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of C2, resiliency measures and mission partner interfaces, space test/combat range events, and office support etc.</p> <p><b>FY 2023 Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 decreased compared to FY 2022 due to transfer of UDL-related funding from Space Data Fusion Project to new Unified Data Library Project (673941) for transparency.</p>			
<p><b>Title:</b> Space Surveillance Telescope (SST)</p> <p><b>Description:</b> Space Surveillance Telescope (SST) provides rapid un-cued search, detection, and tracking of dim objects in deep space, collecting data on all viewable objects in the Indo-Pacific region. As a combined program with Australia's Department of Defence, per the 2013 USSECDEF and AUSMINDEF SST Partnership MOU, SST improves detection and characterization of friendly and enemy military space activities; improves orbital safety of flight during maneuver, separation, conjunction assessment,</p>	0.000	1.800	0.000

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 673940 / <i>Space Data Fusion</i>

<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
and proximity operations; and improves support to defensive and offensive counterspace operations addressing critical space domain awareness gaps.			
<b>FY 2022 Plans:</b> Complete SST Developmental/Operational Test and Evaluation (DT&E/OT&E), complete Space Force Operational Acceptance process, and support Australian Defence testing efforts for joint Initial Operational Capability (IOC)/Full Operational Capability (FOC) declaration. Continue program office and other related support and integration activities such as, but not limited to, studies, technical analysis, experimentation, prototyping, architectural development, systems engineering, demonstrations, testing, command and control integration, mission partner integration, and space test/combat range events.			
<b>FY 2023 Plans:</b> N/A			
<b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 decreased compared to FY 2022 due to planned completion of activities.			
<b>Accomplishments/Planned Programs Subtotals</b>	0.000	64.763	58.252

<b>C. Other Program Funding Summary (\$ in Millions)</b>											
<u>Line Item</u>	<u>FY 2021</u>	<u>FY 2022</u>	<u>FY 2023</u> <u>Base</u>	<u>FY 2023</u> <u>OCO</u>	<u>FY 2023</u> <u>Total</u>	<u>FY 2024</u>	<u>FY 2025</u>	<u>FY 2026</u>	<u>FY 2027</u>	<u>Cost To</u> <u>Complete</u>	<u>Total Cost</u>
• SPAF 01 SPCMOD: <i>Space Mods</i>	0.000	0.000	8.284	-	8.284	2.000	-	-	-	0.000	10.284

**Remarks**

**D. Acquisition Strategy**

The acquisition strategies for GSW, UDL, and SST include a mix of modifications to existing Air Force or Space Force contracts and directing funds to other Air Force, Space Force, or DoD organizations for contract support. In addition, UDL acquisition strategy will include contracts with commercial providers to source data through a SDA marketplace to allow delivery of needed and timely data.

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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 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 673940 / <i>Space Data Fusion</i>
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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			
GSW Exploitation	Various	MIT/LL : Lexington, MA	-	-		11.842	Nov 2021	16.150	Mar 2023	-		16.150	Continuing	Continuing	-
GSW Dynamic Tasking	Various	Various : Various	-	-		9.213	Dec 2021	9.850	Dec 2022	-		9.850	Continuing	Continuing	-
GSW Sensor Comm Upgrades	Various	Various : Various	-	-		18.891	Mar 2022	23.090	Mar 2023	-		23.090	Continuing	Continuing	-
GSW SW Development 3	Various	Sandia National Labs : Albuquerque, NM	-	-		1.000	Nov 2021	1.337	Nov 2022	-		1.337	Continuing	Continuing	-
UDL Data Science WG	C/CPFF	L3Harris : Colorado Springs, CO	-	-		0.556	Jan 2022	-		-		-	0.000	0.556	-
UDL Commercial Data	C/CPFF	Various : Various	-	-		3.000	Jan 2022	-		-		-	0.000	3.000	-
UDL Development/Data Onboarding	Various	Various : Various	-	-		3.821	Dec 2021	-		-		-	0.000	3.821	-
UDL Cloud Hosting	Various	Various : Various	-	-		6.230	Mar 2022	-		-		-	0.000	6.230	-
Space Surveillance Telescope	Various	Various : Exmouth, Australia	-	-		1.800	Oct 2021	-		-		-	0.000	1.800	-
TAPOUT	MIPR	AFRL : Various	-	-		-		2.425	Oct 2022	-		2.425	Continuing	Continuing	-
<b>Subtotal</b>			-	-		56.353		52.852		-		52.852	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			
A&AS	Allot	Various : Colorado Springs, CO	-	-		6.610	Dec 2021	2.650	Dec 2022	-		2.650	Continuing	Continuing	-
FFRDC	RO	Various : Colorado Springs, CO	-	-		1.500	Nov 2021	2.000	Nov 2022	-		2.000	Continuing	Continuing	-
Other Support	Various	Various : Colorado Springs, CO	-	-		0.300	Dec 2021	0.750	Dec 2022	-		0.750	Continuing	Continuing	-
<b>Subtotal</b>			-	-		8.410		5.400		-		5.400	Continuing	Continuing	N/A

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<b>Exhibit R-3, RDT&amp;E Project Cost Analysis: PB 2023 Air Force</b>								<b>Date: April 2022</b>			
<b>Appropriation/Budget Activity</b> 3620F / 7				<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>				<b>Project (Number/Name)</b> 673940 / <i>Space Data Fusion</i>			
	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>		<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>Cost To Complete</b>	<b>Total Cost</b>	<b>Target Value of Contract</b>	
<b>Project Cost Totals</b>	-	-	64.763		58.252	-	58.252	Continuing	Continuing	N/A	

**Remarks**

The Space Data Fusion project has minimal organic resources. The FY 2023 Management Services includes parallel efforts to integrate commercial, allied, academic & other non-traditional SDA data sources into UDL and establish secure connectivity between the US and Japanese Space Operations Centers.

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 673940 / <i>Space Data Fusion</i>

	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>Global Sensor Watch (GSW)</b>																												
GSW Operationalization																												
GSW Sensor Comm Upgrades - First Site Operational																												
GSW Sensor Comm Upgrades - Second Site Operational																												
GSW SW Development 2 (Legacy)(Version Releases)																												
GSW Prototypes/Integration																												
GSW Command and Control (Anduril, Lattice, Snare)																												
GSW SW Development 3 (Non-traditional)																												
TAPOUT Experimental Operations and Development																												
TAPOUT Operations Evaluation Period																												
TAPOUT IOC																												
TAPOUT FOC																												
<b>Unified Data Library (UDL)</b>																												
UDL Cloud Hosting																												
Development/Data Onboarding (Demos, Use Cases, Commercial)																												
<b>Space Surveillance Telescope (SST)</b>																												
OT&E																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 673940 / <i>Space Data Fusion</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Global Sensor Watch (GSW)</b>				
GSW Operationalization	1	2022	4	2027
GSW Sensor Comm Upgrades - First Site Operational	1	2022	3	2023
GSW Sensor Comm Upgrades - Second Site Operational	1	2022	4	2023
GSW SW Development 2 (Legacy)(Version Releases)	1	2022	4	2026
GSW Prototypes/Integration	1	2022	1	2025
GSW Command and Control (Anduril, Lattice, Snare)	1	2022	3	2026
GSW SW Development 3 (Non-traditional)	1	2023	4	2027
TAPOUT Experimental Operations and Development	1	2023	1	2024
TAPOUT Operations Evaluation Period	4	2023	4	2024
TAPOUT IOC	4	2023	1	2024
TAPOUT FOC	3	2024	4	2024
<b>Unified Data Library (UDL)</b>				
UDL Cloud Hosting	1	2022	4	2022
Development/Data Onboarding (Demos, Use Cases, Commercial)	1	2022	4	2022
<b>Space Surveillance Telescope (SST)</b>				
OT&E	2	2022	3	2022

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 3620F / 7					<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>				<b>Project (Number/Name)</b> 673941 / <i>Unified Data Library (UDL)</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
673941: <i>Unified Data Library (UDL)</i>	-	0.000	0.000	19.507	0.000	19.507	19.889	20.267	20.851	20.743	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

In FY 2023, the Unified Data Library (UDL) efforts were transferred from Project 673940, Space Data Fusion, into Project 673941, Unified Data Library (UDL) to provide additional clarity on UDL and commercial SDA efforts.

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

The Space Data Fusion effort develops the UDL to support integration, exploitation and delivery of Space Domain Awareness (SDA) data sources for C2 and battle management of space forces. It focuses on enabling data sharing, establishing the data architecture required to aggregate multi-sensor data for broader use at different clearance levels, transforming any-source data into normalized, usable information via data exploitation tools, followed by data hand off to Battle Management Command and Control mission systems to support actual space operations. Space Data Fusion/UDL efforts include purchasing commercial SDA data and services in support of US Space Command (USSPACECOM) operations. This program is complementary and performed in parallel with program PE 1206425SF, Space Situational Awareness Systems, which develops new network sensors and improved information integration capabilities across the network.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Center (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 UDL for 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. In PY \$0 was expended for civilian pay expenses in this program element, and in CY \$0 is forecasted for civilian pay expenses in this program element.

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

	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<b>Title:</b> Unified Data Library (UDL)	-	-	19.507
<b>Description:</b> UDL capabilities support integration, exploitation, and delivery of data sources for command and control and battle management of space forces. UDL will continue to develop the library by onboarding new data sets, to include data from other domains outside of SDA, expand data services, expand defensive cyber operations capabilities, add non-metric data to the SDA marketplace, continue to expand local area network capability to share Space Surveillance Network (SSN) data in a cyber-secure			

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 673941 / <i>Unified Data Library (UDL)</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2021	FY 2022	FY 2023
<p>manner, and purchase commercial data and services to support USSPACECOM operations, allow optimized data flow for use of existing SDA capability, and provide access to new commercial SDA innovations that will enable the broader SDA mission. This is not a new start.</p> <p><b><i>FY 2023 Plans:</i></b> Continue to expand UDL infrastructure to support increased number of customers and operations across multiple security environments by initiating an Enterprise Support structure that allows for the UDL to be "franchised" and proliferated at different classification levels, yet still supported by a common source of system administration for all UDL instances located at any classification level. All commercial SDA related funding will result in the timely provision of accurate data and information to government customers. Fund the expansion of defensive cyber operations capability, to include persistent red team analysis of broader UDL architecture. Overall, funds cover cloud hosting cost, data service development, security, system administration, data on boarding, Data as a Service platform for data ingestion, retention, processing, normalization, and analysis across the global space enterprise, Space Force related exercise support, cross domain solution services and integration of the legacy communications architecture with the UDL.</p> <p>Additionally, FY 2023 funding will allow the program to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to: studies, technical analysis, risk reduction experiments and prototyping, integration and test of C2, resiliency measures and mission partner interfaces, space test/combat range events, and office support etc.</p> <p><b><i>FY 2022 to FY 2023 Increase/Decrease Statement:</i></b> FY 2023 increased compared to FY 2022. Due to transfer of UDL-related funding from Project 673940, Space Data Fusion, into Project 673941, United Data Library, for transparency.</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	-	-	19.507

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

**Remarks**

**D. Acquisition Strategy**  
The acquisition strategy for UDL includes a mix of modifications to existing Air Force or Space Force contracts and directing funds to other Air Force, Space Force, or DoD organizations for contract support. In addition, UDL acquisition strategy will include contracts with commercial providers to source data through a SDA marketplace to allow delivery of needed and timely data.

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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 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 673941 / <i>Unified Data Library (UDL)</i>
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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			
UDL Data Science Working Group	C/CPFF	L3Harris : Colorado Springs, CO	-	-		-		0.573	Jan 2023	-		0.573	Continuing	Continuing	-
UDL Commercial Data	C/CPFF	Various : TBD	-	-		-		4.365	Jan 2023	-		4.365	Continuing	Continuing	-
UDL Development/Data Onboarding	C/Various	Various : TBD	-	-		-		2.936	Dec 2022	-		2.936	Continuing	Continuing	-
UDL Cloud Hosting	C/Various	Various : TBD	-	-		-		6.429	Mar 2023	-		6.429	Continuing	Continuing	-
Technical Mission Analysis	Various	Various : Various	-	-		-		1.100	Nov 2022	-		1.100	Continuing	Continuing	-
<b>Subtotal</b>			-	-		-		15.403		-		15.403	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			
A&AS	Various	Various : Colorado Springs, CO	-	-		-		3.214	Dec 2022	-		3.214	Continuing	Continuing	-
FFRDC	Various	Various : Colorado Springs, CO	-	-		-		0.800	Nov 2022	-		0.800	Continuing	Continuing	-
Other Support	C/Various	Various : Colorado Springs, CO	-	-		-		0.090	Dec 2022	-		0.090	Continuing	Continuing	-
<b>Subtotal</b>			-	-		-		4.104		-		4.104	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>		-	-	-	19.507	-	19.507	Continuing	Continuing	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 673941 / <i>Unified Data Library (UDL)</i>

	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>Unified Data Library (UDL)</b>	
UDL Cloud Hosting	
UDL - Development/Data Onboarding (Demos, Use Cases, Commercial)	
<b>UDL Commercial Data</b>	
Commercial Data	

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 673941 / <i>Unified Data Library (UDL)</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b><i>Unified Data Library (UDL)</i></b>				
UDL Cloud Hosting	1	2023	4	2027
UDL - Development/Data Onboarding (Demos, Use Cases, Commercial)	1	2023	4	2027
<b><i>UDL Commercial Data</i></b>				
Commercial Data	1	2023	4	2027

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 3620F / 7					<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>				<b>Project (Number/Name)</b> 67A017 / <i>Sensor Service Life Extension Program</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
67A017: <i>Sensor Service Life Extension Program</i>	-	68.070	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	68.070
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

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

In FY 2022, PE 1203940F, Space Situation Awareness Operations, Project 67A017, Sensor Service Life Extension Program efforts were transferred to Project 673940, Space Data Fusion to more accurately describe the work being performed.

Service Life Extension Programs (SLEPs) are efforts to upgrade, operationalize and extend the life of operational SSA sensors. These SLEPs extend the serviceable life of assets and maintain critical capability by replacing aging and increasingly unsustainable components with modern and sustainable equipment. In addition, the SLEPs themselves may be designed to increase capabilities not currently realized. As the need arises in the execution year, funds in this project may be used to begin SLEPs on additional efforts. These efforts may include prototyping and technology demonstrations.

The Global Sensor Watch (GSW) effort provides an integrated, end-to-end SDA tip & cue capability that implements a survivable architecture providing overlapping, assured, and viable surveillance options for executing event response, SDA data processing at multiple classification levels, and automated, worldwide, cross-sensor tipping & cueing. Efforts directly enable support for Space Command & Control (C2) by developing & deploying advanced software algorithms to identify, acquire, characterize, and maintain custody of both space objects of interest and new foreign launches; developing & deploying advanced data analytics, machine learning, & artificial intelligence capabilities for rapid indication & warning; enhancing space environmental monitoring solutions; integrating and optimizing access to coalition, commercial, academic, intelligence community (IC) & Missile Defense Agency sensors to better support the broader space enterprise; supporting US Space Command (USSPACECOM) operations and training exercises; leading trials, testing and training campaigns to test & optimize capabilities in support of the broader space kill chain; enhancing sensor performance to close the solar exclusion gap by leveraging modern technology and commercial & IC sensors for greater space domain coverage; and improving legacy communication paths to enable a more complete space enterprise capability.

The Space Surveillance Telescope (SST) provides rapid un-cued search, detection and tracking of dim objects in deep space, collecting data on all viewable objects in the Indo-Pacific region. As a combined program with Australia's Department of Defense, per the 2013 US Secretary of Defense (USSECDEF) and the Australian Defence Minister (AUSMINDEF) SST Partnership Memorandum of Understanding (MOU), SST improves detection and characterization of friendly and enemy military space activities; improves orbital safety of flight during maneuver, separation, conjunction assessment, and proximity operations; and improves support to defensive and offensive counterspace operations.

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 2023 Air Force	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 67A017 / <i>Sensor Service Life Extension Program</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 repurpose existing capabilities.

This program element may include necessary civilian pay expenses required to manage, execute, and deliver the 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. Accomplishments/Planned Programs (\$ in Millions)**

	FY 2021	FY 2022	FY 2023
<p><b>Title:</b> Space Surveillance Telescope (SST) Developmental/Operational Test and Evaluation (DT&amp;E/OT&amp;E)</p> <p><b>Description:</b> Space Surveillance Telescope (SST) provides rapid un-cued search, detection and tracking of dim objects in deep space, collecting data on all viewable objects in the Indo-Pacific region. As a combined program with Australia's Department of Defense, per the 2013 USSECDEF and AUSMINDEF SST Partnership Memorandum of Understanding (MOU), SST improves detection and characterization of friendly and enemy military space activities; improves orbital safety of flight during maneuver, separation, conjunction assessment, and proximity operations; and improves support to defensive and offensive counterspace operations addressing critical space domain awareness gaps.</p> <p><b>FY 2022 Plans:</b> N/A</p> <p><b>FY 2023 Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> N/A</p>	4.912	0.000	0.000
<p><b>Title:</b> Global Sensor Watch Program (GSW)</p> <p><b>Description:</b> GSW provides an integrated SDA architecture to deliver a resilient, high capacity, sensitive, timely, and comprehensive global ground and space-based network of sensors that cover the geocentric and cislunar orbit regimes with a survivable tip &amp; cue capability that provides overlapping, assured, and viable surveillance options for executing event response, processing of SDA data at multiple classification levels, and automated cross-sensor tipping &amp; cueing worldwide. In order to ensure the successful implementation of a survivable, overlapping, assured, and viable architecture, GSW includes the necessary sensor comm upgrades to ensure data transport/throughput, compatibility, and effects-based tactical tasking/response functionality. To do this, GSW enables highly available, non-stovepipe sensor planning, sensor tasking, sensor response, collected sensor data, and processed information/products/results to be stored, shared, and integrated for warfighting and analysis.</p>	38.158	0.000	0.000

**UNCLASSIFIED**

<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force	<b>Date:</b> April 2022
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<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 67A017 / <i>Sensor Service Life Extension Program</i>
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<b>B. Accomplishments/Planned Programs (\$ in Millions)</b>	FY 2021	FY 2022	FY 2023
<p>GSW will continue coordination with Japanese Ministry of Defense (JMOD) on the development of classified C2 and SDA data sharing between a Japanese Space Operations Center (SpOC) and Combined Space Operations Center (CSpOC). This will align Japanese sensors and United States Government (USG) and non-USG assets to provide critical national security space solutions on tactical operational timelines.</p> <p><b>FY 2022 Plans:</b> N/A</p> <p><b>FY 2023 Plans:</b> N/A</p> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> N/A</p>			
<b>Accomplishments/Planned Programs Subtotals</b>	43.070	0.000	0.000

	FY 2021	FY 2022
<p><b>Congressional Add:</b> Commercial Space Domain Awareness</p> <p><b>FY 2021 Accomplishments:</b> The program office will execute funding through various existing and new contracts such as using the SDA Marketplace for data buys and associated services, procuring UDL enhancement and improvement on the ACCESS contract, and utilizing Small Business Innovative Research to evaluate emerging technical capability in the commercial space sector.</p>	25.000	-
<b>Congressional Adds Subtotals</b>	25.000	-

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

N/A

**Remarks**

**D. Acquisition Strategy**

Congressional add will be executed on a variety of new and existing contracts using competitive sources to the maximum amount possible, such as Automated Non-Traditional Data Validation efforts on the MOSSAIC contract, Commercial Services Onboarding on a new contract, Data Visualization Services on multiple existing contracts, data buys and associated services via the SDA Marketplace; UDL enhancement and improvement on the ACCESS contract, and utilizing Small Business Innovative Research to evaluate emerging technical capability in the commercial space sector.

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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 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 67A017 / <i>Sensor Service Life Extension Program</i>
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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			
GSW Operationalization	C/TBD	Multiple : Colorado Springs, CO	-	29.958	Dec 2020	-		-		-		-	0.000	29.958	-
GSW SW Development 1	Various	AFRL : TBD	-	2.750	Feb 2021	-		-		-		-	0.000	2.750	-
GSW SW Development 2	Various	MIT/LL : Lexington, MA	-	2.800	Jan 2021	-		-		-		-	0.000	2.800	-
GSW SW Development 3	Various	Sandia National Labs : Albuquerque, NM	-	0.600	Nov 2020	-		-		-		-	0.000	0.600	-
UDL Commercial Data	Various	Various : Various	-	25.000	Jul 2021	-		-		-		-	0.000	25.000	-
Space Surveillance Telescope	Various	Multiple : Exmouth Australia	-	4.912		-		-		-		-	0.000	4.912	-
<b>Subtotal</b>			-	66.020		-		-		-		-	0.000	66.020	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			
A&AS	Various	Multiple : Colorado Springs, CO	-	1.200	Nov 2020	-		-		-		-	0.000	1.200	-
FFRDC	Various	Multiple : Colorado Springs, CO	-	0.700	Dec 2020	-		-		-		-	0.000	0.700	-
Other Support	Various	Multiple : Colorado Springs, CO	-	0.150	Nov 2020	-		-		-		-	0.000	0.150	-
<b>Subtotal</b>			-	2.050		-		-		-		-	0.000	2.050	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>		-	68.070	-	-	-	0.000	68.070	N/A

**Remarks**

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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 67A017 / <i>Sensor Service Life Extension Program</i>

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

	FY 2021				FY 2022				FY 2023				FY 2024				FY 2025				FY 2026				FY 2027			
<b>Sensor SLEP</b>																												
Global Sensor Watch (GSW) Program																												
GSW Operationalization																												
Sensor Comm Upgrades - First Site																												
GSW SW Development 1 (Operationalized)																												
GSW SW Development 2 (Legacy)(Version Releases)																												
GSW Prototypes/Integration																												
GSW Command and Control (Anduril, Lattice, Snare)																												
Unified Data Library (Cloud Hosting)																												
Unified Data Library Development/ Data Onboarding (Demos, Use Cases, Commercial)																												
Sensor Comm Upgrades - Second Site																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 67A017 / <i>Sensor Service Life Extension Program</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Sensor SLEP</b>				
Global Sensor Watch (GSW) Program	1	2021	4	2021
GSW Operationalization	1	2021	4	2021
Sensor Comm Upgrades - First Site	1	2021	3	2021
GSW SW Development 1 (Operationalized)	1	2021	4	2021
GSW SW Development 2 (Legacy)(Version Releases)	1	2021	4	2021
GSW Prototypes/Integration	1	2021	4	2021
GSW Command and Control (Anduril, Lattice, Snare)	1	2021	4	2021
Unified Data Library (Cloud Hosting)	1	2021	4	2021
Unified Data Library Development/Data Onboarding (Demos, Use Cases, Commercial)	1	2021	4	2021
Sensor Comm Upgrades - Second Site	3	2021	4	2021

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force										<b>Date:</b> April 2022		
<b>Appropriation/Budget Activity</b> 3620F / 7					<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>				<b>Project (Number/Name)</b> 67A018 / <i>SF Weather Services Research</i>			
<b>COST (\$ in Millions)</b>	<b>Prior Years</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023 Base</b>	<b>FY 2023 OCO</b>	<b>FY 2023 Total</b>	<b>FY 2024</b>	<b>FY 2025</b>	<b>FY 2026</b>	<b>FY 2027</b>	<b>Cost To Complete</b>	<b>Total Cost</b>
67A018: <i>SF Weather Services Research</i>	-	0.000	0.000	3.144	0.000	3.144	3.939	3.121	3.222	3.284	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

**Note**

This program, BA 7, PE 1203940SF, project , Space Weather Analysis and Forecast System (SWAFS), is a new start.

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

In FY 2023, a portion of the APPN 3600 funding and activities from PE 0305111F, Project 672738, Weather Service, were transferred to PE 1203940SF, Space Situational Awareness Operations, in order to align current AF ground-based space sensing projects to the USSF.

This budget activity funds the operational development necessary to acquire, sustain, and modernize SF Weather Services Research capabilities in support of the 2018 National Defense Strategy's (NDS) three lines of effort: build a more lethal force, strengthen alliances and attract new partners, and change the way we do business.

To improve readiness for a more lethal force, SF Weather Services Research provides timely, accurate, resilient, and relevant environmental information to enable global battlespace situational awareness for Air Force (AF), Army, Special Operations Forces (SOF), Space Force (USSF), combatant commands, the Intelligence Community (IC), and other government agencies. SF Weather Services Research provides climate impacts and assessments, as well as space and terrestrial weather sensing, forecasting, and weather analytic capabilities, at home station and deployed, in order to deliver critical environmental intelligence in support of makers to gain the asymmetric advantage during the full spectrum of air and space combat operations. SF Weather Services Research decreases the risk to mission and risk to force by increasing the lethality, effectiveness, and survivability of Department of Defense (DoD) weapon systems.

To strengthen alliances and partnerships, SF Weather Services Research development efforts integrate DoD, government agency, commercial, and international partner environmental data with AFWS information system equipment for processing, storing, exploiting, and disseminating multi-domain weather information for analysis, forecasting, mission integration, and greater interoperability.

To ensure greater performance and affordability for the Department of the AF, SF Weather Services Research sensors and information systems are being modernized through improvements to architecture and system efficiency, cybersecurity, joint all-domain command and control (JADC2) and sensing grid integration, migration to cloud computing, artificial intelligence and machine learning (AI/ML) initiatives, and expanding agile software development, delivery, and integration practices. The AF Weather Enterprise digital transformation and cloud migration effort modernizes key capabilities providing the military advantage to accurately predict environmental impacts optimizing mission planning, targeting, weaponeering, mission execution, battle damage assessment, and space systems operations.

Activities include research and analysis to support current program planning. Management Service costs include Federally Funded Research and Development Centers (FFRDC) and Advisory and Assistance Service (A&AS).

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 67A018 / <i>SF Weather Services Research</i>

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. Accomplishments/Planned Programs (\$ in Millions)</b>	<b>FY 2021</b>	<b>FY 2022</b>	<b>FY 2023</b>
<p><b>Title:</b> Space Weather Analysis and Forecast System (SWAFS)</p> <p><b>Description:</b> The SWAFS legacy baseline is currently being redesigned and upgraded under the Space Domain Awareness Environmental Toolkit for Defense (SET4D) effort to satisfy Space Domain Awareness goals for a modern cloud hosted infrastructure that is cyber resilient and integrated with the Unified Data Library. The Energetic Charged Particle Hazard Assessment System (ECP HAS) is one of several models and applications within the SET4D environment designed to inform satellite operators of hazards and the impacts of those hazards to their spacecraft that will provide warfighters with the environmental awareness to safely sustain their respective orbits and missions.</p> <p><b>FY 2022 Plans:</b> N/A</p> <p><b>FY 2023 Plans:</b></p> <ul style="list-style-type: none"> <li>- Complete integration of the last component of the ECP HAS into the SET4D cloud infrastructure. This final phase will incorporate the Versatile Electron Radiation Belt (VERB) outer zone application which provides a complete picture of the space environment charging impacts on satellites.</li> <li>-Begin the software integration activities associated with the Military Application of the Space Environment (MASE) application for improved combat situational awareness tools hosted on the Unified Data Library (UDL).</li> <li>-Integrate the newest version of the Radio Frequency Ionospheric Scintillation Analysis Tool (RISA) application for improved solar forecasting capabilities. This application will enhance the prediction and forecasting capabilities associated with major solar events that impact critical VHF/UHF/HF communication lines in support of global combat operations.</li> <li>- Integrate new data sources such as Global Positioning System Radio Occultation and Ultraviolet Photometer Co-located/Limb-imaging Ionospheric and Thermospheric Extreme Ultraviolet Spectrograph (GROUP C Lites) and Responsive Environmental Assessment Commercially Hosted (REACH) to enhance the performance and accuracy of numerous models within the SET4D baseline.</li> </ul> <p><b>FY 2022 to FY 2023 Increase/Decrease Statement:</b> FY 2023 increased compared to FY 2022. These efforts were previously conducted under PE 0305111F, Project 672738, Weather Service, and were transferred in FY 2023 due to transfer of space-related weather service funding to this SF program new project and to align current AF ground-based space sensing projects to the USSF.</p>	-	0.000	3.144
<b>Accomplishments/Planned Programs Subtotals</b>	-	0.000	3.144

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<b>Exhibit R-2A, RDT&amp;E Project Justification:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 67A018 / <i>SF Weather Services Research</i>

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

Line Item	FY 2021	FY 2022	FY 2023	FY 2023	FY 2023	FY 2024	FY 2025	FY 2026	FY 2027	Cost To	
			Base	OCO	Total					Complete	Total Cost
• SPAF 01 SPCMOD: <i>Space Mods</i>	-	-	5.111	-	5.111	3.100	2.967	3.056	3.117	Continuing	Continuing
• RDTE 04 0604002F: <i>Air Force Weather Services Research</i>	-	-	0.796	-	0.796	-	-	-	-	0.000	0.796

**Remarks**

**D. Acquisition Strategy**

AF Weather is adopting a Continuous Integration/Continuous Deployment (CI/CD) approach to delivering capabilities rapidly and routinely using multiple contracts to support a family of systems through development fielding and sustainment.

Cost Plus contracts are utilized for software development and sustainment and Fixed Firm Price contracts for Commercial-off-the-shelf (COTS) systems and Contract Logistics Support (CLS) efforts. Pre-competed General Services Administration (GSA) and Defense MicroElectronics Activity (DMEA) contract vehicles are leveraged when appropriate, and competitive and small-business awards are favored.



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<b>Exhibit R-4, RDT&amp;E Schedule Profile:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 67A018 / <i>SF Weather Services Research</i>

	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><i>Weather Service</i></b>																												
SET4D Modernization Efforts																												

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<b>Exhibit R-4A, RDT&amp;E Schedule Details:</b> PB 2023 Air Force		<b>Date:</b> April 2022
<b>Appropriation/Budget Activity</b> 3620F / 7	<b>R-1 Program Element (Number/Name)</b> PE 1203940SF / <i>Space Situation Awareness Operations</i>	<b>Project (Number/Name)</b> 67A018 / <i>SF Weather Services Research</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
<b>Weather Service</b>				
SET4D Modernization Efforts	2	2023	4	2027