| Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force | Date: April 2022 |
|---|---|
| **Appropriation/Budget Activity**<br>3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 1206447SF *I Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)* |

| COST ($ in Millions) | Prior Years | FY 2021 | FY 2022 | FY 2023 Base | FY 2023 OCO | FY 2023 Total | FY 2024 | FY 2025 | FY 2026 | FY 2027 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Program Element | - | 0.000 | 0.000 | 139.131 | 0.000 | 139.131 | 267.358 | 258.168 | 126.255 | 36.202 | Continuing | Continuing |
| 657MEO: *Resilient MW/MT - MEO* | - | 0.000 | 0.000 | 139.131 | 0.000 | 139.131 | 267.358 | 258.168 | 126.255 | 36.202 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**Note**

This program, BA 5, PE 1206447SF, Budget Program Accounting Code 657???, Missile Warning (MW)/ Missile Tracking (MT) - Medium Earth Orbit (MEO) Space, is a continuation of the prototyping of the MEO Track Custody Demonstration under PE 1206442SF Next Generation OPIR Budget Program Accounting Code 657009: Space Modernization Initiative.

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

In 2021, the Space Warfighting Analysis Center (SWAC) conducted its inaugural USSF Force Design with a key focus area in the Missile Warning and Missile Tracking mission area. The goal of the analysis was to produce a highly resilient government reference design that could maintain custody of emergent dimmer and more maneuverable threats through the boost and post-boost phases of flight. The SWAC concluded that a multi-layered approach was required to meet the stringent performance requirements while maximizing total system resilience. Their recommended government reference design included a combined constellation of 135 LEO and 16 MEO satellites working in concert through an integrated ground solution. On 27 Jan 2022, the Space Acquisition Council concluded that the Space Development Agency would develop the LEO layer of the architecture while Space Systems Command would provide the MEO layer in addition to serving as the total system integrator.

The Resilient Missile Warning/Missile Tracking project executes the architecture transition from a missile warning boost-phase focused constellation to a distributed, multi-orbit, constellation to meet the intent of the 2021 SWAC Force Design recommendation. This architecture pivot performs both missile warning and missile tracking (post-boost phase) anchored on the Missile Warning and Missile Defense OPIR Enterprise OPIR Capability Development Document (CDD), validated by the Joint Requirements Oversight Council (JROC), JROCM 042-19, dated 8 May 2019. The inclusion of missile tracking ensures the constellation can maintain custody of evolved dim and maneuvering threats through all phases of flight to provide required missile warning attack characterization. This pivot also marks the transition to a more resilient architecture against kinetic and non-kinetic threats. With space assets distributed in multiple orbits, the overall architecture and mission is more resilient in a contested environment. The Resilient Missile Warning / Missile Tracking MEO investments evolve the architecture beyond Next-Gen OPIR GEO, Polar and the Space Modernization Initiative demonstrations to an operational system that will perform the full missile warning and missile tracking mission. The Space Force will phase and deploy space assets for this effort in collaboration with capabilities delivered by the Space Development Agency (SDA) (PE 1206446SF). Additionally, the Space Force will develop satellite control capabilities and fuse mission data for accurate warning/tracking solutions through the Missile Warning / Missile Tracking MEO Ground segment (PE 1206448SF, 657???). This ground segment will integrate with the existing global OPIR ground infrastructure as well as SDA's ground to provide a robust, combined ground solution to meet stringent data accuracy and latency needs. Overall, the Department of Defense is united to deliver a multi-faceted OPIR architecture that meets warfighter needs for detection, tracking, and reporting on these challenging evolved missile threats.

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The Department of Defense recently completed an Analysis of Alternatives (AoA) for the future missile warning and missile tracking architecture. The AoA identified several architecture building blocks to further investigate feasibility to meet mission needs while focusing on aggressive cost control. In FY22, the Missile Track Custody Digital Engineering Risk Reduction effort (PE 1206442SF, 657009) iterated on the AoA sensor recommendations, developed digital payload designs, validated system performance against threat models, and performed ground demonstrations of sensor hardware and software. Transitioning development into this program element expands MEO development from a single satellite demonstration into a multiple satellite prototype system that will deliver at least 4 MEO satellites as an Initial Warfighting Capability in coordination with LEO for a minimum viable product combined warning and tracking architecture by FY2028.

Space acquisition must respond with speed and agility to emerging adversary threats. Space Systems Command (SSC) has transformed the organization and implementation of space acquisition to an enterprise approach, 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 existing capabilities.

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

This program is in Budget Activity 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 2021 | FY 2022 | FY 2023 Base | FY 2023 OCO | FY 2023 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 |
| Current President's Budget | 0.000 | 0.000 | 139.131 | 0.000 | 139.131 |
| Total Adjustments | 0.000 | 0.000 | 139.131 | 0.000 | 139.131 |
| • 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 | 139.131 | 0.000 | 139.131 |

**Change Summary Explanation**

MW/MT- MEO Space, BA 5, PE 1206447SF, is a continuation of the MEO Track Custody Demonstration under PE 1206442SF Next Generation OPIR Budget Program Accounting Code 657009: Space Modernization Initiative. This PE was established for FY2023 and beyond to transition these ongoing efforts into an operational space architecture.

| Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force | Date: April 2022 |
|---|---|
| **Appropriation/Budget Activity**<br>3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 1206447SF *I Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)* |

| C. Accomplishments/Planned Programs ($ in Millions) | FY 2021 | FY 2022 | FY 2023 |
|---|---|---|---|
| ***Title:*** Missile Warning (MW)/ Missile Tracking (MT) - Medium Earth Orbit (MEO) Space | - | - | 139.131 |
| ***Description:*** Transitions the MEO Track Custody Demonstration under PE 1206442SF Next Generation OPIR Budget Program Accounting Code 657009: Space Modernization Initiative from a demonstration to a future program of record. The Space Force recently completed an OSD/CAPE directed Analysis of Alternatives (AoA) update for the future missile warning and missile tracking architecture. The AoA update recommended the Space Force aggressively pursue MEO satellites by using prototyping to control costs and deliver capability incrementally.<br><br>To responsively deliver capabilities, this BPAC will fund continued development of the MEO prototypes through multiple satellite launches and operations in support of an initial warfighting capability for the combined LEO and MEO architecture. Initial Warfighting Capability is comprised of validating through on-orbit measurements the ability for regional tracking, mission management and control, and coordinated regional warning and access. After performance validation is complete, prototype sensors will feed data directly to operational warning and defense systems. The initial warfighting capability will provide: sensitivity to detect emerging threats; accurate tracking to contain maneuvering targets, and deliver data within the required latency to close the kill-chain solution.<br><br>***FY 2023 Plans:***<br>Continues efforts in PE 1206442SF to rapidly transition the track custody demo from a single satellite sensor demonstration to a multiple satellite coordinated prototype effort tied to a cross-linked initial warfighting capability of the future architecture. In coordination with funds in 1206442SF Next Generation OPIR Budget Program Accounting Code 657009, this program element will begin development of SVs 2 and beyond with plans to achieve a multiple orbital plane prototype. FY23 begins long lead purchases of flight parts to take two or more designs from payload critical design review through system critical design review. Additionally, it begins crosslink development, communication system upgrades, and full spacecraft development to expand beyond a single demonstration to a multi-satellite, multi-plane prototype. Finally, Bus integration and test begins after completion of system CDR. 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 2022 to FY 2023 Increase/Decrease Statement:***<br>FY 2023 funds increased to establish a new program element and allow for a pivot to an integrated MW/MT architecture. | | | |
| **Accomplishments/Planned Programs Subtotals** | - | - | 139.131 |

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

N/A

| Exhibit R-2, RDT&E Budget Item Justification: PB 2023 Air Force | Date: April 2022 |
|---|---|
| **Appropriation/Budget Activity**<br>3620F: *Research, Development, Test & Evaluation, Space Force I* BA 5: *System Development & Demonstration (SDD)* | **R-1 Program Element (Number/Name)**<br>PE 1206447SF *I Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO)* |

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

**Remarks**

**E. Acquisition Strategy**

The Space Force will continue development of current demonstration contracts competitively awarded using funds from 1206442SF Next Generation OPIR Budget Program Accounting Code 657009. The program will develop an acquisition strategy for transition from a demonstration to a program of record which will include expanding from a single satellite demonstration to a multiple satellite coordinated prototyping effort that provides mission and operational utility. The initial architecture will be based on the Missile Warning and Missile Defense OPIR Enterprise Capability Development Document (CDD), validated by the Joint Requirements Oversight Council (JROC) in May 2019. The first satellites, to fulfill detection and reporting within regions of interest, are required starting in 2028. A transition is planned in FY2023 to support additional development contract modifications and/or awards.

| Exhibit R-3, RDT&E Project Cost Analysis: PB 2023 Air Force | | | Date: April 2022 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>3620F / 5 | **R-1 Program Element (Number/Name)**<br>PE 1206447SF / *Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO )* | **Project (Number/Name)**<br>657MEO / *Resilient MW/MT - MEO* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2021 Cost | FY 2021 Award Date | FY 2022 Cost | FY 2022 Award Date | FY 2023 Base Cost | FY 2023 Base Award Date | FY 2023 OCO Cost | FY 2023 OCO Award Date | FY 2023 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Tech Development | Various | Various : TBD | - | - | | - | | 14.800 | Dec 2022 | - | | 14.800 | Continuing | Continuing | - |
| Space Segment Dev | Various | Various : TBD | - | - | | - | | 114.131 | Dec 2022 | - | | 114.131 | Continuing | Continuing | - |
| | | **Subtotal** | - | - | | - | | 128.931 | | - | | 128.931 | Continuing | Continuing | N/A |

**Management Services ($ in Millions)**

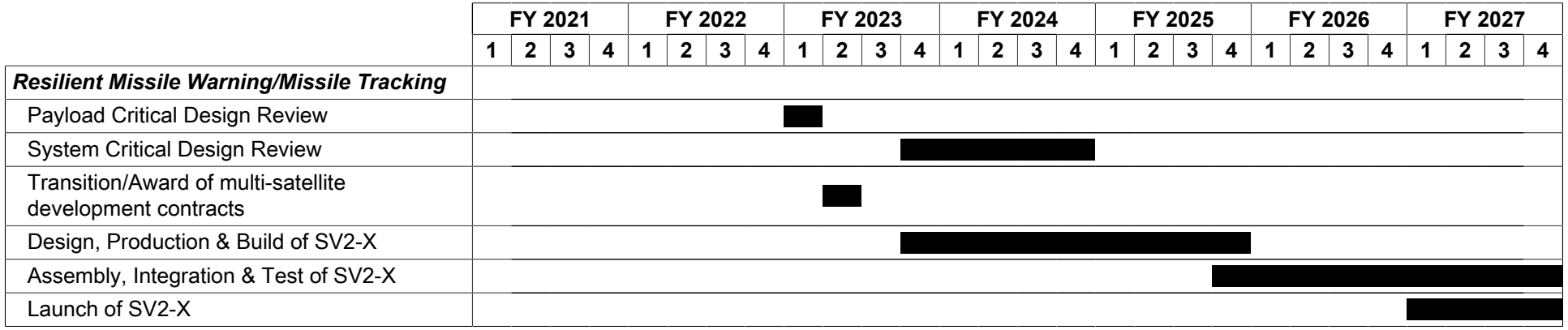
| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2021 Cost | FY 2021 Award Date | FY 2022 Cost | FY 2022 Award Date | FY 2023 Base Cost | FY 2023 Base Award Date | FY 2023 OCO Cost | FY 2023 OCO Award Date | FY 2023 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| FFRDC | RO | Aerospace Corp. : El Segundo, CA | - | - | | - | | 4.000 | Jan 2023 | - | | 4.000 | Continuing | Continuing | - |
| A&AS | Various | Various: TBD : TBD | - | - | | - | | 6.000 | Nov 2022 | - | | 6.000 | Continuing | Continuing | - |
| Other Support | Various | Various: TBD : TBD | - | - | | - | | 0.200 | Nov 2022 | - | | 0.200 | Continuing | Continuing | - |
| | | **Subtotal** | - | - | | - | | 10.200 | | - | | 10.200 | Continuing | Continuing | N/A |

| | Prior Years | FY 2021 | | FY 2022 | | FY 2023 Base | | FY 2023 OCO | | FY 2023 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | - | - | | - | | 139.131 | | - | | 139.131 | Continuing | Continuing | N/A |

**Remarks**

Funding in FY23 to support necessary government program office activities required to develop the technical requirements, perform market research, solicit, evaluate, award and begin development of the resilient MW/MT architecture.

| Exhibit R-4, RDT&E Schedule Profile: PB 2023 Air Force | | Date: April 2022 |
|---|---|---|
| **Appropriation/Budget Activity**<br>3620F / 5 | **R-1 Program Element (Number/Name)**<br>PE 1206447SF / *Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO )* | **Project (Number/Name)**<br>657MEO / *Resilient MW/MT - MEO* |



| Exhibit R-4A, RDT&E Schedule Details: PB 2023 Air Force | | Date: April 2022 |
|---|---|---|
| **Appropriation/Budget Activity**<br>3620F / 5 | **R-1 Program Element (Number/Name)**<br>PE 1206447SF / *Resilient Missile Warning Missile Tracking - Medium Earth Orbit (MEO )* | **Project (Number/Name)**<br>657MEO / *Resilient MW/MT - MEO* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events by Sub Project** | **Quarter** | **Year** | **Quarter** | **Year** |
| ***Resilient Missile Warning/Missile Tracking*** | | | | |
| Payload Critical Design Review | 1 | 2023 | 1 | 2023 |
| System Critical Design Review | 4 | 2023 | 4 | 2024 |
| Transition/Award of multi-satellite development contracts | 2 | 2023 | 2 | 2023 |
| Design, Production & Build of SV2-X | 4 | 2023 | 4 | 2025 |
| Assembly, Integration & Test of SV2-X | 4 | 2025 | 4 | 2027 |
| Launch of SV2-X | 1 | 2027 | 4 | 2027 |