Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force											Date: February 2019	
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*					R-1 Program Element (Number/Name) PE 1206442F / *Next Generation OPIR*							
COST ($ in Millions)	**Prior Years**	**FY 2018**	**FY 2019**	**FY 2020 Base**	**FY 2020 OCO**	**FY 2020 Total**	**FY 2021**	**FY 2022**	**FY 2023**	**FY 2024**	**Cost To Complete**	**Total Cost**
Total Program Element	-	439.497	643.126	1,395.278	0.000	1,395.278	1,989.520	2,287.702	2,669.754	3,075.826	Continuing	Continuing
657009: *Space Mod Initiative*	-	173.584	186.556	205.723	0.000	205.723	209.731	200.731	221.409	225.394	Continuing	Continuing
657106: *Next-Gen OPIR Ground*	-	71.018	257.865	264.768	0.000	264.768	498.453	539.678	340.490	357.950	Continuing	Continuing
657120: *Next-Gen OPIR Space, Block 0 GEO*	-	185.611	198.705	817.383	0.000	817.383	969.220	1,157.467	1,331.302	1,316.920	Continuing	Continuing
657121: *Next-Gen OPIR Space, Block 0 Polar*	-	9.284	0.000	107.404	0.000	107.404	312.116	389.826	581.843	579.207	Continuing	Continuing
657122: *Next-Gen OPIR Space, Block 1**	-	0.000	0.000	0.000	0.000	0.000	0.000	0.000	194.710	596.355	Continuing	Continuing

*This project's R-2a exhibit has been suppressed due to funding not beginning until after FY 2020

Note

- PE 1206442F nomenclature has been updated to "Next-Generation OPIR" from "Evolved SBIRS."
- Project 657106 nomenclature has been updated to "Next-Generation OPIR Ground" from "Evolved SBIRS" to reflect the true mission of the Project.
- In FY2019 Project 657120 has been broken out into three Projects in order to improve transparency:
--Project 657120 nomenclature has been updated to "Next-Gen OPIR Space, Block 0 GEO" from "Evolved SBIRS Space."
--Project 657121, "Next-Gen OPIR Space, Block 0 Polar," is a new Project to provide improved transparency.
--Project 657122, "Next-Gen OPIR Space, Block 1," is a new Project to improve transparency.
- Congressional direction transferred FY2018 funding from Project 657009, "Space Modernization Initiative" (SMI), PE 1206441F to PE 1206442F in order to isolate SBIRS Program of Record (PoR) development through completion and align SMI with future efforts.

A. Mission Description and Budget Item Justification

The Next-Generation Overhead Persistent Infrared (Next-Gen OPIR) RDT&E FY2020 budget justification exhibits describe the Next-Gen OPIR Space, Ground, and Space Modernization Initiative (SMI) programs.

1. Next-Gen OPIR Space Modernization Initiative (SMI) (Project 657009): SMI supports the SBIRS Program of Record (PoR) and Next-Gen OPIR by assessing future parts and material obsolescence, designing space and ground modifications focused on affordability and capability, and maximizing the effectiveness of existing system data products. SMI funds engineering activities to reduce both production and future system costs through manufacturing and 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 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 and battlespace awareness processing and data dissemination tools to support warfighters and other data users.

Reduce SMI saved $25.000M in FY 2020. Reduce SMI identified excess need in engineering efforts for space modernization in FY 2020. Funding decreases do not affect technology maturation for insertion into Next-Gen OPIR Block 1. Funding contributes to the acceleration of the Next-Gen OPIR initial launch capability.

2. 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 Air Force Space Command's Enterprise Ground Services (EGS), modernization of Mission Data Processing (MDP), and required development/upgrades to Relay Ground Stations (RGS) to meet AFSPC guidance on the current and future space domain demands. The FORGE effort will implement an open framework for MDP and migration of C2 satellite operations to integrate with EGS. FORGE and EGS efforts will provide the flexibility and scalability to integrate new sensors and capabilities more efficiently in order to meet evolving warfighter needs. The Next-Gen OPIR ground also includes risk reduction efforts to enable cyber enhancements for the PoR and Next-Gen OPIR ground systems. EGS will introduce common ground services such as Telemetry, Tracking and Command (TT&C) and automation. To support initial Next-Gen OPIR Space satellite launches without driving undue risk into the FORGE development schedule, the program will establish a risk reduction ground capability Next-Gen OPIR Interim Operations (NIO) option based on a limited Block 20 solution that can be exercised.

3. Next-Gen OPIR Space: Is a transition from the legacy Space Based Infrared System (SBIRS) program. 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 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 GEO and Polar satellites in sufficient number to meet global warning coverage with no exploitable holes (5 GEO + 2 Polar) plus required backup and attrition and reconstitution reserve. The Air 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 FY2025 and the first Polar satellite is required in FY2027. All five Block 0 satellites need to be on orbit by FY2029. Follow-on blocks will be addressed in future acquisition strategies.

Next-Gen OPIR Space, Block 0 Geosynchronous Earth Orbit (GEO)(NGG) (Project 657120): The Program Office intends to acquire the NGG capability in two contract actions. Phase 1 was awarded in August 2018 and 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 for the manufacturing, assembly, system integration and test, launch and early on-orbit test through the delivery of NGGs 1-3 for operational acceptance of each space vehicle.

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, encompassing system and payload requirements analysis and risk reduction efforts leading to a System Requirements Review. 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. Phase 2 will be awarded for the manufacturing, assembly, integration and test, and delivery of NGP satellites 1&2.

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
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Next-Gen OPIR Space, Block 1 (Project 657122): The Air Force plans to acquire subsequent blocks in a competitive environment. The Block 1 satellites will be based on the Enterprise OPIR Capability Development Document (CDD), validated by the Joint Requirements Oversight Council (JROC). The Next Gen OPIR Block 1 program acquisition will begin in FY2023 in time to deliver its first satellite by FY2030.

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.

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

As directed in the FY 2018 NDAA, Sec 825, amendment to PL 114-92 FY 2016 NDAA, Sec 828 Penalty for Cost Overruns, the FY 2018 Air Force penalty total is $14.373M. The calculated percentage reduction to each research, development, test and evaluation and procurement account will be allocated proportionally from all programs, projects, or activities under such account.

This program is in Budget Activity 5, System Development and Demonstration (SDD) because it has passed Milestone B approval and is conducting engineering and manufacturing development tasks aimed at meeting validated requirements prior to full rate production.

B. Program Change Summary ($ in Millions)	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total
Previous President's Budget	71.018	643.126	936.450	0.000	936.450
Current President's Budget	439.497	643.126	1,395.278	0.000	1,395.278
Total Adjustments	368.479	0.000	458.828	0.000	458.828
• 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	256.004	0.000			
• Reprogrammings	112.475	0.000			
• SBIR/STTR Transfer	0.000	0.000			
• Other Adjustments	0.000	0.000	458.828	0.000	458.828

Exhibit R-2, RDT&E Budget Item Justification: PB 2020 Air Force	Date: February 2019
Appropriation/Budget Activity 3600: *Research, Development, Test & Evaluation, Air Force* / BA 5: *System Development & Demonstration (SDD)*	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*

Change Summary Explanation

FY 2018: $173.584M transferred from PE 1206441F and realigned into SMI; funds reprogrammed from PE 1203915F to increase transparency; $73.136M transferred into Next-Gen OPIR Space, Block 0 GEO; $9.284M transferred into Next-Gen OPIR Space, Block 0 Polar. In Sept 2018, Congress approved an above threshold reprogramming to add $112.475M into Next-Gen OPIR Space, Block 0 GEO to support launch timeline acceleration.

FY 2020: -$25.000M from SMI to support acceleration of Next-Gen OPIR; +311.324M to support launch timeline acceleration for Next-Gen OPIR Space, Block 0 GEO; +$51.800M to Next-Gen OPIR Space, Block 0 GEO to reduce schedule risk to meet the initial launch capability date; +37.404M for Next-Gen OPIR Space, Block 0 Polar to support launch timeline acceleration; +$83.300M to accelerate ground development to support launch timelines.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206442F / *Next Generation OPIR*	Project (Number/Name) 657009 / *Space Mod Initiative*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
657009: *Space Mod Initiative*	-	173.584	186.556	205.723	0.000	205.723	209.731	200.731	221.409	225.394	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

SMI supports the SBIRS Program of Record (PoR) and Next Gen OPIR by assessing future parts and material obsolescence, designing space and ground modifications focused on affordability and capability, and maximizing the effectiveness of existing system data products. SMI funds engineering activities to reduce both production and future system costs through manufacturing and 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 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 in ground and on-orbit prototypes, advance system performance and algorithms for tactical and strategic applications to enhance PoR capabilities and 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 responsive to the evolving threat environment. Data Exploitation enables access to OPIR data sources to expand technical intelligence and battlespace awareness processing and data dissemination tools to support warfighters and other data users.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Demonstrations	51.705	60.325	113.838
Description: The Demonstrations mature and demonstrate OPIR technologies in 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 MDP algorithms for tactical and strategic applications which are critical efforts to enhance PoR capabilities and to reduce program risks for future OPIR systems, whether new systems, reconstitution, or evolutions of the PoR. 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. Collection of on-orbit WFOV data is critical to develop algorithms to process large data sets generated by emerging large format focal planes and to reduce risk for possible 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 employing WFOV sensors. The testbed program will integrate, test, and launch a prototype, developmental 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.			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020

The Technology Demonstration space vehicle prototype(s) under development is responsive to emerging missile types and threats to the current missile warning architecture, as well as the rapidly evolving threats to the enterprise to inform the future OPIR architecture to include SBIRS, the Missile Defense Agency (MDA), and other mission partners. The assets will be Class-C mission assurance prototype(s) with a 3-5 year designed mission life and 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 and system resiliency components. 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 2019 Plans:

Complete support of WFOV Space Vehicle integration and test. Begin integrated WFOV Space Vehicle end-to-end test and maintenance. Continue Systems Engineering, Integration and Test (SEIT) activities, including inter-segment testing and Information Assurance accreditation approval. Begin launch service integration. Continue concept refinement of technology demonstration space vehicles, and hold design reviews. Select up to two contractors to develop a system level Critical Design Review (CDR) design, mature ground integration plan, begin development of engineering model for a resiliency ground demonstration in sensor test bed, and begin procuring long lead items. Continue program office support and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.

FY 2020 Plans:

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 and mission operations planning. Finalize launch service integration campaign. Execute multiple design efforts through System CDR and initiate build of Technology Demonstration program and associated ground aimed at Concept of Operations (CONOPS) and reducing technical risks for future blocks of Next Gen OPIR programs. Block 1 Prototype: Hold a System Requirements Review. Execute option for up to five contractors that culminates in a tailored Preliminary Design Review (PDR). Continue to mature ground integration plan, begin development of engineering model for a resiliency ground demonstration in sensor test bed, and begin 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, space and ground prototyping, etc.

FY 2019 to FY 2020 Increase/Decrease Statement:

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
FY 2020 increased compared to FY 2019 by $53.513M. Justification for this increase includes launch support and initial operations for WFOV. Furthermore, the cost increase supports initial requirements study and development for the Block 1 prototype demonstration.			
Title: Technology Maturation	52.944	59.909	32.118
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 to include 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 to reduce risk and mature technologies applicable to future systems and architectures. Develop 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 2019 Plans:*** Continue prototyping resilient hardware and maturing critical technologies that include large format FPAs, resilient FPAs, resilient processing algorithms, pointing mirrors, threat warning sensors, and processors. 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 SBIRS and future OPIR programs. Continue to develop system resiliency and advanced technology concepts via ground and on-orbit demos in order to validate requirements, demonstrate performance, develop CONOPS, and prove enhanced system capabilities. Continue the integration of sensor test bed components and begin resiliency tests in sensor ground test bed. ***FY 2020 Plans:*** 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 ground and on-orbit demos in order to demonstrate performance, develop CONOPS, and prove enhanced system capabilities. Continue the integration of sensor test bed components and resiliency tests in sensor ground test bed. Begin maturation of sensor and bus modularity concepts. Rapidly			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
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 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 decreased compared to FY 2019 by $27.791M. Justification for this decrease is described in plans above.			
Title: Data Exploitation ***Description:*** Exploit existing OPIR data sources (Defense Support Program (DSP), SBIRS Highly Elliptical Orbit (HEO), SBIRS GEO Scanner, SBIRS GEO Starer, SMI and other prototypes, and other sources to include classified through data 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 other applications. SMI data exploitation efforts are complementary to, and enhance, the exploitation capabilities delivered by the PoR, prototypes, and inform future PoR exploitation efforts. 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 for risk reduction to evolve the PoR ground system to an open architecture that could support PoR and other future satellites and payload alternatives. SMI ground system development activities seek to demonstrate the performance of an evolved ground system architecture capable of supporting multi-satellite, multi-payload, multi-mission management and data processing for any infrared payload to achieve lower operating costs with enhanced net-centric and service oriented features along with a flexible expansion capability that was not designed into the current PoR ground system. Support demonstration and prototype architecture planning and experimentation. ***FY 2019 Plans:*** Continue to provide enhanced ground segment capability and tools for C2, data collection, mission processing, and data dissemination to 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 building and expansion of data exploitation lab capability into its final location and support experimentation, technology maturity and evolution of exploitation algorithms. 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. Develop and demonstrate the performance of an evolved ground system architecture to support multi-satellite, multi-payload, multi-mission management and data processing for any infrared payload with enhanced net-centric and service oriented features along with a flexible expansion capability. Incorporate results from WFOV payload calibration into WFOV MDP software. Develop and test WFOV calibration algorithm. Begin preparation for WFOV on-orbit calibration support. ***FY 2020 Plans:***	68.935	66.322	59.767

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
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B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Continue to provide enhanced ground segment capability and tools for C2, data collection, mission processing, and data dissemination to 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. Complete building and expansion of data exploitation lab capability into its final location and support experimentation, technology maturity and evolution of exploitation algorithms. 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 and developing applications for the OBAC and transition those processes to the OPIR Next Generation, Future Operationally Resilient Ground Evolution (FORGE). Develop and demonstrate the performance of a Government owned open and extensible evolved ground system architecture to support multi-satellite, multi-payload C2, multi-mission management and data processing for any infrared payload with enhanced net-centric and service oriented features along 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 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 decreased compared to FY 2019 by $6.555M. Justification for this decrease is described in plans above.			
Accomplishments/Planned Programs Subtotals	173.584	186.556	205.723

C. Other Program Funding Summary ($ in Millions)

Line Item	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
• SPAF 01 Line 13: *MSSBIR: SBIR High (Space)*	929.058	108.397	233.952	-	233.952	176.065	55.188	8.340	8.490	Continuing	Continuing
• RDTE 05 1206441F: *Space Based Infrared System (SBIRS) High EMD*	0.000	10.129	0.000	-	0.000	-	-	-	-	0.000	10.129

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; in fact

many are planned in collaboration with Air Force Research Lab (AFRL) and other government agencies. Where practical, other efforts could be competed. An SMC BAA will be used to acquire and mature high priority technology items requiring program office control to ensure goals are met. 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 to allow their incorporation into any 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.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force			Date: February 2019
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Product Development ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Demonstrations	Various	Various : Various	-	30.844	Dec 2017	39.753	Dec 2018	91.796	Dec 2019	-		91.796	Continuing	Continuing	-
Technology Maturation	Various	Various : Various	-	52.944	Dec 2017	59.909	Jan 2019	32.118	Jan 2020	-		32.118	Continuing	Continuing	-
Data Exploitation	Various	Various : Various	-	68.935	Dec 2017	66.322	Jan 2019	59.767	Jan 2020	-		59.767	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace : El Segundo, CA	-	3.726	Oct 2017	8.493	Oct 2018	8.095	Oct 2019	-		8.095	Continuing	Continuing	-
		Subtotal	-	156.449		174.477		191.776		-		191.776	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	Various	Various : Various	-	3.232	Oct 2017	5.081	Dec 2018	5.018	Dec 2019	-		5.018	Continuing	Continuing	-
A&AS	Various	Various : Various	-	1.852	Aug 2018	1.359	Feb 2019	2.371	Oct 2019	-		2.371	Continuing	Continuing	-
Other Support	Various	Various : Various	-	12.051	Feb 2018	5.639	Jan 2019	6.558	Jan 2020	-		6.558	Continuing	Continuing	-
		Subtotal	-	17.135		12.079		13.947		-		13.947	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	173.584		186.556		205.723		-		205.723	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

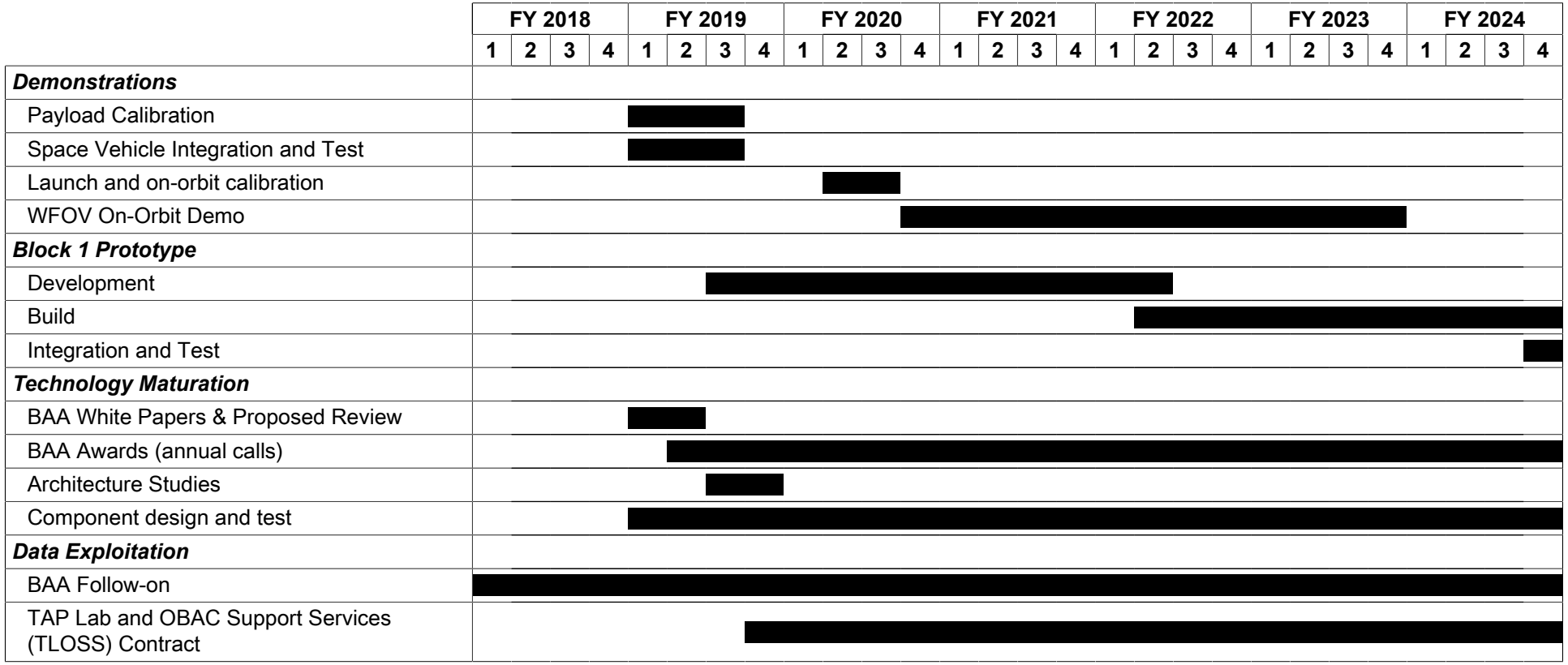

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657009 / *Space Mod Initiative*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Demonstrations				
Payload Calibration	1	2019	3	2019
Space Vehicle Integration and Test	1	2019	3	2019
Launch and on-orbit calibration	2	2020	3	2020
WFOV On-Orbit Demo	4	2020	4	2023
Block 1 Prototype				
Development	3	2019	2	2022
Build	2	2022	4	2024
Integration and Test	4	2024	4	2024
Technology Maturation				
BAA White Papers & Proposed Review	1	2019	2	2019
BAA Awards (annual calls)	2	2019	4	2024
Architecture Studies	3	2019	4	2019
Component design and test	1	2019	4	2024
Data Exploitation				
BAA Follow-on	1	2018	4	2024
TAP Lab and OBAC Support Services (TLOSS) Contract	4	2019	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206442F / *Next Generation OPIR*	Project (Number/Name) 657106 / *Next-Gen OPIR Ground*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
657106: *Next-Gen OPIR Ground*	-	71.018	257.865	264.768	0.000	264.768	498.453	539.678	340.490	357.950	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

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 Air Force Space Command's Enterprise Ground Services (EGS), modernization of Mission Data Processing (MDP), and required development/upgrades to Relay Ground Stations (RGS) to meet AFSPC guidance on the current and future space domain demands. The FORGE effort will implement an open framework for MDP and migration of C2 satellite operations to integrate with EGS. FORGE and EGS efforts will provide the flexibility and scalability to integrate new sensors and capabilities more efficiently in order to meet evolving warfighter needs. The Next-Gen OPIR ground also includes risk reduction efforts to enable cyber enhancements for the PoR and Next-Gen OPIR ground systems. EGS will introduce common ground services such as Telemetry, Tracking and Command (TT&C) and automation. To support initial Next-Gen OPIR Space satellite launches without driving undue risk into the FORGE development schedule, the program will establish a risk reduction ground capability Next-Gen OPIR Interim Operations (NIO) option based on a limited Block 20 solution that can be exercised.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Next-Gen OPIR Ground	71.018	257.865	264.768
Description: Infrastructure modernization and implementation of a Government owned open framework for MDP, migration for C2 of satellite operations onto EGS and required development/upgrades to Relay Ground Stations (RGS). ***FY 2019 Plans:*** Complete development of C2 capabilities and transition two SBIRS HEO payloads to EGS. Continue risk reduction phase of FORGE MDP with framework prototype and begin MDP application provider prototype. Initial demonstration of the framework prototype with subset of mission applications. These efforts provide initial open architecture capabilities, standardized interfaces across multiple space missions, a resilient cyber defense, and a system that is prepared to meet evolving user and warfighter needs. MDP which began in FY2018 will ramp up starting in FY2019. Begin risk reduction efforts to current ground statuses to enable Next-Gen OPIR system, accelerate FORGE activities, and implement cyber modernization for EGS. Continue program office support and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc. ***FY 2020 Plans:*** Continue competitive MDP applications provider prototype that will utilize the FORGE MDP framework. Continue work on first GEO C2 transition to EGS. Continue work on Next-Gen GEO ground software development for integration into EGS and FORGE MDP. Assess need for continued development of Next Gen Interim Operations (NIO) risk reduction effort. Continue FORGE accelerated activity for RGS build out. Rapidly respond to implement system resiliency and situational awareness necessary			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657106 / *Next-Gen OPIR Ground*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
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 2019 to FY 2020 Increase/Decrease Statement:*** FY2020 increased compared to FY 2019 by $6.903M. Justification for this increase includes a refined acquisition strategy that delivers an enterprise ground system to support operations of Next Gen OPIR by 2025.			
Accomplishments/Planned Programs Subtotals	71.018	257.865	264.768

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

FORGE is initially operating as an enterprise architecture development program with plans to present a formal acquisition strategy and request 804 authorities from SAF/AQ in late FY2019. Utilize existing Space and Missile Systems Center (SMC) contracts to transition SBIRS C2 satellite operations to EGS. Compete a MDP framework provider and MDP applications provider. EGS infrastructure modernization and FORGE MDP will introduce competition into OPIR ground systems with an emphasis to onramp 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 as applicable. Funding in execution years will be realigned within the Next-Gen OPIR program element to respond to execution requirements.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206442F / *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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next-Gen OPIR Ground	Various	Various : Various	-	56.683	May 2018	214.908	Oct 2018	224.998	Oct 2019	-		224.998	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	Engility Corp. : Andover, MA	-	2.137	Jun 2018	9.168	Nov 2018	6.000	Nov 2019	-		6.000	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corporation : El Segundo, CA	-	2.137	Jun 2018	9.453	Oct 2018	8.306	Oct 2019	-		8.306	Continuing	Continuing	-
		Subtotal	-	60.957		233.529		239.304		-		239.304	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corporation : El Segundo, CA	-	4.052	Jun 2018	6.158	Oct 2018	5.481	Oct 2019	-		5.481	Continuing	Continuing	-
A&AS	Various	Various : Various	-	1.584	Aug 2018	13.021	Feb 2019	14.688	Feb 2020	-		14.688	Continuing	Continuing	-
Other Support	Various	Various : Various	-	4.425	Jun 2018	5.157	Oct 2018	5.295	Oct 2019	-		5.295	Continuing	Continuing	-
		Subtotal	-	10.061		24.336		25.464		-		25.464	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	71.018		257.865		264.768		-		264.768	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657106 / *Next-Gen OPIR Ground*

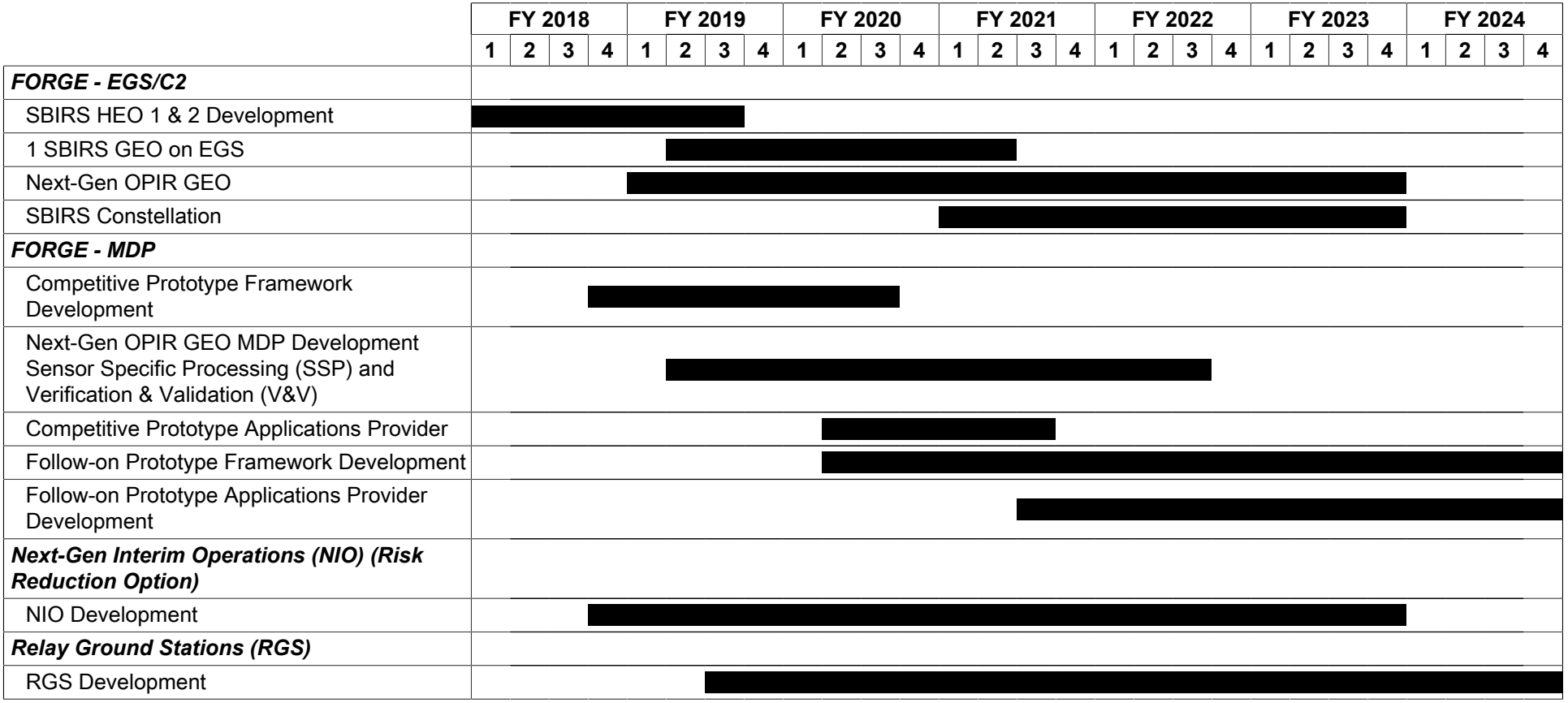

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657106 / *Next-Gen OPIR Ground*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
FORGE - EGS/C2				
SBIRS HEO 1 & 2 Development	1	2018	3	2019
1 SBIRS GEO on EGS	2	2019	2	2021
Next-Gen OPIR GEO	1	2019	4	2023
SBIRS Constellation	1	2021	4	2023
FORGE - MDP				
Competitive Prototype Framework Development	4	2018	3	2020
Next-Gen OPIR GEO MDP Development Sensor Specific Processing (SSP) and Verification & Validation (V&V)	2	2019	3	2022
Competitive Prototype Applications Provider	2	2020	3	2021
Follow-on Prototype Framework Development	2	2020	4	2024
Follow-on Prototype Applications Provider Development	3	2021	4	2024
Next-Gen Interim Operations (NIO) (Risk Reduction Option)				
NIO Development	4	2018	4	2023
Relay Ground Stations (RGS)				
RGS Development	3	2019	4	2024

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206442F / *Next Generation OPIR*	Project (Number/Name) 657120 / *Next-Gen OPIR Space, Block 0 GEO*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
657120: *Next-Gen OPIR Space, Block 0 GEO*	-	185.611	198.705	817.383	0.000	817.383	969.220	1,157.467	1,331.302	1,316.920	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

A. Mission Description and Budget Item Justification

Next-Gen OPIR Space Block 0 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 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 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 and 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 for the manufacturing, assembly, system integration and test, launch and early on-orbit test through the delivery of NGGs 1-3 for operational acceptance of each space vehicle.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Next-Gen OPIR Space, Block 0 GEO	185.611	198.705	817.383
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 (with exception of northern hemisphere) infrared coverage. The first GEO satellite is required in FY2025.			
FY 2019 Plans: Acquire Next Gen OPIR GEO satellites. Continue maturing payload design for satellite systems that meet new missile warning requirements balancing affordability, capability, and resiliency requirements. Develop a PDR-level design and initiate detailed design in preparation for CDR, risk reduction and purchase of flight components. Continue program office support and other related support activities that may include, but are not limited to studies, technical analysis, prototyping, etc.			
FY 2020 Plans: Will 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. Continue maturing payload design and resiliency related re-design of the LMS A2100 Tech Refresh SV. Mature the PDR-level design into a detailed design for a SV CDR and System CDR by FY2021 for risk reduction, and purchase the remaining critical flight components. Modify the LMS Phase 1 contract to finish the manufacture, build, integration, test, and launch of GEO SVs. Rapidly respond to implement system			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657120 / *Next-Gen OPIR Space, Block 0 GEO*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
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 2019 to FY 2020 Increase/Decrease Statement:*** FY 2020 increased compared to FY 2019 by $618.678M. Justification for this increase is described in plans above.			
Accomplishments/Planned Programs Subtotals	185.611	198.705	817.383

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Air 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 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 class 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. Next-Gen GEO Phase 2 will be awarded (FY 2020 timeframe) as a modification to the Phase 1 contract. This will 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 Air Force plans to acquire subsequent blocks in a competitive environment. The Block 1 satellites will be based on an approved Enterprise OPIR Capability Development Document. Funding in execution years will be realigned within the Next-Gen OPIR program element to respond to execution requirements.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
Next-Gen OPIR Space, Block 0 GEO	SS/CPIF	Lockheed Martin : Sunnyvale, CA	-	165.381	Aug 2018	167.496	Oct 2018	766.700	Oct 2019	-		766.700	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	Engility Corp. : El Segundo, CA	-	4.158	Jun 2018	5.672	Nov 2018	8.491	Nov 2019	-		8.491	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp. : El Segundo, CA	-	3.574	Jun 2018	7.695	Oct 2018	9.699	Oct 2019	-		9.699	Continuing	Continuing	-
		Subtotal	-	173.113		180.863		784.890		-		784.890	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp. : El Segundo, CA	-	4.136	Jun 2018	2.534	Oct 2018	3.194	Oct 2019	-		3.194	Continuing	Continuing	-
A&AS	Various	Various : Various	-	3.362	Aug 2018	10.441	Feb 2019	12.374	Feb 2019	-		12.374	Continuing	Continuing	-
Other Support	Various	Various : Various	-	5.000		4.867	Oct 2018	16.925	Oct 2018	-		16.925	Continuing	Continuing	-
		Subtotal	-	12.498		17.842		32.493		-		32.493	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	185.611		198.705		817.383		-		817.383	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657120 / *Next-Gen OPIR Space, Block 0 GEO*

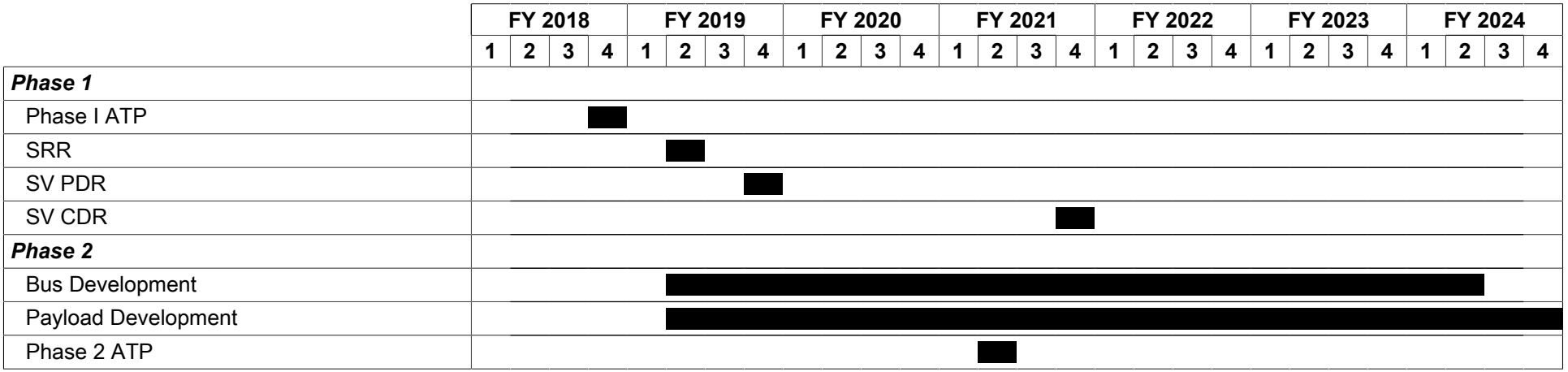

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657120 / *Next-Gen OPIR Space, Block 0 GEO*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Phase 1				
Phase I ATP	4	2018	4	2018
SRR	2	2019	2	2019
SV PDR	4	2019	4	2019
SV CDR	4	2021	4	2021
Phase 2				
Bus Development	2	2019	2	2024
Payload Development	2	2019	4	2024
Phase 2 ATP	2	2021	2	2021

Note

Next-Gen OPIR Space, Block 0 GEO efforts continue past 2024.

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force			Date: February 2019
Appropriation/Budget Activity 3600 / 5	R-1 Program Element (Number/Name) PE 1206442F / *Next Generation OPIR*	Project (Number/Name) 657121 / *Next-Gen OPIR Space, Block 0 Polar*	

COST ($ in Millions)	Prior Years	FY 2018	FY 2019	FY 2020 Base	FY 2020 OCO	FY 2020 Total	FY 2021	FY 2022	FY 2023	FY 2024	Cost To Complete	Total Cost
657121: *Next-Gen OPIR Space, Block 0 Polar*	-	9.284	0.000	107.404	0.000	107.404	312.116	389.826	581.843	579.207	Continuing	Continuing
Quantity of RDT&E Articles	-	-	-	-	-	-	-	-	-	-		

Note

Created new Project 657121 Next-Gen OPIR Space, Block 0 Polar for transparency between efforts.

A. Mission Description and Budget Item Justification

Next-Gen OPIR Space, Block 0 Polar (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 JROC requirements on current and future space domain demands.

The Program Office intends to acquire the Next Gen OPIR Polar (NGP) capability in three contract actions. Phase 0 awarded in June 2018, encompassing system and payload requirements analysis and risk reduction efforts leading to a System Requirements Review. 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. Phase 2 will be awarded for the manufacturing, assembly, integration and test, and delivery of NGP satellites 1&2.

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
Title: Next-Gen OPIR Space, Block 0 Polar	9.284	0.000	107.404
Description: Development of the Next-Gen OPIR Polar missile warning satellites with a proven bus with modifications and auxiliary payloads for improved resiliency, and new hardened sensors. The Polar space segment will consist of two Next-Gen OPIR Polar satellites in a resilient architecture, providing real time persistent infrared coverage of the northern hemisphere.			
FY 2019 Plans: N/A			
FY 2020 Plans: Will continue maturing payload and bus requirements for satellite systems that meet new missile warning requirements balancing affordability, capability, and resiliency requirements. Conduct SRR and begin preliminary design in preparation for PDR. Award follow-on contract for design, long lead parts procurement, development and risk reduction efforts leading to system CDR. Rapidly respond to incorporate system resiliency and situational awareness requirements necessary to operate in the contested			

Exhibit R-2A, RDT&E Project Justification: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657121 / *Next-Gen OPIR Space, Block 0 Polar*

B. Accomplishments/Planned Programs ($ in Millions)	FY 2018	FY 2019	FY 2020
space domain. These activities may include, but are not limited to program office support, studies, technical analysis, prototyping etc. ***FY 2019 to FY 2020 Increase/Decrease Statement:*** FY2020 increased compared to FY2019 by $107.404M. Justification for this increase is to meet the requirement to deliver two polar satellites by 2029. Acceleration of the program requires significant early funding for bus and payload development to meet warfighter requirements.			
Accomplishments/Planned Programs Subtotals	9.284	0.000	107.404

C. Other Program Funding Summary ($ in Millions)

N/A

Remarks

D. Acquisition Strategy

The Air 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 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 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 class Justification & Authorization documents. The Air Force plans to acquire subsequent blocks in a competitive environment. The Block 1 satellites will be based on an approved Enterprise OPIR Capability Development Document. Funding in execution years will be realigned within the Next-Gen OPIR program element to respond to execution requirements.

E. Performance Metrics

Please refer to the Performance Base Budget Overview Book for information on how Air Force resources are applied and how those resources are contributing to Air Force performance goals and most importantly, how they contribute to our mission.

Exhibit R-3, RDT&E Project Cost Analysis: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *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 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 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	-	5.486	Jun 2018	0.000		91.124	Oct 2019	-		91.124	Continuing	Continuing	-
Enterprise SE&I	C/CPAF	Engility Corp. : El Segundo, CA	-	0.120	Jun 2018	0.000		2.674	Nov 2019	-		2.674	Continuing	Continuing	-
Technical Mission Analysis	RO	Aerospace Corp. : El Segundo, CA	-	0.608	Jun 2018	0.000		4.718	Oct 2019	-		4.718	Continuing	Continuing	-
		Subtotal	-	6.214		0.000		98.516		-		98.516	Continuing	Continuing	N/A

Management Services ($ in Millions)

Cost Category Item	Contract Method & Type	Performing Activity & Location	Prior Years	FY 2018 Cost	FY 2018 Award Date	FY 2019 Cost	FY 2019 Award Date	FY 2020 Base Cost	FY 2020 Base Award Date	FY 2020 OCO Cost	FY 2020 OCO Award Date	FY 2020 Total Cost	Cost To Complete	Total Cost	Target Value of Contract
FFRDC	RO	Aerospace Corp. : El Segundo, CA	-	0.275	Jun 2018	0.000		1.554	Oct 2019	-		1.554	Continuing	Continuing	-
A&AS	Various	Various : Various	-	2.795	Aug 2018	0.000		5.186	Feb 2019	-		5.186	Continuing	Continuing	-
Other Support	Various	Various : Various	-	0.000		0.000		2.148	Oct 2018	-		2.148	Continuing	Continuing	-
		Subtotal	-	3.070		0.000		8.888		-		8.888	Continuing	Continuing	N/A

	Prior Years	FY 2018		FY 2019		FY 2020 Base		FY 2020 OCO		FY 2020 Total	Cost To Complete	Total Cost	Target Value of Contract
Project Cost Totals	-	9.284		0.000		107.404		-		107.404	Continuing	Continuing	N/A

Remarks

Exhibit R-4, RDT&E Schedule Profile: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657121 / *Next-Gen OPIR Space, Block 0 Polar*

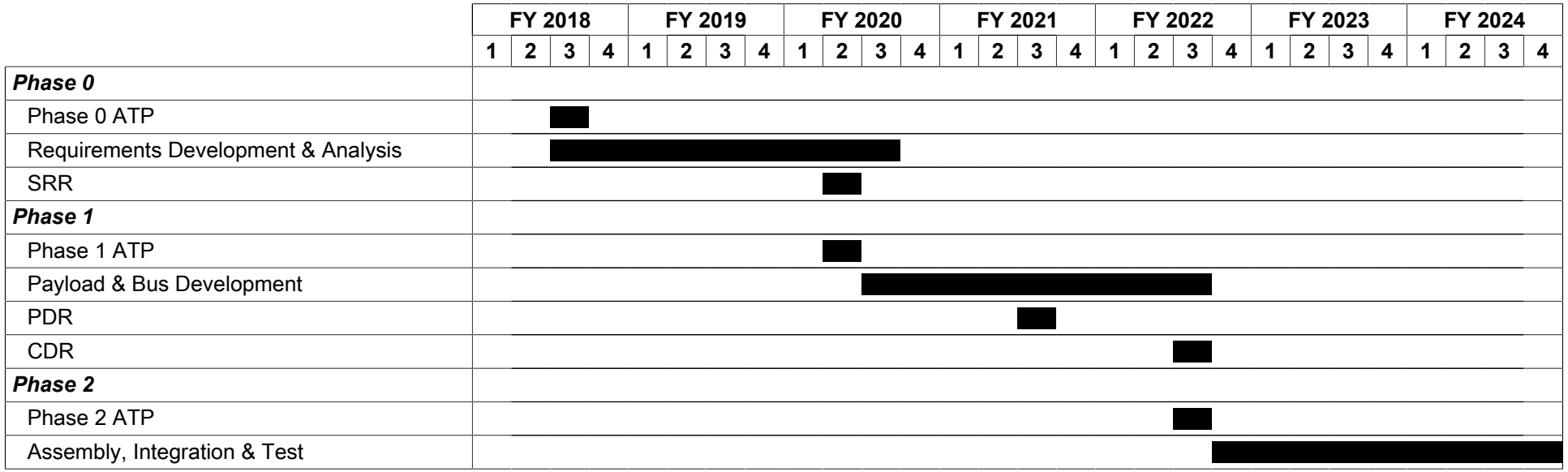

Exhibit R-4A, RDT&E Schedule Details: PB 2020 Air Force		Date: February 2019
Appropriation/Budget Activity 3600 / 5	**R-1 Program Element (Number/Name)** PE 1206442F / *Next Generation OPIR*	**Project (Number/Name)** 657121 / *Next-Gen OPIR Space, Block 0 Polar*

Schedule Details

	Start		End	
Events by Sub Project	**Quarter**	**Year**	**Quarter**	**Year**
Phase 0				
Phase 0 ATP	3	2018	3	2018
Requirements Development & Analysis	3	2018	3	2020
SRR	2	2020	2	2020
Phase 1				
Phase 1 ATP	2	2020	2	2020
Payload & Bus Development	3	2020	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	2024

Note

Next-Gen OPIR Polar efforts continue past 2024