Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force											Date: February 2020	
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206442SF *I Next Generation OPIR*							
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	-	0.000	0.000	2,318.864	0.000	2,318.864	2,319.702	2,668.900	3,074.872	2,646.907	Continuing	Continuing
657009: *Space Mod Initiative*	-	0.000	0.000	209.662	0.000	209.662	200.731	221.338	225.324	229.451	Continuing	Continuing
657106: *Next-Gen OPIR Ground*	-	0.000	0.000	498.289	0.000	498.289	539.678	340.381	357.839	364.393	Continuing	Continuing
657120: *Next-Gen OPIR Space, Block 0 GEO*	-	0.000	0.000	1,128.900	0.000	1,128.900	1,157.467	1,330.876	1,316.512	728.974	Continuing	Continuing
657121: *Next-Gen OPIR Space, Block 0 Polar*	-	0.000	0.000	482.013	0.000	482.013	421.826	581.657	579.027	717.000	Continuing	Continuing
657122: *Next-Gen OPIR Space, Block 1**	-	0.000	0.000	0.000	0.000	0.000	0.000	194.648	596.170	607.089	Continuing	Continuing

*This project's R-2a exhibit has been suppressed due to funding not beginning until after FY 2021

A. Mission Description and Budget Item Justification

In FY 2021, PE 1206442F, Next Generation Overhead Persistent Infrared (Next-Gen OPIR) efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation (RDT&E), Space Force, PE 1206442SF, Next-Gen OPIR from Appropriation 3600, Budget Activity 05 due to the creation of a new Appropriation for Space Force.

1. Next-Generation Overhead Persistent Infrared (OPIR) Space Modernization Initiative (SMI) (Project 657009): SMI supports Next-Gen OPIR by assessing and demonstrating new technologies to better enable detection of emerging global missile threats and awareness of material obsolescence. Additionally, SMI supports space and ground design efforts focused on delivering affordable capabilities, maximizing the effectiveness of existing system data products. SMI funds engineering activities to reduce both production and future system costs through manufacturing improvements, producibility enhancements, and technology insertion. SMI will also mature potential technology upgrades at the component and system level for space and ground architecture enhancements. SMI includes studies and risk reduction activities to evolve the current SBIRS Program of Record (PoR) constellation, reduce production timelines, and reduce recurring production costs. SMI activities are balanced and phased to enable an expanded trade space and improve the competitive environment. The three major thrust areas under SMI are Demonstrations, Technology Maturation and Data Exploitation. The Demonstrations mature and demonstrate technologies with ground and on-orbit prototypes. Demonstrations advance system performance and algorithms for tactical and strategic applications to enhance PoR capabilities. Finally, demonstrations reduce program risks for future OPIR systems, whether new systems or evolutions of the current PoR. Technology Maturation assesses and addresses needs to support resiliency of PoR assets and future architectures that must respond to an evolving threat environment. Data Exploitation enables access to OPIR data sources to expand technical intelligence products, battlespace awareness processing, and data dissemination tools to support warfighters and other data users.

2. Next-Gen OPIR Ground (Project 657106): Next-Gen OPIR Ground, also known as Future Operationally Resilient Ground Evolution (FORGE), consists of Command and Control (C2) migration to the Space Force's Enterprise Ground Services (EGS), modernization of Mission Data Processing (MDP) to implement an open framework, and required development and/or upgrades to Relay Ground Stations (RGS) to meet United States Space Command guidance on the current and future space domain

demands. FORGE and EGS efforts combined will provide the flexibility and scalability to integrate new satellites, sensors, and capabilities more rapidly and efficiently in order to meet evolving threats and warfighter needs. The Next-Gen OPIR ground efforts enable cyber enhancements for both space and ground systems. EGS will introduce common ground services such as Telemetry, Tracking, and Command (TT&C); mission management; and automation. To support initial Next-Gen OPIR Space satellite launches without driving risks into the FORGE development schedule, the program will establish a risk reduction ground Next-Gen OPIR Interim Operations (NIO) capability based on a limited Space Based Infrared System (SBIRS) Block 20 solution that can be utilized if FORGE is delayed.

3. Next-Gen OPIR Space: Next-Gen OPIR implements the direction of the Joint Requirements Oversight Council Memorandum (JROCM) 130-17, dated 21 December 2017, by developing the next generation of strategically survivable space-based missile warning OPIR platforms in both GEO and Polar orbits. This program is a transition from the legacy SBIRS to a program that will deliver improved core missile warning capabilities that are more survivable against emerging threats. The full Next-Gen OPIR constellation will consist of a minimum of Geosynchronous Earth Orbit (GEO) and Polar satellites in sufficient number to meet global warning coverage with no exploitable holes (5 GEO + 2 Polar) plus required backup for attrition or reconstitution reserves. The Space Force intends to acquire Next-Gen systems in block procurements. The Block 0 acquisition strategy consists of three GEO and two Polar satellites. The first GEO satellite is required no later than FY 2025 and the first Polar satellite is required in FY 2027. All five Block 0 satellites need to be on orbit by FY 2029. Follow-on blocks will be addressed in future acquisition strategies.

Next-Gen OPIR Space, Block 0 GEO (GEO) (NGG) (Project 657120): The Program Office intends to acquire the NGG capability in two contract actions. Phase 1, awarded in August 2018, encompasses requirements analysis, design/development, critical path flight hardware procurement, and risk reduction efforts leading to a System CDR. Phase 2 will be awarded in FY 2021 for the manufacturing, assembly, system integration and test, launch, and early on-orbit test, through operational acceptance of NGG satellites 1-3.

Next-Gen OPIR Space, Block 0 Polar (NGP) (Project 657121): The Program Office intends to acquire the NGP capability in three contract actions. Phase 0, awarded in June 2018, encompasses system and payload requirements analysis and risk reduction efforts leading to a System Requirements Review. Phase 1 will include design and development, critical path flight hardware procurement, and risk reduction efforts leading to a System CDR. Phase 2 will be awarded for the manufacturing, assembly, integration and test, and early on-orbit test, through operational acceptance of NGP satellites 1 and 2.

Next-Gen OPIR Space, Block 1 (Project 657122): The Space Force plans to acquire subsequent blocks in a competitive environment. The Block 1 satellites will be based on the Missile Warning and Missile Defense OPIR Capability Development Document (CDD), validated by the Joint Requirements Oversight Council (JROC) in May 2019. The Next Gen OPIR Block 1 program acquisition will begin in FY 2023 in time to deliver its first satellite by FY 2030.

Space acquisition must respond with speed and agility to emerging adversary threats. Space & Missile Systems Center (SMC) is transforming the organization and implementation of space acquisition to an enterprise approach, maximizing 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, SMC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

Exhibit R-2, RDT&E Budget Item Justification: PB 2021 Air Force	Date: February 2020
Appropriation/Budget Activity 3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206442SF *I Next Generation OPIR*

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

The majority of Projects under PE 1206442SF have been declared Section 804 Rapid Prototype efforts. This program is in Budget Activity 5, System Development and Demonstration (SDD) because the majority of Projects are conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2019	FY 2020	FY 2021 Base	FY 2021 OCO	FY 2021 Total
Previous President's Budget	0.000	0.000	0.000	0.000	0.000
Current President's Budget	0.000	0.000	2,318.864	0.000	2,318.864
Total Adjustments	0.000	0.000	2,318.864	0.000	2,318.864
• Congressional General Reductions	0.000	0.000			
• Congressional Directed Reductions	0.000	0.000			
• Congressional Rescissions	0.000	0.000			
• Congressional Adds	0.000	0.000			
• Congressional Directed Transfers	0.000	0.000			
• Reprogrammings	0.000	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	2,318.864	0.000	2,318.864

Change Summary Explanation

FY 2021: +$2318.864M; funds starting in FY 2021 were transferred from RDT&E, Air Force to RDT&E, Space Force; total includes a $329.344M increase to cover unfunded FY 2020 scope for work on GEO Block 0.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*	Project (Number/Name) 657009 / *Space Mod Initiative*	

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
657009: *Space Mod Initiative*	-	0.000	0.000	209.662	0.000	209.662	200.731	221.338	225.324	229.451	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2021, PE 1206442F, Next Generation OPIR efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206442SF, Next Generation OPIR from Appropriation 3600, Budget Activity 05 due to the creation of a new Appropriation for Space Force.

Next-Generation Overhead Persistent Infrared (OPIR) Space Modernization Initiative (SMI) (Project 657009): SMI supports Next-Gen OPIR by assessing and demonstrating new technologies to better enable detection of emerging global missile threats and awareness of material obsolescence. Additionally, SMI supports space and ground design efforts focused on delivering affordable capabilities, maximizing the effectiveness of existing system data products. SMI funds engineering activities to reduce both production and future system costs through manufacturing improvements, producibility enhancements, and technology insertion. SMI will also mature potential technology upgrades at the component and system level for space and ground architecture enhancements. SMI includes studies and risk reduction activities to evolve the current SBIRS Program of Record (PoR) constellation, reduce production timelines, and reduce recurring production costs. SMI activities are balanced and phased to enable an expanded trade space and improve the competitive environment. The three major thrust areas under SMI are Demonstrations, Technology Maturation and Data Exploitation. The Demonstrations mature and demonstrate technologies with ground and on-orbit prototypes. Demonstrations advance system performance and algorithms for tactical and strategic applications to enhance PoR capabilities. Finally, demonstrations reduce program risks for future OPIR systems, whether new systems or evolutions of the current PoR. Technology Maturation assesses and addresses needs to support resiliency of PoR assets and future architectures that must respond to an evolving threat environment. Data Exploitation enables access to OPIR data sources to expand technical intelligence products, battlespace awareness processing, and data dissemination tools to support warfighters and other data users.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Demonstrations	0.000	0.000	95.520
Description: Demonstrations mature and demonstrate OPIR technologies with ground and on-orbit prototypes advance system performance, algorithms, and resiliency for future OPIR systems. The demonstrations explore technology maturation, qualification of new components, and subsystem/component prototyping to evolve the OPIR architecture. The demonstrations support maturation of Mission Data Processing (MDP) algorithms for tactical and strategic applications which are critical efforts to enhance PoR capabilities and to reduce program risks for future OPIR systems. The Wide Field Of View (WFOV) demonstration matures WFOV technology and validates multi-mission capabilities including the potential for a single sensor to simultaneously perform strategic and tactical missions. WFOV is ready for launch in FY 2021. Collection of on-orbit WFOV data is critical to develop algorithms to process large data sets generated by emerging large format focal planes and reduce risk for future architectures. The WFOV payload and bus are separate development efforts. The WFOV testbed program provides a bus capable of demonstrating on-orbit mission performance and mitigating the development risks for			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
employing WFOV sensors. The testbed program will integrate, test, and launch a prototype WFOV payload with a government-owned free-flyer spacecraft. The WFOV testbed will host the WFOV payload. As an integrated Space Vehicle, the WFOV system will prove on-orbit mission performance of WFOV sensors. The WFOV payload will provide the critical on-orbit data required to develop and validate WFOV algorithms, as well as on-board MDP throughput requirements for strategic missile warning. The Block 1 Prototype (space vehicle) is under development and will be responsive to emerging missile types and threats to the current missile warning architecture as well as evolving threats to the enterprise. The Block 1 Prototype will inform future OPIR architecture to include those achieved by the Space Force, Missile Defense Agency (MDA), and other mission partners. The Block 1 Prototype has a Class-C mission assurance with a 3-5 year designed mission life. The Block 1 Prototype is targeting an initial launch capability beginning in 2025. The technology demonstrations will incorporate resiliency capabilities while advancing the state of the art performance technology. The demonstrations will focus on the rapid advancement, technology insertion, and launch of future generations of missile warning technologies. These assets will incorporate threat mitigation technologies and other resiliency features with the goal of demonstrating these technologies in ground and on-orbit. These demonstrations will facilitate tech insertion, validate technical performance, inform future OPIR requirements, and reduce technical risk to the enterprise. ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** WFOV Demonstration: Finalize launch service integration campaign. Demo ready for launch in FY 2021. Complete WFOV OCONUS ground infrastructure bed-down. Complete Blossom Point Tracking Facility integration to support Command and Control (C2) and data dissemination. Finalize on-orbit mission calibration planning and execution. Continue support of WFOV Space Vehicle maintenance and storage. Complete any remaining integrated WFOV Space Vehicle end-to-end test and maintenance. Continue Systems Engineering, Integration and Test (SEIT) activities including pre-launch preparations, mission operations planning, and training. Conduct on-orbit checkout operations and initiate execution of the experimentation plan. Block 1 Prototype: Execute option for up to two contractors that culminates in a tailored delta Preliminary Design Review (PDR) progressing to a Space Vehicle PDR in FY 2022. Continue to mature ground integration plan. Begin development of engineering model for a resiliency ground demonstration sensor test bed. Continue procuring long lead items. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. Activities may include, but are not limited to program office support, studies, technical analysis, experimentation, prototyping, etc. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Technology Maturation	0.000	0.000	44.719

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Description: Assess technology needs to support resiliency of PoR assets and future architectures that are responsive to the evolving threat environment. Perform trade and design studies to assess obsolescence, affordability, capability design modifications, and CONOPS for the OPIR mission. Mature technologies and manufacturability to reduce cost, schedule, and technical risk for new component and subsystem designs that may be used in the future systems. Mature technologies including algorithms, Focal Plane Arrays (FPA), optical filters, on-board processors, auxiliary resiliency payloads, and other payload components for future missile warning satellites, and reconstitution capabilities. Develop modeling and simulation (M&S) capabilities, and engineering model prototypes for hardware/software integration and testing. These efforts will reduce risk and mature technologies applicable to future systems and architectures. Additionally, develop a sensor ground test bed incorporating M&S software, breadboards/brassboards, test equipment, and data reduction software to provide an evaluation capability for prototype systems and hardware. The test bed will validate/verify requirements and ensure technical maturity for next-gen payload technologies as well as threat mitigation components and techniques. ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** Initiate development of critical technologies that directly impact the performance of current technology efforts (Back-end electronics, cryocoolers, etc). Continue prototyping resilient hardware and maturing critical technologies that include large format FPAs, resilient FPAs, resilient processing algorithms, pointing mirrors, threat sensors, and processors for earliest integration into Next Gen OPIR or similar programs. Continue to develop technology options to address emerging threats and stressing targets to current and future OPIR systems. Continue to develop and space qualify emerging technologies to reduce risk for Next Gen OPIR satellites. Continue to develop system resiliency and advanced technology concepts via Hardware-in-the-Loop (HWIL) modeling and simulations in order to demonstrate performance, develop CONOPS, and prove enhanced system capabilities. Continue the integration of sensor test bed components and conduct resiliency characterization tests in the sensor ground test bed. Continue to develop on-board algorithms that support processing of large format arrays. Continue to enhance system response to emerging threats and stressing targets. Begin maturation of sensor and bus modularity concepts. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Data Exploitation ***Description:*** Data exploitation efforts will exploit existing OPIR data sources including Defense Support Program (DSP), SBIRS Highly Elliptical Orbit (HEO), SBIRS GEO Scanner, SBIRS GEO Starer, prototypes, and other sources. Efforts will exploit data through collection, processing, fusion, data dissemination, algorithm development and testing, network connectivity, and sensor performance assessments. SBIRS and other sensors provide a rich data set for exploitation. SMI data exploitation enables access to raw and processed data for data analysts and application developers to expand capabilities for battlespace awareness and	0.000	0.000	69.423

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
other applications. SMI data exploitation efforts are complementary to, and enhance, the exploitation capabilities delivered by the PoR and prototypes. SMI will develop tools and algorithms to enable users to apply OPIR data to support their mission needs. Data exploitation efforts also evaluate tools for C2, mission management, and MDP to reduce risk. Data exploitation efforts evolve the PoR ground system to an open architecture that could support PoR and other future satellite alternatives. SMI ground system development activities seek to demonstrate the performance of an evolved ground system architecture capable of supporting multiple satellites, payloads, and missions through management and data processing. These efforts seek to lower operating costs with enhanced net-centric and service oriented features with a new flexible expansion capability. Data exploitation efforts support demonstration and prototype architecture planning and experimentation. ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** Begin operations of data exploitation lab capability. Support experimentation, technology maturity, and evolution of exploitation algorithms. Continue to provide enhanced ground segment capability and tools for C2, data collection, mission processing, and data dissemination. Enhance mission resiliency and data exploitation of SBIRS and other OPIR data. Continue to collaborate with Intelligence Community (IC) and MDA to enhance Joint OPIR Ground (JOG) study initiatives. Continue development of applications for data exploitation of Infrared (IR) data within the data exploitation lab. Continue development and expansion of a Battlespace Awareness real-time capability in the OPIR Battlespace Awareness Center (OBAC) that will integrate applications and services matured in the data exploitation government lab. Continue to develop, expand, and manage the common open framework architecture of the data exploitation lab and real-time OBAC capability. Support development of experimental operations and additional uses of the program of record data in the OBAC. Develop prototype processes for managing an open framework architecture. Develop applications for the OBAC that transition to the Future Operationally Resilient Ground Evolution (FORGE). Develop and demonstrate the performance of a Government owned open and extensible evolved ground system architecture to support multiple satellites, payloads, and missions. Demonstrate data processing for any infrared payload with enhanced net-centric and service oriented features with a flexible expansion capability. Incorporate results from WFOV payload calibration into WFOV MDP software. Develop and test WFOV calibration algorithm and execute the WFOV on-orbit calibration. Support demonstration and prototype architecture planning and experimentation. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	0.000	0.000	209.662

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

C. Other Program Funding Summary ($ in Millions)

Line Item	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
• SPAF 01 Line 13: *MSSBIR: SBIR High (Space)*	108.397	233.952	176.007	-	176.007	55.188	8.337	8.487	0.000	Continuing	Continuing
• RDTE 05 1206441F: *Space Based Infrared System (SBIRS) High EMD*	60.565	-	-	-	-	-	-	-	-	0.000	60.565

Remarks

D. Acquisition Strategy

The program office will use a variety of acquisition approaches to execute various concept studies, technology maturation efforts, testbed/prototype demonstrations, and data exploitation initiatives and projects. The program office will collaborate with appropriate contracting agencies to support each individual effort. Data exploitation efforts in the laboratory and the Battlespace Awareness center will leverage existing external contracts, as well as new internal competitive contracts. Activities, such as SBIRS obsolescence and affordability enhancements to the existing satellite design, will leverage existing Program of Record contracts. Technology maturation and component prototyping and/or qualification could leverage existing contracts. Broad Agency Announcements (BAAs) and Other Transaction Authorities are planned in collaboration with Air Force Research Lab (AFRL) and other government agencies. Where practical, other efforts are competed. An SMC BAA will be used to acquire and mature high priority technology items. Federally Funded Research and Development Center (FFRDC), University Affiliated Research Centers (UARCs), and Systems Engineering and Technical Assistance (SETA) contractors will also be used to conduct and support studies. New technology, replacement components, and system designs will be acquired with government data rights to the maximum extent, allowing incorporation into future OPIR satellite production or system development. Contracting partnerships with other agencies will also be used to study, develop, demonstrate, and prove emerging capabilities. Funding in execution years will be realigned within the Next-Gen OPIR program element to respond to execution requirements. To accelerate contracting actions and program execution, a local SMC contract vehicle will be utilized for the OPIR Battlespace Awareness Center (OBAC) and government lab services.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force			Date: February 2020
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstrations	Various	Various : Various	-	-		-		86.201	Dec 2020	-		86.201	Continuing	Continuing	-
Technology Maturation	Various	Various : Various	-	-		-		40.356	Jan 2021	-		40.356	Continuing	Continuing	-
Data Exploitation	Various	Various : Various	-	-		-		62.651	Jan 2021	-		62.651	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	-		-		7.781	Oct 2020	-		7.781	Continuing	Continuing	-
		Subtotal	-	-		-		196.989		-		196.989	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : Various	-	-		-		4.986	Dec 2020	-		4.986	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		-		1.387	Oct 2020	-		1.387	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		-		6.300	Jan 2021	-		6.300	Continuing	Continuing	-
		Subtotal	-	-		-		12.673		-		12.673	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		209.662		-		209.662	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

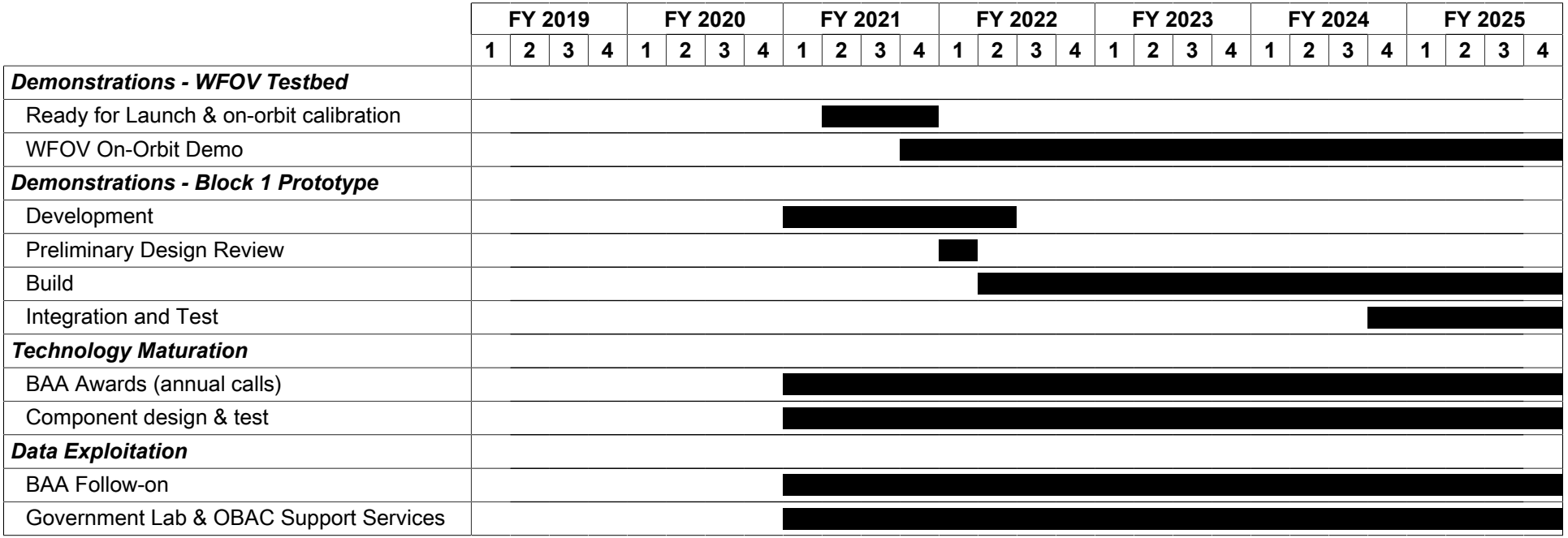

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Demonstrations - WFOV Testbed				
Ready for Launch & on-orbit calibration	2	2021	4	2021
WFOV On-Orbit Demo	4	2021	4	2025
Demonstrations - Block 1 Prototype				
Development	1	2021	2	2022
Preliminary Design Review	1	2022	1	2022
Build	2	2022	4	2025
Integration and Test	4	2024	4	2025
Technology Maturation				
BAA Awards (annual calls)	1	2021	4	2025
Component design & test	1	2021	4	2025
Data Exploitation				
BAA Follow-on	1	2021	4	2025
Government Lab & OBAC Support Services	1	2021	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*	Project (Number/Name) 657106 / *Next-Gen OPIR Ground*	

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
657106: *Next-Gen OPIR Ground*	-	0.000	0.000	498.289	0.000	498.289	539.678	340.381	357.839	364.393	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2021, PE 1206442F, Next Generation OPIR efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206442SF, Next Generation OPIR from Appropriation 3600, Budget Activity 05 due to the creation of a new Appropriation for Space Force.

Next-Gen OPIR Ground (Project 657106): Next-Gen OPIR Ground, also known as Future Operationally Resilient Ground Evolution (FORGE), will consist of Command and Control (C2) migration to US Space Force (USSF) HQ Enterprise Ground Services (EGS), modernization of Mission Data Processing (MDP) to implement an open framework, and required development and/or upgrades to Relay Ground Stations (RGS) to meet USSF HQ guidance on the current and future space domain demands. FORGE and EGS efforts combined will provide the flexibility and scalability to integrate new satellites, sensors and capabilities more rapidly and efficiently in order to meet evolving threats and warfighter needs. The Next-Gen OPIR ground efforts enable cyber enhancements for both space and ground systems. EGS will introduce common ground services such as Telemetry, Tracking, and Command (TT&C); mission management; and automation. To support initial Next-Gen OPIR Space satellite launches without driving risks into the FORGE development schedule, the program will establish a risk reduction ground Next-Gen OPIR Interim Operations (NIO) capability based on a limited Space Based Infrared System (SBIRS) Block 20 solution.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Future Operationally Resilient Ground Evolution (FORGE)- Enterprise Ground Services (EGS)/Command and Control (C2) Thrust	0.000	0.000	64.540
Description: This is not a New Start. This thrust was previously justified under the effort titled Next-Gen OPIR Ground, but has been broken out for transparency. The Space Force is transitioning to a Government owned ground architecture (Enterprise Ground Services (EGS)) that focuses on Mission Management (MM), Telemetry, Tracking, and Commanding (TT&C), and Ground Control (GC) utilizing common services. FORGE C2 creates Mission Unique Software (MUS) and provides sensor/spacecraft-specific C2 capabilities to plug into the EGS suite of services. In the future, the legacy Space Based Infrared System (SBIRS) constellation assets C2 will be transitioned to using the FORGE C2 portion of EGS.			
FY 2020 Plans: N/A			
FY 2021 Plans: Continue proof of concept development for shadow operations of legacy SBIRS GEO space vehicles. Begin to develop mission-unique C2 capability for remaining GEO assets. Use lessons learned from HEO Operations Migrations to EGS (HOME) to begin C2 migration of remaining HEO payload assets to EGS.			
FY 2020 to FY 2021 Increase/Decrease Statement:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657106 / *Next-Gen OPIR Ground*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
N/A			
Title: FORGE - Mission Data Processing (MDP) Thrust	0.000	0.000	337.549
Description: This is not a New Start. This thrust was previously justified under the effort titled Next Gen OPIR Ground, but has been broken out for transparency. The FORGE MDP effort creates a replacement for the existing legacy SBIRS Ground mission processing applications which has cyber security and scalability limitations. MDP is creating a cyber-resilient, flexible, and scalable open framework capable of meeting tomorrow's threats. MDP will plan Overhead Persistent Infra-Red (OPIR) and other mission data resource utilization to meet warfighter requirements in the future. MDP provides the ability to: ingest and publish varying levels of processed data for enhanced processing; perform efficient and systematic upgrades; and orchestrate real-time wideband processing for Integrated Threat Warning/Attack Assessment (ITW/AA) and non-ITW/AA mission areas. The MDP system provides modular mission applications to meet the future challenges of Missile Warning (MW), Missile Defense (MD), Battlespace Awareness (BA), Technical Intelligence (TI), and Civil/Environmental (C/E). MDP is critical to making cyber-secure, effective use of the increased amounts of data that will be collected by Next-Gen OPIR. ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** Continue development of MDP system framework and initial applications. Establish MDP capability in contractor facilities and Government laboratory environment. Award follow-on MDPAP effort. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Next Gen Interim Operations (NIO)	0.000	0.000	50.200
Description: This is not a New Start. This thrust was previously justified under the effort titled Next Gen OPIR Ground, but has been broken out for transparency. The NIO effort is a risk reduction effort for FORGE. It is being developed simultaneously with the full Next-Gen OPIR Ground efforts in order to ensure the most critical ground processing is ready in time for the first Next-Gen OPIR satellite launch. It will provide the ability to perform limited processing of the data from the NGG asset using the FORGE solutions. The NIO solution will create mono tracks and publish those mono tracks to the existing SBIRS Block 20 ground system for fusion and dissemination to the warfighter. NIO follows a similar paradigm utilized for processing the initial HEO and GEO assets where HEO Mono Tracks (HMTs) and GEO Mono Tracks (GMTs) were fused outside of the operational baseline. ***FY 2020 Plans:***			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657106 / *Next-Gen OPIR Ground*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
N/A ***FY 2021 Plans:*** Complete the Critical Design Review and begin to develop the risk reduction system. Scale the scope of the risk reduction development based on evolving technology maturity level of the FORGE C2/MDP solutions. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Title: Relay Ground Stations (RGSs) ***Description:*** This is not a New Start. This thrust was previously justified under the effort titled Next Gen OPIR Ground, but has been broken out for transparency. OPIR data collected in space must be relayed to ground entry points and routed to provide warfighters with timely information. The legacy SBIRS ground architecture requires RGS upgrades and new RGSs to receive OPIR data from legacy and future Next-Gen OPIR assets. This effort expands the set of RGSs to include up to three RGSs that will use common hardware capable of supporting both GEO and Polar assets. This effort will and provide data to the Mission Control Station for processing and dissemination to warfighters and National Command Authorities. The RGS modernization effort will include the ability to operate antennas, process data, and integrate to support older Defense Support Program (DSP) assets. ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** Continue build-out of the RGS facility which is an integral part of RGS development and prepare for installation/checkout of modernized capabilities. Perform site surveys and planning for the next RGS site. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A	0.000	0.000	46.000
Accomplishments/Planned Programs Subtotals	0.000	0.000	498.289

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Next Gen OPIR Ground program has been declared a Section 804 Rapid Prototype effort under the 2016 National Defense Authorization Act (NDAA), effective December 2019. Up to this point, FORGE has utilized existing Space and Missile Systems Center (SMC) contracts to transition SBIRS C2 satellite operations to EGS.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657106 / *Next-Gen OPIR Ground*

SMC intends to compete a MDP framework provider and MDP applications provider via Other Transaction Authority (OTA). EGS infrastructure modernization and FORGE MDP will introduce competition into OPIR ground systems with an emphasis to on ramp to EGS as soon as practical. NIO is being acquired as part of the Next-Gen GEO Block 0 contract. RGS(s) will be developed utilizing a combination of existing and future contracts using competitive processes whenever possible.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*	Project (Number/Name) 657106 / *Next-Gen OPIR Ground*	

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FORGE-EGS/C2	TBD	TBD : TBD	-	-		-		64.540	Nov 2020	-		64.540	Continuing	Continuing	-
FORGE - MDP	TBD	TBD : TBD	-	-		-		288.835	Nov 2020	-		288.835	Continuing	Continuing	-
Next Gen Interim Operations (NIO) (Risk Reduction Option)	TBD	TBD : TBD	-	-		-		50.200	Nov 2020	-		50.200	Continuing	Continuing	-
Relay Ground Stations (RGS)	TBD	TBD : TBD	-	-		-		46.000	Nov 2020	-		46.000	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	Engility Corp. : Andover, MA	-	-		-		7.027	Nov 2020	-		7.027	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corporation : El Segundo, CA	-	-		-		7.928	Nov 2020	-		7.928	Continuing	Continuing	-
		Subtotal	-	-		-		464.530		-		464.530	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corporation : El Segundo, CA	-	-		-		5.438	Jan 2021	-		5.438	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		-		18.352	Feb 2021	-		18.352	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		-		9.969	Nov 2020	-		9.969	Continuing	Continuing	-
		Subtotal	-	-		-		33.759		-		33.759	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		498.289		-		498.289	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657106 / *Next-Gen OPIR Ground*

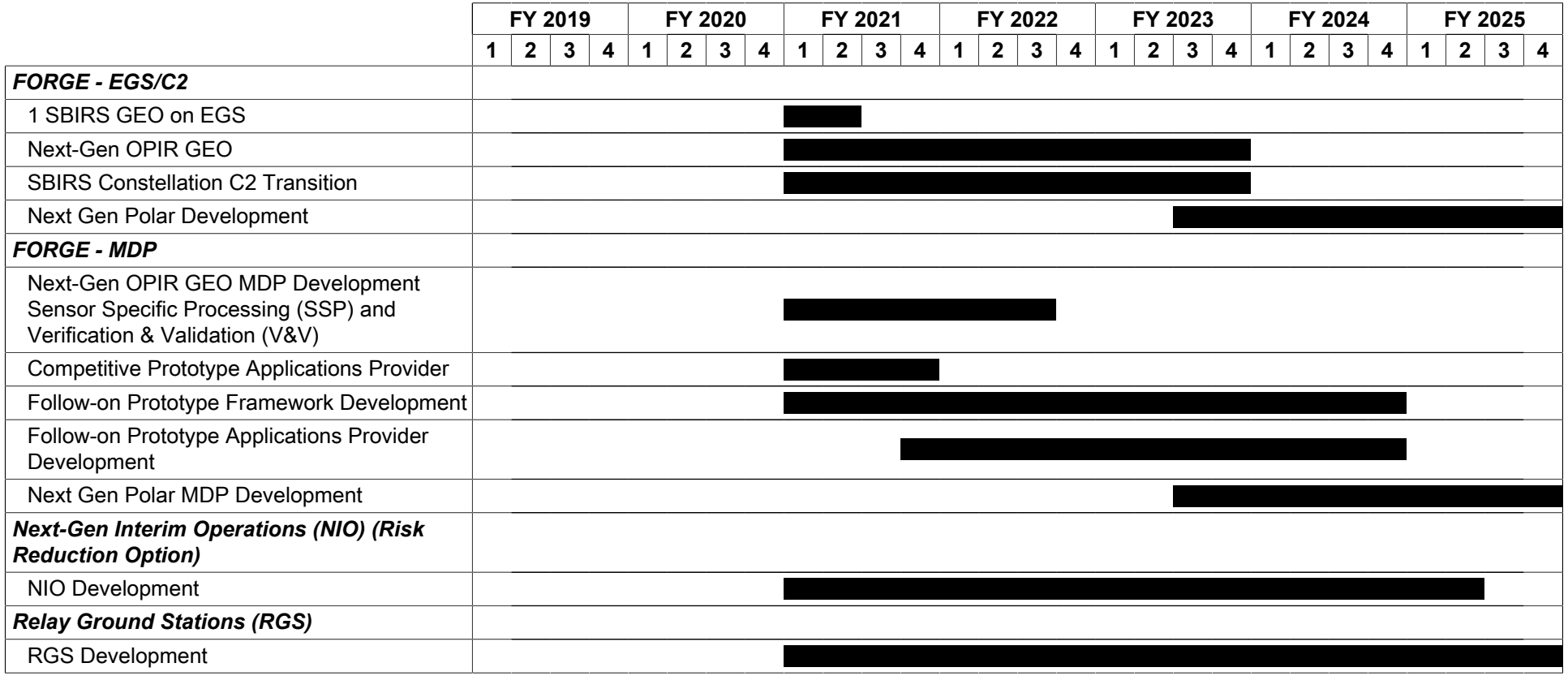

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657106 / *Next-Gen OPIR Ground*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
FORGE - EGS/C2				
1 SBIRS GEO on EGS	1	2021	2	2021
Next-Gen OPIR GEO	1	2021	4	2023
SBIRS Constellation C2 Transition	1	2021	4	2023
Next Gen Polar Development	3	2023	4	2025
FORGE - MDP				
Next-Gen OPIR GEO MDP Development Sensor Specific Processing (SSP) and Verification & Validation (V&V)	1	2021	3	2022
Competitive Prototype Applications Provider	1	2021	4	2021
Follow-on Prototype Framework Development	1	2021	4	2024
Follow-on Prototype Applications Provider Development	4	2021	4	2024
Next Gen Polar MDP Development	3	2023	4	2025
Next-Gen Interim Operations (NIO) (Risk Reduction Option)				
NIO Development	1	2021	2	2025
Relay Ground Stations (RGS)				
RGS Development	1	2021	4	2025

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*	Project (Number/Name) 657120 / *Next-Gen OPIR Space, Block 0 GEO*	

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
657120: *Next-Gen OPIR Space, Block 0 GEO*	-	0.000	0.000	1,128.900	0.000	1,128.900	1,157.467	1,330.876	1,316.512	728.974	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

FY 2021: $160M added to fund FY20 scope of work for Next-Gen GEO, providing the requisite backstop in the event a FY 2020 Above Threshold Reprogramming is unattainable.

A. Mission Description and Budget Item Justification

In FY 2021, PE 1206442F, Next Generation OPIR efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206442SF, Next Generation OPIR from Appropriation 3600, Budget Activity 05 due to the creation of a new Appropriation for Space Force.

Next-Generation Overhead Persistent Infrared (Next-Gen OPIR) Space Block 0 Geosynchronous Earth Orbit (GEO) (Project 657120): The primary mission is to provide initial missile warning of a ballistic missile attack on the US, deployed forces and allies. The Next-Gen OPIR GEO (NGG) missile warning satellites enhance detection and improve reporting of intercontinental ballistic missile launches, submarine ballistic missile launches, and tactical ballistic missile launches. Development consists of new payloads in a highly resilient bus, providing real-time persistent global infrared coverage to meet validated Joint Requirements Oversight Council (JROC) requirements on current and future space domain demands.

The Program Office intends to acquire the NGG capability in two contract actions. Phase 1 awarded in August 2018 encompasses requirements analysis, design/ development, critical path flight hardware procurement, and risk reduction efforts leading to a System Critical Design Review (CDR). Phase 2 will be awarded in FY 2021 for the manufacturing, assembly, system integration and test, launch, and early on-orbit test through operational acceptance of NGG satellites 1-3.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Next-Gen OPIR Space, Block 0 GEO	0.000	0.000	1,128.900
Description: Development of the Next-Gen OPIR GEO missile warning satellites with a proven bus, new hardened sensors, and auxiliary payloads for increased resilience. The space segment for GEO missile warning satellites consist of a resilient architecture providing real time persistent global equatorial infrared coverage. The first GEO satellite is required in FY 2025.			
FY 2020 Plans: N/A			
FY 2021 Plans:			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657120 / *Next-Gen OPIR Space, Block 0 GEO*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Continue to perform requirements analysis, design/development, critical path flight hardware procurement, and risk reduction efforts leading to a System Critical Design Review (CDR) for GEO satellites in FY 2021. Conduct CDR for the payload to evaluate progress and performance of the payload design. Complete detailed design, ramp-up procurement and integration of the functional test bed. Award the Phase 2 contract modification to begin the manufacture, build, integration, test, and launch of the GEO SVs. Purchase critical path flight hardware for SVs #2 & 3 under Phase 2 contract award. Continue to purchase required flight hardware for SV #1 and begin build of SV #1 subsystem components following each subsystem CDR. Rapidly respond to implement system resiliency and situational awareness necessary to operate in the contested space domain. These activities may include, but are not limited to program office support, studies, technical analysis, prototyping, etc. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	0.000	0.000	1,128.900

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Space Force intends to acquire Next-Gen systems in block developments to deliver the required constellation. The first block, Block 0, consists of 3 Next-Gen GEO and 2 Next-Gen Polar satellites. The Next-Gen OPIR Space program has been declared a Section 804 Rapid Prototype effort under the 2016 National Defense Authorization Act (NDAA). The first GEO satellite is required by FY 2025 and the first Polar satellite is required in FY 2027. All five Block 0 satellites need to be on orbit by FY 2029. The program office awarded two sole source contracts (one to a GEO prime and one to a Polar prime) under the authority of two Justification & Authorization documents. Next-Gen GEO Phase 1 was awarded in FY 2018, encompassing requirements analysis, design/development, critical path flight hardware procurement, and risk reduction efforts leading to a System Critical Design Review for SV #1. Next-Gen GEO Phase 2 will be awarded in FY 2021 as a modification to the Phase 1 contract. This will include material buys for SV #2 and #3, as well as complete the manufacturing, assembly, system integration and test, launch, and early on-orbit test through the delivery of GEOs 1-3 for operational acceptance of each space vehicle. The Block 1 satellites will be based on the Missile Warning and Missile Defense OPIR Capability Development Document (CDD), validated by the Joint Requirements Oversight Council (JROC) in May 2019. Funding in execution years will be realigned within the Next-Gen OPIR program element to respond to execution requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657120 / *Next-Gen OPIR Space, Block 0 GEO*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next-Gen OPIR Space, Block 0 GEO	SS/CPIF	Lockheed Marin : Sunnyvale, CA	-	-		-		1,069.066	Oct 2020	-		1,069.066	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	Engility Corp. : El Segundo, CA	-	-		-		13.870	Nov 2020	-		13.870	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp. : El Segundo, CA	-	-		-		11.003	Oct 2020	-		11.003	Continuing	Continuing	-
		Subtotal	-	-		-		1,093.939		-		1,093.939	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp. : El Segundo, CA	-	-		-		3.624	Oct 2020	-		3.624	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		-		11.352	Feb 2021	-		11.352	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		-		19.985	Oct 2020	-		19.985	Continuing	Continuing	-
		Subtotal	-	-		-		34.961		-		34.961	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		1,128.900		-		1,128.900	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657120 / *Next-Gen OPIR Space, Block 0 GEO*

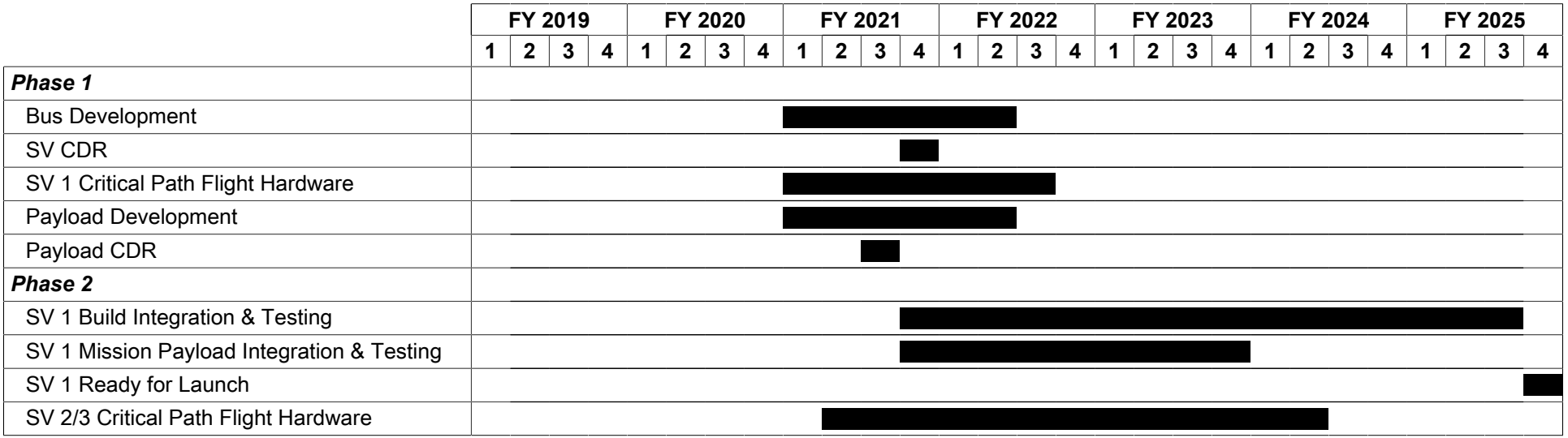

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657120 / *Next-Gen OPIR Space, Block 0 GEO*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Phase 1				
Bus Development	1	2021	2	2022
SV CDR	4	2021	4	2021
SV 1 Critical Path Flight Hardware	1	2021	3	2022
Payload Development	1	2021	2	2022
Payload CDR	3	2021	3	2021
Phase 2				
SV 1 Build Integration & Testing	4	2021	3	2025
SV 1 Mission Payload Integration & Testing	4	2021	4	2023
SV 1 Ready for Launch	4	2025	4	2025
SV 2/3 Critical Path Flight Hardware	2	2021	2	2024

Note

Next-Gen OPIR Space, Block 0 GEO efforts continue past 2025.

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force			Date: February 2020
Appropriation/Budget Activity 3620F / 5	R-1 Program Element (Number/Name) PE 1206442SF / *Next Generation OPIR*	Project (Number/Name) 657121 / *Next-Gen OPIR Space, Block 0 Polar*	

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
657121: *Next-Gen OPIR Space, Block 0 Polar*	-	0.000	0.000	482.013	0.000	482.013	421.826	581.657	579.027	717.000	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

In FY 2021, PE 1206442F, Next Generation OPIR efforts were transferred to Appropriation 3620, Research, Development, Test & Evaluation, Space Force, PE 1206442SF, Next Generation OPIR from Appropriation 3600, Budget Activity 05 due to the creation of a new Appropriation for Space Force.

Next-Generation Overhead Persistent Infrared (OPIR) Space, Block 0 Polar (NGP) (Project 657121): The primary mission is to provide initial missile warning of a ballistic missile attack on the US, its deployed forces, and its allies. Next-Gen OPIR Space enhances detection and improves reporting of intercontinental ballistic missile launches, submarine launched ballistic missile launches, and tactical ballistic missile launches. Development consists of the Next-Gen OPIR Polar missile warning satellites with new payloads in a highly resilient bus, providing real-time persistent global infrared coverage to meet validated Joint Requirements Oversight Council (JROC) requirements on current and future space domain demands.

The Program Office intends to acquire the NGP capability in three contract actions. Phase 0 awarded in June 2018, encompasses system requirements analysis and risk reduction efforts leading to a System Requirements Review (SRR). Phase 1 will be awarded for design and development, critical path flight hardware procurement, and risk reduction efforts leading to a System Critical Design Review (CDR). Phase 2 will be awarded for the manufacturing, assembly, integration and test, and early on-orbit test, through operational acceptance of NGP satellites 1 and 2.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Title: Next-Gen OPIR Space, Block 0 Polar	0.000	0.000	482.013
Description: Development of the NGP missile warning satellites using a proven bus with modifications, auxiliary payloads for improved resiliency, and new hardened sensors. The Polar space segment will consist of two NGP satellites in a resilient architecture, providing real time persistent infrared coverage of the northern hemisphere. ***FY 2020 Plans:*** N/A ***FY 2021 Plans:*** Ramp up Phase 1 activities including systems engineering and software design to ensure a successful Polar System Preliminary Design Review (PDR) in FY 2021. Perform analysis for requirements unique to Polar bus and payload. Meet new missile warning requirements by balancing affordability, capability, and resiliency. Continue Phase 1 activities to include design/development, risk reduction efforts, and initial procurement of mission critical flight hardware. Continue efforts leading to a System Critical			

Exhibit R-2A, RDT&E Project Justification: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657121 / *Next-Gen OPIR Space, Block 0 Polar*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2019	FY 2020	FY 2021
Design Review (CDR) for Polar Satellites in FY 2022. Rapidly respond to incorporate system resiliency and situational awareness requirements necessary to operate in the contested space domain. These activities may include, but are not limited to program office support, studies, technical analysis, prototyping, critical hardware, etc. ***FY 2020 to FY 2021 Increase/Decrease Statement:*** N/A			
Accomplishments/Planned Programs Subtotals	0.000	0.000	482.013

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Space Force intends to acquire Next-Gen systems in block developments to deliver the required constellation. The first block, Block 0, consists of three Next-Gen Geosynchronous Earth Orbit (GEO) and two Next-Gen Polar satellites. The Next-Gen OPIR Space program has been declared a Section 804 Rapid Prototype effort under the 2016 National Defense Authorization Act (NDAA). The first GEO satellite is required by FY2025, and the first Polar satellite is required in FY2027. All five Block 0 satellites need to be on orbit by FY2029. The program office awarded two sole source contracts (one to a GEO prime and one to a Polar prime) under the authority of two Justification & Authorization documents. The Next-Gen Polar Phase 0 was awarded in FY 2018, consisting of requirements development and culminates in a FY 2020 SRR. Phase 1 will be awarded in FY 2020, encompassing requirements review, design, development, critical path flight hardware procurement, and risk reduction efforts leading to a System CDR for Next-Gen Polar Satellite Vehicles (SV) 1 and 2. Phase 2 will be awarded in FY 2022, encompassing build, integration, test, launch, and transition to operations for Next-Gen Polar SVs 1 and 2. The Space Force plans to acquire subsequent blocks in a competitive environment. The Block 1 satellites will be based on the Missile Warning and Missile Defense OPIR Capability Development Document (CDD), validated by the Joint Requirements Oversight Council (JROC) in May 2019. Funding in execution years will be realigned within the Next-Gen OPIR program element to respond to execution requirements.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657121 / *Next-Gen OPIR Space, Block 0 Polar*

Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next-Gen OPIR Space, Block 0 Polar	SS/CPAF	Northrop Grumman : Redondo Beach, CA	-	-		-		453.859	Oct 2020	-		453.859	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	Engility Corp. : El Segundo, CA	-	-		-		7.455	Nov 2020	-		7.455	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp. : El Segundo, CA	-	-		-		6.484	Oct 2020	-		6.484	Continuing	Continuing	-
		Subtotal	-	-		-		467.798		-		467.798	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2019 Cost	FY 2019 Award Date	FY 2020 Cost	FY 2020 Award Date	FY 2021 Base Cost	FY 2021 Base Award Date	FY 2021 OCO Cost	FY 2021 OCO Award Date	FY 2021 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp. : El Segundo, CA	-	-		-		2.135	Oct 2020	-		2.135	Continuing	Continuing	-
A&AS	Various	Various : Various	-	-		-		5.837	Feb 2021	-		5.837	Continuing	Continuing	-
Other Support	Various	Various : Various	-	-		-		6.243	Oct 2020	-		6.243	Continuing	Continuing	-
		Subtotal	-	-		-		14.215		-		14.215	Continuing	Continuing	N/A

	Prior Years	FY 2019		FY 2020		FY 2021 Base		FY 2021 OCO		FY 2021 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	-		0.000		482.013		-		482.013	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657121 / *Next-Gen OPIR Space, Block 0 Polar*

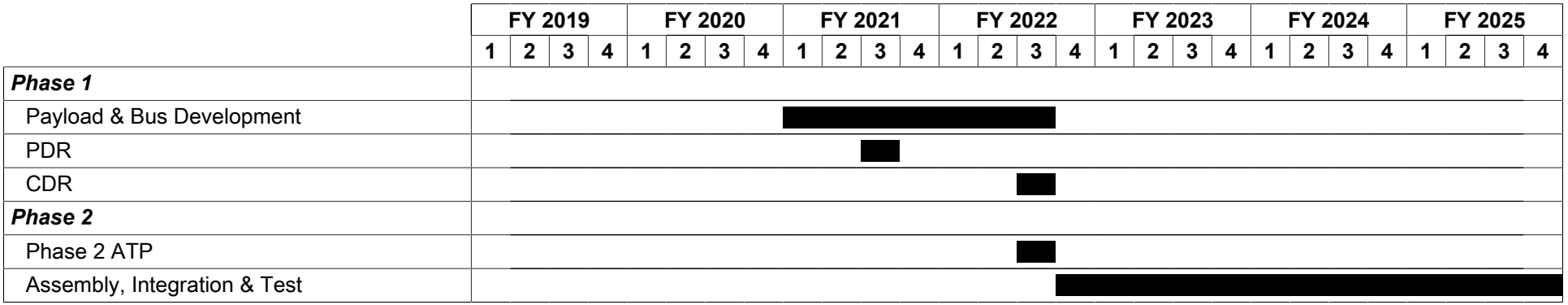

Exhibit R-4A, RDT&E Schedule Details: PB 2021 Air Force		Date: February 2020
Appropriation/Budget Activity 3620F / 5	**R-1 Program Element (Number/Name)** PE 1206442SF / *Next Generation OPIR*	**Project (Number/Name)** 657121 / *Next-Gen OPIR Space, Block 0 Polar*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Phase 1				
Payload & Bus Development	1	2021	3	2022
PDR	3	2021	3	2021
CDR	3	2022	3	2022
Phase 2				
Phase 2 ATP	3	2022	3	2022
Assembly, Integration & Test	4	2022	4	2025

Note

Next-Gen OPIR Polar efforts continue past 2025