| Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force | | | | | | | | | | | | Date: March 2023 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development* | | | | | R-1 Program Element (Number/Name)<br>PE 1203265SF / *GPS III Space Segment* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2022** | **FY 2023** | **FY 2024 Base** | **FY 2024 OCO** | **FY 2024 Total** | **FY 2025** | **FY 2026** | **FY 2027** | **FY 2028** | **Cost To Complete** | **Total Cost** |
| Total Program Element | 10.398 | 6.998 | 1.526 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 18.922 |
| 67A019: *GPS III* | 10.398 | 6.998 | 1.526 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 18.922 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |
| **Program MDAP/MAIS Code:** 292 | | | | | | | | | | | | |

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

The Global Positioning System (GPS) is a space-based navigation system that fills validated Joint Service requirements for worldwide, accurate, common grid three dimensional positioning/navigation for military aircraft, ships, and ground personnel. The consistent accuracy, unaffected by location or weather and available in real time, significantly improves effectiveness of reconnaissance, weapons delivery, mine countermeasures and rapid deployment for all services. GPS must comply with Title 10 United States Code (USC) Sec. 2281, which requires that the Secretary of Defense ensures the continued sustainment and operation of GPS for military and civilian purposes, and 51 USC Sec. 50112, which requires that GPS complies with certain standards and facilitates international cooperation.

The system is composed of three programs: User Equipment (funded under Program Element (PE) 1203164F, 1203164SF), Space (funded under PE 1203165F, 1203265F, 1203265SF, 1203269F, and 1203269SF), and a Control Network (funded under PE 1206423F, 1206423SF and 1203165F). The satellites broadcast high accuracy data using precisely synchronized signals that are received and processed by user equipment installed in military platforms. The user equipment computes the platform position and velocity and provides steering vectors to target locations or navigation waypoints. The control segment provides daily updates to the navigation messages broadcast from the satellites to maintain system precision in three dimensions to 16 meters (spherical error probable) worldwide. Additionally, GPS supports the United States Nuclear Detonation (NUDET) Detection System (USNDS) mission and provides strategic and tactical support to the following Department of Defense missions: Joint Operations by providing capabilities for Positioning, Navigation, and Timing (PNT); Command, Control, Communications, and Intelligence; Special Operations; Military Operations in Urban Terrain; Defense-Wide Mission Support; Air Mobility; and Space Launch Orbital Support.

GPS III is the next generation of Space Vehicles (SV) supporting the GPS constellation and is funded in PE 1203265SF. GPS III SVs deliver significant enhancements over legacy satellites, including a new international civil (L1C) Galileo-compatible signal, and enhanced anti-jam power. GPS III SVs 06-10 are in the Production and Deployment Phase, with SV 06 launching in January 2023.

The GPS III program funds and supports RDT&E of GPS III SVs 01-02 and risk-reducing simulators through a systems engineering approach that matures and delivers SVs for launch. This program includes SVs 01-02 engineering studies and analyses, trade studies, system development, test and evaluation efforts, integrated logistics support products, on-orbit support, and mission operations support for civil and military applications that protect U.S. military and allied use of GPS. The program also includes Contingency Operations as a bridge capability to fly GPS III SVs until the delivery of the Next Generation Operational Control System (OCX) program.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force | Date: March 2023 |
|---|---|
| **Appropriation/Budget Activity**<br>3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development* | **R-1 Program Element (Number/Name)**<br>PE 1203265SF / *GPS III Space Segment* |

Mission Readiness Campaign activities include launch preparation, planning, mission readiness testing to validate space-ground-user interfaces, mission crew exercises and rehearsals, launch vehicle integration, and On-Orbit Checkout activities to validate performance prior to launch and post launch. Newly certified launch vehicles must be incorporated into the GPS III launch baseline. Integration requires the development of plans and procedures and procurement of special support equipment.

GPS supports the early deployment of Global Military-Code (M-Code) to meet a Congressional mandate limiting user equipment purchases to M-Code capable receivers starting in FY 2017. The funds will cover the M-Code Early Use (MCEU) program and support development costs associated with the GPS control segment software to provide core M-Code capabilities to the warfighter, as well as the ability to command and control, process, and monitor the M-Code signal. MCEU mitigates delays with GPS OCX, supports Military GPS User Equipment (MGUE) testing, and allows for early M-Code operations. M-Code provides greater security to protect navigation and timing in electronically contested environments.

Impacts of the M-Code deployment include:
-Compliance with U.S. Space Command Commander's mandate to provide global monitoring necessary for early M-Code operational use and verification of navigation warfare effects.
-Improved resiliency of the GPS capability.
-Confirmation that PNT Enterprise modernization efforts are integrated and properly deployed.
-Testing and verification of M-Code capability on MGUE/GPS III solution and early M-Code use tied to MGUE fielding.

The feasibility studies and preliminary engineering analyses that are funded by this budget item will determine whether an initiative to host GPS M-Code augmentation payloads on other satellite systems is practical and beneficial. The primary goal is to provide additional mission assurance through redundant systems not directly connected with the current U.S. GPS satellite constellation.

This program encompasses GPS III (SVs 01-10) and MCEU.

Space acquisition must respond with speed and agility to pacing and emerging adversary threats. Space Systems Command (SSC) 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, SSC will strategically execute experimentation, prototyping, risk reduction, and other efforts to develop new or repurpose capabilities.

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.

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

| Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force | Date: March 2023 |
|---|---|
| **Appropriation/Budget Activity**<br>3620F: *Research, Development, Test & Evaluation, Space Force* / BA 7: *Operational Systems Development* | **R-1 Program Element (Number/Name)**<br>PE 1203265SF / *GPS III Space Segment* |

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

| B. Program Change Summary ($ in Millions) | FY 2022 | FY 2023 | FY 2024 Base | FY 2024 OCO | FY 2024 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 7.207 | 1.626 | 0.000 | 0.000 | 0.000 |
| Current President's Budget | 6.998 | 1.526 | 0.000 | 0.000 | 0.000 |
| Total Adjustments | -0.209 | -0.100 | 0.000 | 0.000 | 0.000 |
| • Congressional General Reductions | 0.000 | -0.100 | | | |
| • 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 | -0.209 | 0.000 | | | |
| • Other Adjustments | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |

| C. Accomplishments/Planned Programs ($ in Millions) | FY 2022 | FY 2023 | FY 2024 |
|---|---|---|---|
| ***Title:*** GPS III SVs 01-02 | 6.998 | 1.526 | 0.000 |
| ***Description:*** Development, test, and evaluation of GPS III SVs 01-02 and associated simulators, on-orbit engineering, engineering studies and analyses, trade studies, system development, test and evaluation efforts, and integrated logistics support products.<br><br>***FY 2023 Plans:***<br>Finish Space Vehicle (SV) 01/02 On-Orbit Engineering and Performance Validation. Complete final development, test and contract closeout activities. Additionally, FY 2023 funding will allow the program to 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.<br><br>***FY 2024 Plans:***<br>N/A<br><br>***FY 2023 to FY 2024 Increase/Decrease Statement:***<br>Decrease due to completion of SV01/02 On-Orbit Engineering and Performance Validation and completion of final development, test and contract closeout activities. | | | |
| **Accomplishments/Planned Programs Subtotals** | 6.998 | 1.526 | 0.000 |

| Exhibit R-2, RDT&E Budget Item Justification: PB 2024 Air Force | Date: March 2023 |
|---|---|
| **Appropriation/Budget Activity**<br>3620F: *Research, Development, Test & Evaluation, Space Force I* BA 7: *Operational Systems Development* | **R-1 Program Element (Number/Name)**<br>PE 1203265SF *I GPS III Space Segment* |

**D. Other Program Funding Summary ($ in Millions)**

| Line Item | FY 2022 | FY 2023 | FY 2024 Base | FY 2024 OCO | FY 2024 Total | FY 2025 | FY 2026 | FY 2027 | FY 2028 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • SPSF 01 GPSIII: *GPS III Space Segment* | 84.452 | 103.340 | 121.770 | - | 121.770 | 75.491 | 50.078 | 2.809 | 0.000 | 0.000 | 437.940 |

**Remarks**

**E. Acquisition Strategy**

The GPS III next generation space segment (space vehicles (SVs) 01-10) rapidly and affordably responds to warfighter capability requirements. The acquisition approach utilizes a disciplined systems engineering approach which focuses on mitigating cost and schedule risk through a lower-risk incremental delivery of mature technologies. This approach focuses on mission success and on-time delivery. The GPS III SVs will have GPS II Follow-on (IIF) capabilities plus up to a 3x-8x increase in anti-jam signal power, 3x improved accuracy, 3+ year increased design life, a new international civil (L1C) signal compatible with the European Galileo system, and a satellite bus capable of supporting future SV capability additions.

On January 21, 2017, Program Executive Officer (PEO) Space approved the Acquisition Strategy for the Military-Code (M-Code) Early Use (MCEU) program. The MCEU acquisition strategy enables the GPS Enterprise to provide core M-Code capabilities to the warfighter prior to GPS OCX delivery. MCEU supports the scheduled operational testing of MGUE. MCEU updated the GPS control segment software, Architecture Evolution Plan (AEP), to allow for command and control, processing, and integrity monitoring of the M-Code signal. MCEU acquires this capability by using the existing GPS III prime contract vehicle to modify the operational AEP software. The Air Force approved reinstatement of a previously deferred Key Support Area (KSA) on February 10, 2016. The MSTIC receivers currently under development will get a software upgrade to process M-Code data. This 7.96M project to procure the M-Code MSTIC receivers was funded through both O&M and SPAF funds in FY 2016-FY 2018. Performance monitoring, integration, and test will be conducted by the MCEU program and sustained under the Global Positioning Operations Support and Sustainment Division contract with Lockheed Martin.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2024 Air Force | | Date: March 2023 |
|---|---|---|
| **Appropriation/Budget Activity**<br>3620F / 7 | **R-1 Program Element (Number/Name)**<br>PE 1203265SF / *GPS III Space Segment* | **Project (Number/Name)**<br>67A019 / *GPS III* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2022 Cost | FY 2022 Award Date | FY 2023 Cost | FY 2023 Award Date | FY 2024 Base Cost | FY 2024 Base Award Date | FY 2024 OCO Cost | FY 2024 OCO Award Date | FY 2024 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GPS III Development | C/CPIF | Lockheed Martin : Denver, CO | 1.245 | 3.173 | Jun 2022 | 1.190 | Dec 2022 | - | | - | | - | 0.000 | 5.608 | - |
| GPS III SV01-02 On Orbit Incentive Fee | C/CPIF | Lockheed Martin : Denver, CO | 0.547 | - | | - | | - | | - | | - | 0.000 | 0.547 | - |
| GPS III Technical Mission Analysis | RO | Aerospace : El Segundo, CA | 0.756 | 0.670 | May 2022 | 0.000 | Mar 2023 | - | | - | | - | 0.000 | 1.426 | - |
| GPS III Enterprise SE&I | C/CPAF | SAIC : El Segundo, CA | 0.927 | 0.503 | Oct 2023 | 0.303 | Oct 2022 | - | | - | | - | 0.000 | 1.733 | - |
| GPS III Launch Support | RO | 45th SV Processing : Cape Canaveral, FL | 1.475 | 0.000 | Dec 2022 | - | | - | | - | | - | 0.000 | 1.475 | - |
| MCEU Development | C/CPIF | Lockheed Martin : Denver, CO | 3.305 | - | | - | | - | | - | | - | 0.000 | 3.305 | - |
| | | **Subtotal** | 8.255 | 4.346 | | 1.493 | | - | | - | | - | 0.000 | 14.094 | N/A |

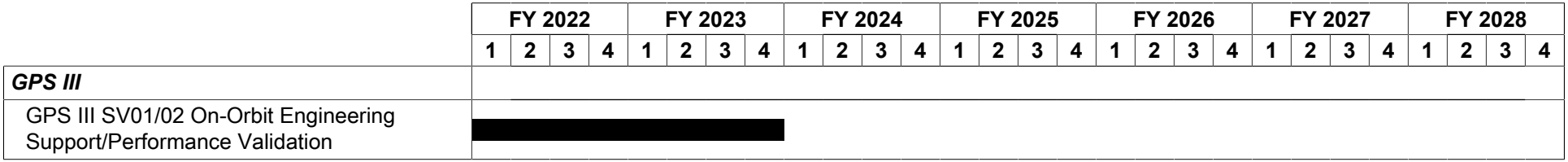
**Management Services ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2022 Cost | FY 2022 Award Date | FY 2023 Cost | FY 2023 Award Date | FY 2024 Base Cost | FY 2024 Base Award Date | FY 2024 OCO Cost | FY 2024 OCO Award Date | FY 2024 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GPS III FFRDC | RO | Aerospace : El Segundo, CA | 1.044 | 0.548 | May 2022 | - | | - | | - | | - | 0.000 | 1.592 | - |
| GPS III A&AS | Various | Various : Various | 1.099 | 2.104 | Jan 2023 | 0.033 | Dec 2022 | - | | - | | - | 0.000 | 3.236 | - |
| | | **Subtotal** | 2.143 | 2.652 | | 0.033 | | - | | - | | - | 0.000 | 4.828 | N/A |

| | Prior Years | FY 2022 | | FY 2023 | | FY 2024 Base | | FY 2024 OCO | | FY 2024 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 10.398 | 6.998 | | 1.526 | | - | | - | | - | 0.000 | 18.922 | N/A |

**Remarks**

| Exhibit R-4, RDT&E Schedule Profile: PB 2024 Air Force | | Date: March 2023 |
|---|---|---|
| **Appropriation/Budget Activity**<br>3620F / 7 | **R-1 Program Element (Number/Name)**<br>PE 1203265SF / *GPS III Space Segment* | **Project (Number/Name)**<br>67A019 / *GPS III* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2024 Air Force | | Date: March 2023 |
|---|---|---|
| **Appropriation/Budget Activity**<br>3620F / 7 | **R-1 Program Element (Number/Name)**<br>PE 1203265SF / *GPS III Space Segment* | **Project (Number/Name)**<br>67A019 / *GPS III* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***GPS III*** | | | | |
| GPS III SV01/02 On-Orbit Engineering Support/Performance Validation | 1 | 2022 | 4 | 2023 |