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Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force **Date:** February 2020

Appropriation/Budget Activity 3600: <i>Research, Development, Test & Evaluation, Air Force I BA 7: Operational Systems Development</i>	R-1 Program Element (Number/Name) PE 1203940F / <i>Space Situation Awareness Operations</i>
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COST (\$ in Millions)	Prior Years	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total	FY 2022	FY 2023	FY 2024	FY 2025	Cost To Complete	Total Cost
Total Program Element	-	18.920	17.834	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
67A017: <i>Sensor Service Life Extension Program</i>	-	18.920	17.834	0.000	0.000	0.000	0.000	0.000	0.000	0.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2021, PE 1203940F, Space Situation Awareness Operations efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1203940SF Space Situation Awareness Operations from Appropriation 3600, Budget Activity 07 due to the creation of a new Appropriation for Space Force.

Space Situational Awareness (SSA) is knowledge of all aspects of space related to operations. As the foundation for space control, SSA encompasses surveillance of all space objects and activities; detailed reconnaissance of specific space assets; monitoring space environmental conditions; monitoring cooperative space assets; gathering intelligence on adversary space operations; and conducting integrated command, control, communications, processing, analysis, dissemination, and archiving activities. SSA also encompasses the integration, exploitation and delivery of data sources to facilitate the battle management and command and control of space forces. This program element fields, upgrades, modifies, modernizes, operationalizes, operates and maintains Air Force sensors and information integration capabilities within the SSA Space Surveillance Network (SSN) while companion program element 1206425F, Space Situational Awareness Systems, develops new network sensors and improved information integration capabilities across the network. Activities funded in this program element (1203940F) 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.

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.

Global Sensor Watch (GSW) Program provides an integrated SSA Tip & Cue capability that implements a survivable architecture providing overlapping, assured, and viable surveillance options for executing event response, multiple level security processing of SSA data and automated cross-sensor tipping & cueing worldwide. Other efforts to support Battle Management Command & Control (BMC2) in space include developing & deploying advanced software algorithms to identify, acquire, characterize, and maintain custody of both space objects of interest and new foreign launches; optimizing commercial, intelligence community (IC) & Missile Defense Agency sensors to better support BMC2; developing & executing Joint Functional Space Component Command (JFSCC) exercises such as Combined Space Operations Center and National Space Defense Center Experimentation, Test and Training Initiative to test & optimize Space Control capabilities, Concept of Operations (CONOPS) development to increase probability of survival for blue assets, and refining requirements across the space enterprise; enhancing sensor performance

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to close the solar exclusion gap leveraging technologies such as optical daylight tracking and incorporating commercial & IC sensors; and improving legacy paths to support bi-directional machine-to-machine sensor communications enabling a more complete BMC2 capability.

Ground Based Radar Upgrades improves the sensitivity, search capabilities and CONOPS of existing ground-based SSA sensors to better support custody and fire control timelines.

Programs and projects in the space warfighting enterprise are evaluating ways to maximize innovation, resiliency, and our ability to rapidly respond to known and emerging threats. Space enterprise efforts aim to execute technology risk reduction efforts, integration of new or repurposed capabilities, enterprise decision-making tools, experimentation, and rapid prototyping and fielding via all appropriate acquisition authorities and contract mechanisms.

Funding for this exhibit is contained in PE 12034940F.

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

B. Program Change Summary (\$ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	19.572	17.834	30.401	0.000	30.401
Current President's Budget	18.920	17.834	0.000	0.000	0.000
Total Adjustments	-0.652	0.000	-30.401	0.000	-30.401
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	-0.652	0.000			
• Other Adjustments	0.000	0.000	-30.401	0.000	-30.401

Change Summary Explanation

FY 2021: -\$44.809M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force; includes \$14.408M increase for sensor upgrades for classified activity and supporting operational roll-out of capability development started in FY 2020.

C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
Title: Global Sensor Watch Program	18.920	12.314	0.000

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C. Accomplishments/Planned Programs (\$ in Millions)		FY 2019	FY 2020	FY 2021
<p>Description: Global Sensor Watch (GSW) Program provides an integrated SSA Tip and Cue capability that implements a survivable architecture that provides overlapping, assured, and viable surveillance options for executing event response, multiple level security processing of SSA data and automated cross-sensor tipping and cueing around the globe. Other efforts to support Battle Management Command & Control (BMC2) in space include developing & deploying advanced software algorithms to identify, acquire, characterize, and maintain custody of deep space SHIOs; optimizing intelligence community & MDA sensors to better support BMC2; developing & executing JFCC Space exercises to test & optimize Space Control capabilities, CONOPS development to increase probability of survival for blue assets, and refining requirements across space enterprise; enhancing sensor performance to close the solar exclusion gap leveraging technologies and improving legacy communication paths to support bi-directional machine-to-machine sensor communications enabling a more complete BMC2 capability.</p> <p>FY 2020 Plans: Funds US portion of bill for interruption of SST reassembly, subsystem integration, and testing as a result of Australian facility delays; finishes SST assembly in Australia, integration of SST subsystems to Australian facility, subcontractor testing, and DT/OT&E planning.</p> <p>FY 2021 Plans: N/A</p> <p>FY 2020 to FY 2021 Increase/Decrease Statement: N/A</p>				
<p>Title: Space Surveillance Telescope DT&E/OT&E</p> <p>Description: Space Surveillance Telescope (SST) provides rapid un-cued search, detection and tracking of dim objects in deep space and offers enhanced capabilities addressing critical space situational awareness gaps. SST relocation from White Sands Missile Range, NM to Western Australia is expected complete in FY 2021. Efforts include executing SST sensor reassembly, subsystem integration and testing subsequent to Australian facility delays. This includes completion of SST integration into a new facility, SST subsystem and system testing & Developmental Test/Operational Test and Evaluation (DT/OT&E).</p> <p>FY 2020 Plans: Funds US portion of bill for interruption of SST reassembly, subsystem integration, and testing as a result of Australian facility delays; includes facility integration, SST subsystem and system testing, and DT/OT&E. Rapidly respond and implement system resiliency and situational awareness necessary to operate in the contested space domain. RDT&E funding is required to support this transformation and enable Space Superiority end-to-end integration activities such as, but not limited to, program</p>		0.000	5.520	0.000

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C. Accomplishments/Planned Programs (\$ in Millions)	FY 2019	FY 2020	FY 2021
office support, studies, technical analysis, experimentation, prototyping, architectural development, systems engineering, demonstrations, testing, command and control integration, mission partner integration, and space test/combat range events. FY 2021 Plans: N/A FY 2020 to FY 2021 Increase/Decrease Statement: N/A			
Accomplishments/Planned Programs Subtotals	18.920	17.834	0.000

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

Remarks

E. Acquisition Strategy
The acquisition strategies for the Global Sensor Watch and Space Surveillance Telescope programs includes a mix of modifications to existing Air Force contracts and directing funds to other AF or DoD organizations for contract support.

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Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force												Date: February 2020			
Appropriation/Budget Activity				R-1 Program Element (Number/Name)				Project (Number/Name)							
3600 / 7				PE 1203940F / Space Situation Awareness Operations				67A017 / Sensor Service Life Extension Program							
Product Development (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
GSW Operationalization	C/TBD	Multiple : Colorado Springs, CO	-	11.610	Dec 2018	7.624	Dec 2019	0.000		-		0.000	Continuing	Continuing	-
GSW SW Development 1	Various	AFRL : Various	-	2.500	Nov 2018	1.000	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
GSW SW Development 2	Various	MIT/LL : Lexington, MA	-	2.500	Nov 2018	1.000	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
GSW SW Development 3	Various	Sandia National Labs : Albuquerque, NM	-	0.500	Nov 2018	0.500	Nov 2019	0.000		-		0.000	Continuing	Continuing	-
Space Surveillance Telescope	Various	Multiple : Exmuth Australia	-	-		5.520	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
Subtotal			-	17.110		15.644		0.000		-		0.000	Continuing	Continuing	N/A
Management Services (\$ in Millions)				FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 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
Management Services	C/CPAF	Not specified. : TBD	-	-		-		-		-		-	Continuing	Continuing	-
A&AS	Various	Multiple : Colorado Springs, CO	-	0.690	Oct 2018	1.290	Oct 2019	0.000		-		0.000	Continuing	Continuing	-
FFRDC	Various	Multiple : Colorado Springs, CO	-	1.020	Dec 2018	0.800	Dec 2019	0.000		-		0.000	Continuing	Continuing	7.788
Other Support	Various	Multiple : Colorado Springs, CO	-	0.100	Oct 2018	0.100	Oct 2019	0.000		-		0.000	Continuing	Continuing	16.626
Subtotal			-	1.810		2.190		0.000		-		0.000	Continuing	Continuing	N/A
Project Cost Totals			-	18.920		17.834		0.000		-		0.000	Continuing	Continuing	N/A
Remarks															

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Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3600 / 7	R-1 Program Element (Number/Name) PE 1203940F / <i>Space Situation Awareness Operations</i>	Project (Number/Name) 67A017 / <i>Sensor Service Life Extension Program</i>

Schedule Details

Events by Sub Project	Start		End	
	Quarter	Year	Quarter	Year
Sensor SLEP				
Global Sensor Watch (GSW) Program	1	2019	4	2020
GSW Legacy Tasking Upgrades	1	2019	4	2019
GSW Operationalization	2	2019	4	2020
GSW SW Development 1 (Operationalized)	1	2019	4	2020
GSW SW Development 2 (Legacy)	2	2020	4	2020
SST OT&E	4	2019	4	2020