| Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Missile Defense Agency | | | | | | | | | | | Date: May 2017 | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Appropriation/Budget Activity<br>0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)* | | | | | R-1 Program Element (Number/Name)<br>PE 0604115C / *Technology Maturation Initiatives* | | | | | | | |
| **COST ($ in Millions)** | **Prior Years** | **FY 2016** | **FY 2017** | **FY 2018 Base** | **FY 2018 OCO** | **FY 2018 Total** | **FY 2019** | **FY 2020** | **FY 2021** | **FY 2022** | **Cost To Complete** | **Total Cost** |
| Total Program Element | - | 24.743 | 99.366 | 128.406 | - | 128.406 | 168.388 | 174.432 | 176.660 | 177.264 | Continuing | Continuing |
| MD98: *Directed Energy Demonstrator Development* | - | 0.000 | 23.744 | 48.099 | - | 48.099 | 76.979 | 66.958 | 61.334 | 71.437 | Continuing | Continuing |
| MD99: *Discrimination Sensor Demonstrator Development* | - | 18.362 | 57.382 | 73.295 | - | 73.295 | 76.985 | 93.876 | 103.683 | 95.845 | Continuing | Continuing |
| MT99: *Technology Maturation Initiatives Test* | - | 2.070 | 13.508 | 0.220 | - | 0.220 | 4.476 | 4.327 | 1.857 | 0.000 | 0 | 26.458 |
| MC98: *Cyber Operations* | - | 0.140 | 0.168 | 0.172 | - | 0.172 | 0.257 | 0.179 | 0.182 | 0.272 | Continuing | Continuing |
| MD40: *Program Wide Support* | - | 4.171 | 4.564 | 6.620 | - | 6.620 | 9.691 | 9.092 | 9.604 | 9.710 | Continuing | Continuing |
| **Program MDAP/MAIS Code:** 362 | | | | | | | | | | | | |

**Note**

N/A

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

Technology Maturation Initiatives develops technology that is matured beyond the laboratory. Technology Maturation Initiatives builds on the MDA Configured Block 1 MQ-9 Reaper Remotely Piloted Aircraft (RPA) missile tracking technology successfully developed under the Discrimination Sensor Technology Program Element 0603177C, improving accuracy, adding range, and conducting operationally representative airborne sensor tests. This Program Element will transition to the use of Block 5 Big Wing (BW) MQ-9 RPA, equipped with an advanced sensor (tracking lasers, advanced detectors, infrared sensors, and precision tracking and discrimination algorithms). It also incorporates industry technology breakthroughs to develop and demonstrate low to mid power lasers on a high altitude airborne platform. Together, these advanced components and tests address complex tracking, discrimination, and boost phase kill challenges for the Ballistic Missile Defense System (BMDS) in support of the Strategic Commands Prioritized Capabilities List and address evolving threats to the homeland from the Pacific theater.

MDA will develop cost effective technology demonstrators to address specific risks:
- A high altitude low power laser equipped airborne system to demonstrate finding, tracking and engaging boosting missiles at the standoff ranges required for missile defense
- An advanced sensor integrated into a MDA Configured MQ-9 to provide discrimination of lethal objects
- An advanced sensor space payload that builds on the airborne discrimination program to demonstrate persistent overhead discrimination coverage
- Continuation of testing of the passive MDA Configured MQ-9 system to validate performance against emerging advanced threats

| Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Missile Defense Agency | Date: May 2017 |
|---|---|
| **Appropriation/Budget Activity**<br>0400: *Research, Development, Test & Evaluation, Defense-Wide* / BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* |

The Low Power Laser Demonstrator program integrates a tracking laser with a more powerful mission laser and larger beam control systems on a high altitude airborne platform. This airborne demonstrator addresses a broad spectrum of directed energy mission applications while refining a missile defense concept of operations doctrine for incorporating lasers into the BMDS. MDA's directed energy plan incrementally demonstrates and improves the constituent components required to execute a directed energy kill chain; acquisition, tracking and lethality. The Agency will select from industry concepts to integrate and test a low to mid power laser on a high altitude airborne platform. The Low Power Laser Demonstrator shapes future BMDS acquisition decisions by advancing and documenting the technology readiness levels of emerging and developing technology, while simultaneously assessing the performance and contributions to the BMDS architecture.

The MDA Configured MQ-9 provides a low cost, mid-altitude unmanned test platform capable of carrying small laser and advanced sensor payloads. This platform allows MDA to introduce unmanned systems and tracking lasers into the BMDS, develop the associated concept of operations and provide the basis for a quick reaction precision tracking capability to augment radar. The advanced sensor incorporates incrementally developed, integrated, and tested next-generation sensors and detectors to demonstrate Launch-on-Remote, Engage-on-Remote, discrimination and handover improvements for missile defense first from the air and then from space. These advanced sensors improve the probability of engagement success for stressing threats, expand the BMD battle space and increase the ability to negate larger raid sizes.

To address emerging advanced threats, MDA may use MDA-configured MQ-9s to support hypersonic threat testing scenarios.

FY 2017 Amended Budget Request Justification: $+9.100M addresses emergency warfighting readiness requirements to ensure readiness of the BMDS. $+9.100M Project MT99-Technology Maturation Initiatives Test/Technology Maturation Initiatives Test to leverage an upcoming hypersonic test event for data collection, and to support threat model validation, detection, tracking and simulated engagement concepts evaluation to address an Emerging Threat and to investigate and demonstrate sensors and systems for integrating left and right of launch.

| B. Program Change Summary ($ in Millions) | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total |
|---|---|---|---|---|---|
| Previous President's Budget | 27.225 | 90.266 | 149.901 | - | 149.901 |
| Current President's Budget | 24.743 | 99.366 | 128.406 | - | 128.406 |
| Total Adjustments | -2.482 | 9.100 | -21.495 | - | -21.495 |
| • 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 | -2.012 | 0.000 | | | |
| • SBIR/STTR Transfer | -0.470 | 0.000 | | | |
| • Other Adjustment | 0.000 | 9.100 | -21.495 | - | -21.495 |

**Change Summary Explanation**

The decrease in FY2018 from PB17 to PB18 reflects a realignment of department priorities and reduction of funding in Directed Energy.

| Exhibit R-2, RDT&E Budget Item Justification: FY 2018 Missile Defense Agency | Date: May 2017 |
|---|---|
| **Appropriation/Budget Activity**<br>0400: *Research, Development, Test & Evaluation, Defense-Wide I* BA 4: *Advanced Component Development & Prototypes (ACD&P)* | **R-1 Program Element (Number/Name)**<br>PE 0604115C *I Technology Maturation Initiatives* |

FY 2017 Amended Budget Request Justification: $+9.100M is required to address emergency warfighting readiness requirements to ensure readiness of the BMDS.

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | | Date: May 2017 |
|---|---|---|---|
| Appropriation/Budget Activity<br>0400 / 4 | R-1 Program Element (Number/Name)<br>PE 0604115C / *Technology Maturation Initiatives* | Project (Number/Name)<br>MD98 / *Directed Energy Demonstrator Development* | |

| COST ($ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MD98: *Directed Energy Demonstrator Development* | - | 0.000 | 23.744 | 48.099 | - | 48.099 | 76.979 | 66.958 | 61.334 | 71.437 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**Note**

The increase from FY 2017 to FY 2018 funds the ramp up in Industry personnel required to transition from the initial design phase to full demonstrator development and purchase of long lead hardware required to build and test a LPLD based on the cost and schedule provided during industry's concept definition studies.

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

The Directed Energy Demonstrator Development project develops, integrates, and tests the technologies required to demonstrate the complete acquisition, tracking and lethality engagement sequence of a high energy laser system for boost-phase missile defense. The Low Power Laser Demonstrator (LPLD) builds on tracking technology developed under the Discrimination Sensor Technology Program Element (0603117C) with laser technology developed under the Weapons Technology Program Element (0603178C) and industry concepts for a cost-effective demonstrator. The demonstrator will integrate the lasers, detectors, beam control system, processors, power supplies and thermal management systems into a high altitude airborne platform for missile defense laser applications. MDA will test the laser platform under realistic conditions in conjunction with on-going BMDS tests.

This approach informs a missile defense laser concept of operations under realistic BMDS scenarios. The Directed Energy Demonstrator Development project provides the necessary technology, test data, and operations familiarity to successfully transition to a higher power directed energy weapon capable of destroying a boosting missile before payloads deploy, complicating kill.

The technology, individually and jointly developed and tested by MDA, the Air Force and the Defense Advanced Research Projects Agency (DARPA) under the Weapons Technology program element, underpins multiple LPLD Industry concepts. This LPLD provides additional collaborative development and test opportunities to investigate laser beam pointing, stability and jitter effects under various altitude and flight conditions.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|
| ***Title:*** Directed Energy Demonstrator Development | 0.000 | 23.744 | 48.099 |
| ***Articles:*** | - | - | - |
| ***Description:*** The Directed Energy Demonstrator Development project designs, integrates, and tests a Low Power Laser Demonstrator (LPLD) for missile defense. Depending on the specific industry initial design selected to continue through critical design, the demonstrator will consist of a kilowatt (kW)-class tracking laser, a multi-kilowatt class mission laser and a 0.5 meter telescope. A key risk area to cost effective boost phase kill is acquisition, tracking and beam stability at long stand-off ranges. | | | |

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD98 / *Directed Energy Demonstrator Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|
| The demonstrator will incrementally verify acquisition and tracking, laser pointing and stability accuracy at extended ranges, then mission laser effectiveness at shorter ranges.<br><br>The LPLD provides an autonomously controlled laser-equipped airborne platform to develop a missile defense directed energy Concept of Operations (CONOPS). The laser flight system, beam control methodology and laser CONOPS inform development of higher power, higher altitude directed energy systems necessary for missile defense.<br><br>***FY 2016 Accomplishments:***<br>Under the Weapons Technology PE completed 5, $1M industry concept definition studies and conducted concept trade analysis, updated Advanced Technology Innovation - Broad Agency Announcement (ATI-BAA) and solicited white papers for follow on design and build phases of the program. Selected beam control as highest priority to maximize laser intensity at the target.<br><br>***FY 2017 Plans:***<br>Award multiple contracts through a tailored Preliminary Design Review (PDR) to conduct the systems engineering and preliminary design necessary to define a LPLD that integrates the lasers, detectors, beam control system, processors, power supplies and thermal management systems into an airborne platform for missile defense.<br>- Analyze and evaluate industry concepts for integrating and testing a multi-kW class laser into an airborne platform for missile defense applications<br>-- Determine the best laser/aircraft combination to cost effectively address the directed energy missile defense mission space<br>-- Award three contracts through a tailored PDR<br>- Perform the directed energy requirements flow down and engineering analysis for a LPLD<br>- Define a preliminary directed energy concept of operations for laser equipped high altitude airborne platform participation in BMDS tests<br><br>***FY 2018 Plans:***<br>The increase from FY 2017 to FY 2018 funds the ramp up in Industry personnel required to transition from the initial design phase to full demonstrator development and purchase of long lead hardware required to build and test a LPLD based on the cost and schedule provided during industry's concept definition studies.<br>Complete the systems engineering and preliminary design for the LPLD that integrates the lasers, detectors, beam control system, processors, power supplies and thermal management systems into an airborne platform for missile defense.<br>- Complete the initial design through PDR<br>-- Complete LPLD requirements flow down and engineering analysis<br>-- Define long lead procurement requirements<br>-- Conduct PDR<br>- Select the best laser/aircraft design to demonstrate pointing and tracking, beam control and lethality. | | | |

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD98 / *Directed Energy Demonstrator Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|
| - Award a follow-on contract for continued development though a tailored Critical Design Review (CDR) and begin long lead material procurement<br>-- Complete long lead build to drawings and release for fabrication<br>-- Refine the directed energy concept of operations for laser equipped high altitude airborne platforms | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.000 | 23.744 | 48.099 |

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

| Line Item | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0603176C: *Advanced Concepts and Performance Assessment* | 11.853 | 17.880 | 12.996 | - | 12.996 | 13.741 | 15.048 | 15.319 | 16.361 | Continuing | Continuing |
| • 0603177C: *Discrimination Sensor Technology* | 27.981 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • 0603178C: *Weapons Technology* | 50.263 | 71.843 | 5.495 | - | 5.495 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • 0603180C: *Advanced Research* | 16.987 | 27.733 | 20.184 | - | 20.184 | 20.695 | 21.555 | 21.936 | 22.361 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy for MD98, Directed Energy Development, consists of contracts to industry via the Advanced Technology Innovation Broad Agency Announcement and competitive procurement(s) to develop and demonstrate a LPLD system in realistic test environments. The MDA will leverage Agency, partner subject matter experts and use government model based assessments to inform Better Buying Power philosophy acquisition decisions.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD98 / *Directed Energy Demonstrator Development* |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directed Energy Demonstrator Development - LPLD Continued Best Design | C/CPFF | TBD : TBD | 0.000 | 0.000 | | 0.000 | | 16.175 | May 2018 | - | | 16.175 | Continuing | Continuing | Continuing |
| Directed Energy Demonstrator Development - LPLD Preliminary Design A | C/CPFF | Lockheed Martin : CA | 0.000 | 0.000 | | 6.940 | Jul 2017 | 9.000 | Nov 2017 | - | | 9.000 | Continuing | Continuing | Continuing |
| Directed Energy Demonstrator Development - LPLD-Preliminary Design B | C/CPFF | General Atomics : CA | 0.000 | 0.000 | | 6.940 | Jul 2017 | 9.000 | Nov 2017 | - | | 9.000 | Continuing | Continuing | Continuing |
| Directed Energy Demonstrator Development - LPLD-Preliminary Design C | C/CPFF | Boeing : CA | 0.000 | 0.000 | | 6.940 | Jul 2017 | 9.000 | Nov 2017 | - | | 9.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 20.820 | | 43.175 | | - | | 43.175 | - | - | - |

**Remarks**

N/A

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Directed Energy Demonstrator Development - Agency Operations – Civilian Salaries and Travel | Allot | MDA Multi : AL, NM | 0.000 | 0.000 | | 0.000 | | 0.219 | Oct 2017 | - | | 0.219 | Continuing | Continuing | Continuing |
| Directed Energy Demonstrator Development - LPLD-Performance Analysis | MIPR | MIT LL, Aviation and Missile Research Development and | 0.000 | 0.000 | | 1.600 | Jan 2017 | 2.556 | Jan 2018 | - | | 2.556 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency | | | Date: May 2017 |
|---|---|---|---|
| Appropriation/Budget Activity<br>0400 / 4 | R-1 Program Element (Number/Name)<br>PE 0604115C / *Technology Maturation Initiatives* | Project (Number/Name)<br>MD98 / *Directed Energy Demonstrator Development* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | Engineering Center (AMRDEC) : MA, AL | | | | | | | | | | | | | |
| Directed Energy Demonstrator Development - LPLD– Engineering and Technical Services | MIPR | Aviation and Missile Research Development and Engineering Center (AMRDEC) : AL | 0.000 | 0.000 | | 1.324 | Oct 2016 | 2.149 | Oct 2017 | - | | 2.149 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 2.924 | | 4.924 | | - | | 4.924 | - | - | - |

**Remarks**

N/A

| | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.000 | | 23.744 | | 48.099 | | - | | 48.099 | - | - | - |

**Remarks**

N/A

| Exhibit R-4, RDT&E Schedule Profile: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD98 / *Directed Energy Demonstrator Development* |

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

| | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| LPLD Contract Awards | | | | | | | | △ | | | | | | | | | | | | | | | | | | | | |
| LPLD tailored PDR | | | | | | | | | | | △ | | | | | | | | | | | | | | | | | |
| LPLD tailored CDR | | | | | | | | | | | | | | | | △ | | | | | | | | | | | | |
| LPLD Checkout Ground Test | | | | | | | | | | | | | | | | | | | | | | | | △ | | | | |
| LPLD Checkout Flight Test | | | | | | | | | | | | | | | | | | | | | | | | | △ | | | |
| Target Acquisition and Tracking Demonstration | | | | | | | | | | | | | | | | | | | | | | | | | | △ | | |
| Beam Control and Stability Demonstration | | | | | | | | | | | | | | | | | | | | | | | | | | | △ | |
| Laser Concept of Operations | | | | | | | | | | | | | | | | | | | | | | | | | | | | △ |

| Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD98 / *Directed Energy Demonstrator Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events** | **Quarter** | **Year** | **Quarter** | **Year** |
| LPLD Contract Awards | 4 | 2017 | 4 | 2017 |
| LPLD tailored PDR | 3 | 2018 | 3 | 2018 |
| LPLD tailored CDR | 4 | 2019 | 4 | 2019 |
| LPLD Checkout Ground Test | 3 | 2021 | 3 | 2021 |
| LPLD Checkout Flight Test | 1 | 2022 | 1 | 2022 |
| Target Acquisition and Tracking Demonstration | 2 | 2022 | 2 | 2022 |
| Beam Control and Stability Demonstration | 3 | 2022 | 3 | 2022 |
| Laser Concept of Operations | 4 | 2022 | 4 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | | Date: May 2017 |
|---|---|---|---|
| Appropriation/Budget Activity<br>0400 / 4 | R-1 Program Element (Number/Name)<br>PE 0604115C / *Technology Maturation Initiatives* | Project (Number/Name)<br>MD99 / *Discrimination Sensor Demonstrator Development* | |

| COST ($ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MD99: *Discrimination Sensor Demonstrator Development* | - | 18.362 | 57.382 | 73.295 | - | 73.295 | 76.985 | 93.876 | 103.683 | 95.845 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**Note**

The increase from FY 2017 to FY 2018 reflects Discrimination Sensor Demonstrator flight qualification hardware build, aircraft integration, and flight qualification of the updated MDA-configured MQ-9 aircraft.

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

Discrimination Sensor Demonstrator Development, builds on the technology developed and demonstrated in the Discrimination Sensor Technology Program Element 0603177C. Areas of concentration include tracking lasers, advanced detectors, infrared sensors, and precision tracking and discrimination algorithms (constitutes the advanced sensor system). Discrimination Sensor Demonstrator Development pursues a cost-effective incremental upgrade philosophy that demonstrates precision track of advanced threats at extended ranges, simple scene discrimination and then complex scene discrimination through ground, flight, and space demonstrations.

This project develops and tests high-precision advanced sensors to improve identifying, acquiring, tracking and discriminating incoming ballistic missile threats, specifically addressing U.S. Strategic Commands Prioritized Capabilities List requirements. Discrimination Sensor Demonstrator Development enhances the BMDS capability to discriminate lethal objects in a threat cluster, and track and hand over the threat object with Aegis Launch on Remote and Engage on Remote precision. Aegis Launch on Remote is the capability that allows Aegis BMD to launch an interceptor before its own radar acquires the threat. Aegis BMD Launch on Remote involves Command, Control, Battle Management and Communications providing information about the paths (called tracks) of ballistic missile threats to Aegis BMD from forward based radars. It expands the space where the system can intercept the threat and the defended area. Engage on Remote engagement allows Aegis to use off board sensor information to launch and guide the Standard Missile - 3 (SM-3) missile to final intercept. The increased kinematics envelope of the SM-3 Block IIA, when combined with Engage on Remote capability, will expand battlespace and increase the number of threats engaged.

Discrimination Sensor Demonstrator Development uses an incremental development and test approach to address risk through a series of ground, air, then space demonstrations. This project funds development of next-generation advanced sensor systems to include tracking lasers, specialized detectors, and unique processors and the corollary ground, airborne and space subsystems required for BMDS test. These advanced sensors operate at the strategic ranges required to augment BMDS radar, improve the BMDS discrimination capability and provide precision track of large raids. These advanced sensor systems can track multiple targets simultaneously, substantially reducing the number of sensor assets required for large raids.

MDA tests promising advanced sensor technology at the Mt Wilson Aerospace Facility for Integrated Optical Test (MAFIOT) in California. This ground testbed provides line of sight viewing of missile launches from Vandenberg AFB and San Nicolas Island.

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD99 / *Discrimination Sensor Demonstrator Development* |

This project includes advanced sensor integration into a high altitude airborne platform, a MDA Configured MQ-9 aircraft, and testing in operationally relevant environments. The MDA Configured MQ-9 aircraft equipped with an advanced sensor provides the MDA a viable quick reaction capability to augment BMDS radar.

The program will leverage the technology demonstrated from the ground and in the air to build space qualified advanced sensor payloads. These cost-effective focal plane array and advanced sensor space demonstrations inform future BMDS space layer decisions for persistent tracking and discrimination.

MDA will also partner with the Services to develop concepts for the cost effective integration of the sensor technology successfully demonstrated under the Discrimination Sensor Technology Program Element into limited fielding upgrade kits. The concept information will inform a MDA Product Development Decision for further development and/or limited fielding decisions. These kits could be installed on MQ-9 aircraft deployed in theater to add missile defense capabilities on short notice.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|
| ***Title:*** Discrimination Sensor Demonstrator Development | 18.362 | 57.382 | 73.295 |
| ***Articles:*** | - | - | - |

***Description:*** This project develops an advanced sensor for participation in BMDS tests under operationally relevant conditions and at operationally relevant ranges. The sensors upgrade the proven Multi-Spectral Targeting System (MTS) / MQ-9 Aircraft combination demonstrated under the Discrimination Sensor Technology Program Element to perform tracking and discrimination of lethal objects.

***FY 2016 Accomplishments:***
- Initiated design and development of an advanced sensor for MTS-C / MQ-9 Reaper integration that supports improved BMDS discrimination capability
-- Began the preliminary design of an advanced sensor
-- Conducted integration and component test of advanced sensor subsystems
-- Performed laboratory testing to verify subsystem performance
-- Analyzed laboratory test data to verify advanced sensor precision track and discrimination capability
- Conducted compact advanced sensor ground tests against targets of opportunity to verify tracking and algorithm performance for BMDS discrimination

***FY 2017 Plans:***
In FY 2017, an increase of $39.020 million funds MD99, Discrimination Sensor build, ground test, aircraft integration, and flight qualification.

- Continue development and test of an advanced sensor equipped MTS-C and MDA Configured MQ-9 Aircraft system
-- Conduct a Preliminary Design Review (PDR) for the advanced sensor system
-- Conduct a Critical Design Review (CDR) for the advanced sensor system

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD99 / *Discrimination Sensor Demonstrator Development* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|
| -- Initiate development of the flight qualified payload system<br>-- Upgrade the MTS-C to improve pointing and test in the laboratory<br>-- Develop a new chin mount for the MQ-9 Aircraft that increases MTS-C mount rigidity while minimizing weight and drag<br>- Complete development and ground test of a compact, fully packaged, flight qualifiable advanced sensor for future integration into a high altitude platform<br>- Participate in multiple Target of Opportunity (TOO) tests to include Glory Trip (GT)-219, GT-220, GT-221 and World View (WV)-4<br>***FY 2018 Plans:***<br>The increase from FY 2017 to FY 2018 reflects Discrimination Sensor continued build, aircraft integration, and flight qualification.<br><br>- Continue development of the advanced sensor system to include the laser, detector, and unique advanced processor<br>- Conduct missile boost-phase tracking tests with advanced sensor ground testbed<br>-- Develop and improve algorithms and models based on data from advanced sensor ground testbeds<br>-- Conduct airborne advanced sensor ground-truth tests with ground testbed<br>-- Conduct advanced sensor risk reduction tests at ground testbeds<br>- Conduct a flight laboratory test for a compact combined advanced sensor<br>- Complete build and begin integration of a flight qualified laser system onto a MQ-9 Aircraft<br>- Solicit a Broad Agency Announcement for advanced sensor for space concept definition | | | |
| **Accomplishments/Planned Programs Subtotals** | 18.362 | 57.382 | 73.295 |

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

| Line Item | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0603176C: *Advanced Concepts and Performance Assessment* | 11.853 | 17.880 | 12.996 | - | 12.996 | 13.741 | 15.048 | 15.319 | 16.361 | Continuing | Continuing |
| • 0603177C: *Discrimination Sensor Technology* | 27.981 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • 0603178C: *Weapons Technology* | 50.263 | 71.843 | 5.495 | - | 5.495 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • 0603179C: *Advanced C4ISR* | 9.661 | 3.626 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 13.287 |
| • 0603180C: *Advanced Research* | 16.987 | 27.733 | 20.184 | - | 20.184 | 20.695 | 21.555 | 21.936 | 22.361 | Continuing | Continuing |
| • 0603884C: *Ballistic Missile Defense Sensors* | 233.020 | 230.077 | 247.345 | - | 247.345 | 247.643 | 362.850 | 401.267 | 497.503 | Continuing | Continuing |
| • 0603890C: *BMD Enabling Programs* | 406.326 | 408.594 | 449.442 | - | 449.442 | 466.760 | 540.409 | 629.864 | 501.915 | Continuing | Continuing |

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD99 / *Discrimination Sensor Demonstrator Development* |

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

| Line Item | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0603896C: *Ballistic Missile Defense Command and Control, Battle Management & Communication* | 425.996 | 456.267 | 430.115 | - | 430.115 | 461.275 | 501.956 | 496.411 | 514.139 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy for MD99, Discrimination Sensor Demonstrator Development consists of a contract(s) to industry via the Advanced Technology Innovation Broad Agency Announcement and competitive procurements and agreements with Federally Funded Research and Development Centers to develop and demonstrate an advanced sensor system in realistic test environments. The MDA will leverage Agency, partner subject matter experts and use government model based assessments to inform Better Buying Power philosophy acquisition decisions.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency | | | Date: May 2017 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD99 / *Discrimination Sensor Demonstrator Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Discrimination Sensor Demonstrator Development - Advanced Sensor Development Support | MIPR | Aerospace, MIT/LL : CA, MA | 0.000 | 0.436 | | 0.936 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Discrimination Sensor Demonstrator Development - Advanced Sensor Flight Demonstrator | Various | General Atomics, MIT/LL, TBD : C, MA, TBD | 0.000 | 0.000 | | 24.500 | | 53.423 | Aug 2018 | - | | 53.423 | Continuing | Continuing | Continuing |
| Discrimination Sensor Demonstrator Development - Advanced Sensor Ground Test | MIPR | MIT LL, Aerospace : MA, CA | 0.000 | 8.698 | Dec 2015 | 2.300 | | 1.673 | Oct 2017 | - | | 1.673 | Continuing | Continuing | Continuing |
| Discrimination Sensor Demonstrator Development - Advanced Sensor Laboratory Test | C/CPFF | General Atomics : CA | 0.000 | 1.655 | | 6.454 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Discrimination Sensor Demonstrator Development - Advanced Sensor Performance Analysis Aegis Engage on Remote Concept Assessment | MIPR | MIT LL : MA | 0.000 | 0.500 | Dec 2015 | 0.000 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Discrimination Sensor Demonstrator Development - Advanced Sensor Performance Analysis Aegis Engage on Remote Hardware in the Loop (HWIL) | MIPR | MIT LL, Aviation and Missile Research, Development, and Engineering Center (AMRDEC) : MA, AL | 0.000 | 0.000 | | 5.800 | | 6.100 | Nov 2017 | - | | 6.100 | Continuing | Continuing | Continuing |
| Discrimination Sensor Demonstrator Development - Airborne EO/IR Demonstrator | C/CPFF | General Atomics : CA | 0.000 | 1.708 | | 6.041 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency | | | Date: May 2017 |
|---|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD99 / *Discrimination Sensor Demonstrator Development* | |

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 0.000 | 12.997 | | 46.031 | | 61.196 | | - | | 61.196 | - | - | - |

**Remarks**

N/A

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Discrimination Sensor Demonstrator Development - Agency Operations - Advisory and Assistance Services | C/CPFF | Various : NM, AL | 0.000 | 0.241 | | 3.103 | | 3.164 | Oct 2017 | - | | 3.164 | Continuing | Continuing | Continuing |
| Discrimination Sensor Demonstrator Development - Agency Operations - Engineering and Technical Services | MIPR | Aviation and Missile Research, Development, and Engineering Center (AMRDEC), Aerospace : AL, CA | 0.000 | 1.198 | Dec 2015 | 1.371 | | 0.811 | Oct 2017 | - | | 0.811 | Continuing | Continuing | Continuing |
| Discrimination Sensor Demonstrator Development - Agency Operations – Civilian Salaries and Travel | Allot | MDA Multi : AL, NM | 0.000 | 1.366 | | 4.608 | | 4.804 | Oct 2017 | - | | 4.804 | Continuing | Continuing | Continuing |
| Discrimination Sensor Demonstrator Development - Agency Operations – Facility Support | MIPR | 377th ABW : NM | 0.000 | 0.148 | Dec 2015 | 0.111 | | 0.113 | Oct 2017 | - | | 0.113 | Continuing | Continuing | Continuing |
| Discrimination Sensor Demonstrator Development - Information Management and Technology | C/CPAF | Northrop Grumman : CO | 0.000 | 2.412 | | 2.158 | | 3.207 | Feb 2018 | - | | 3.207 | Continuing | Continuing | Continuing |

| Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD99 / *Discrimination Sensor Demonstrator Development* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | 0.000 | 5.365 | | 11.351 | | 12.099 | | - | | 12.099 | - | - | - |

**Remarks**

N/A

| | Prior Years | FY 2016 | | FY 2017 | | FY 2018 Base | | FY 2018 OCO | | FY 2018 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 18.362 | | 57.382 | | 73.295 | | - | | 73.295 | - | - | - |

**Remarks**

N/A

| Exhibit R-4, RDT&E Schedule Profile: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD99 / *Discrimination Sensor Demonstrator Development* |

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

| | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Advanced Sensor Contract Award | | | | ▲ | | | | | | | | | | | | | | | | | | | | | | | | |
| Compact, Advanced Sensor Tracking Ground Test | | | | ▲ | | | | | | | | | | | | | | | | | | | | | | | | |
| Advanced Sensor PDR | | | | | ▲ | | | | | | | | | | | | | | | | | | | | | | | |
| Advanced Sensor CDR | | | | | | | △ | | | | | | | | | | | | | | | | | | | | | |
| Advanced Sensor Flight Laboratory Test | | | | | | | | | △ | | | | | | | | | | | | | | | | | | | |
| Electro Optical Infrared (EOIR) Launch on Remote Track Ex | | | | | | | | △ | | | | | | | | | | | | | | | | | | | | |
| Advanced Sensor System Ground Test | | | | | | | | | △ | | | | | | | | | | | | | | | | | | | |
| Advanced Sensor CONUS Flight Test | | | | | | | | | | | | | △ | | | | | | | | | | | | | | | |
| Advanced Sensor Launch on Remote Test | | | | | | | | | | | | | | △ | | | | | | | | | | | | | | |
| Advanced Sensor Live Fire Track Ex for FEV-02 | | | | | | | | | | | | | | | ○ | | | | | | | | | | | | | |
| Advanced Sensor Discrimination | | | | | | | | | | | | | | | | | △ | | | | | | | | | | | |
| Advanced Sensor Engage on Remote | | | | | | | | | | | | | | | | | | △ | | | | | | | | | | |
| Space Advanced Sensor Contract Award | | | | | | | | | | | | | | | | △ | | | | | | | | | | | | |
| Space Advanced Sensor PDR | | | | | | | | | | | | | | | | | | | △ | | | | | | | | | |
| Space Advanced Sensor CDR | | | | | | | | | | | | | | | | | | | | | | | | △ | | | | |
| Space Advanced Sensor Launch Vehicle Purchase and Build | | | | | | | | | | | | | | | | | | | | | | | | | | ✧ | ✧ | |
| Advanced Sensor Kill Assessment Demo | | | | | | | | | | | | | | | | | | | | | | | | △ | | | | |

| Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD99 / *Discrimination Sensor Demonstrator Development* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events** | **Quarter** | **Year** | **Quarter** | **Year** |
| Advanced Sensor Contract Award | 4 | 2016 | 4 | 2016 |
| Compact, Advanced Sensor Tracking Ground Test | 4 | 2016 | 4 | 2016 |
| Advanced Sensor PDR | 1 | 2017 | 1 | 2017 |
| Advanced Sensor CDR | 3 | 2017 | 3 | 2017 |
| Advanced Sensor Flight Laboratory Test | 1 | 2018 | 1 | 2018 |
| Electro Optical Infrared (EOIR) Launch on Remote Track Ex | 4 | 2017 | 4 | 2017 |
| Advanced Sensor System Ground Test | 1 | 2018 | 1 | 2018 |
| Advanced Sensor CONUS Flight Test | 2 | 2019 | 2 | 2019 |
| Advanced Sensor Launch on Remote Test | 3 | 2019 | 3 | 2019 |
| Advanced Sensor Live Fire Track Ex for FEV-02 | 4 | 2019 | 4 | 2019 |
| Advanced Sensor Discrimination | 2 | 2020 | 2 | 2020 |
| Advanced Sensor Engage on Remote | 3 | 2020 | 3 | 2020 |
| Space Advanced Sensor Contract Award | 1 | 2020 | 1 | 2020 |
| Space Advanced Sensor PDR | 4 | 2020 | 4 | 2020 |
| Space Advanced Sensor CDR | 4 | 2021 | 4 | 2021 |
| Space Advanced Sensor Launch Vehicle Purchase and Build | 2 | 2022 | 3 | 2022 |
| Advanced Sensor Kill Assessment Demo | 4 | 2021 | 4 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | | Date: May 2017 |
|---|---|---|---|
| Appropriation/Budget Activity<br>0400 / 4 | R-1 Program Element (Number/Name)<br>PE 0604115C / *Technology Maturation Initiatives* | Project (Number/Name)<br>MT99 / *Technology Maturation Initiatives Test* | |

| COST ($ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MT99: *Technology Maturation Initiatives Test* | - | 2.070 | 13.508 | 0.220 | - | 0.220 | 4.476 | 4.327 | 1.857 | 0.000 | 0 | 26.458 |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**Note**

The increase from FY 2016 to FY 2017 and subsequent decrease in FY2018 reflects differences in Discrimination Sensor flight-test participation. FY2016 funds MDA-configured MQ-9 participation in a single BMDS Test, FY2017 funds preparation for three tests, while FY2018 funds test analysis.

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

Technology Maturation Initiatives (TMI) Test project funds the management and execution of TMI system participation in BMDS level tests, Hardware-in-the-Loop testing, and performance analysis costs for flight test data. This includes test asset shipment to test ranges, labor, travel, range support and Command Control Battle Management and Communications test support specific to Technology Maturation Initiatives.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|
| ***Title:*** Technology Maturation Initiatives Test | 2.070 | 13.508 | 0.220 |
| ***Articles:*** | - | - | - |
| ***Description:*** This project captures the cost to test the systems developed under the Directed Energy Demonstrator Development and Discrimination Sensor Demonstrator Development projects under realistic conditions in conjunction with on-going BMDS testing and through dedicated live fire tests to inform continued testing, full development and limited fielding decisions. This effort also demonstrates potential sensors, systems, and architectures to integrate the BMDS for left and right of launch.<br>Recurring efforts include:<br>- Conduct system level hardware-in-the-loop testing in conjunction with Enterprise Sensor Laboratory and Experimental Laboratory for a BMDS level test<br>- Shipping, labor, travel, and range support for a BMDS level test | | | |
| ***FY 2016 Accomplishments:***<br>SEE ABOVE | | | |
| ***FY 2017 Plans:***<br>- Complete test activities for an associated operations test, SCD Flight Test Standard Missile (SFTM)-02<br>- Complete test activities for a dedicated live fire test, Flight Experiment Advanced Technology (FEV)-01<br>- Complete preparation for Technology Maturation Initiatives ground and airborne sensor participation in hypersonic threat testing to investigate and demonstrate sensors and systems for integrating left and right of launch | | | |

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MT99 / *Technology Maturation Initiatives Test* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|
| - Prepare threat models for validation and conducted Hardware-in-the-Loop simulations and risk reduction flights to inform weapon concept definition and evaluation of this emerging threat | | | |
| ***FY 2018 Plans:***<br>- Complete residual support and data analysis for FEV-01 and FE-01. | | | |
| **Accomplishments/Planned Programs Subtotals** | 2.070 | 13.508 | 0.220 |

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

| Line Item | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0603176C: *Advanced Concepts and Performance Assessment* | 11.853 | 17.880 | 12.996 | - | 12.996 | 13.741 | 15.048 | 15.319 | 16.361 | Continuing | Continuing |
| • 0603177C: *Discrimination Sensor Technology* | 27.981 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • 0603178C: *Weapons Technology* | 50.263 | 71.843 | 5.495 | - | 5.495 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • 0603179C: *Advanced C4ISR* | 9.661 | 3.626 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 13.287 |
| • 0603180C: *Advanced Research* | 16.987 | 27.733 | 20.184 | - | 20.184 | 20.695 | 21.555 | 21.936 | 22.361 | Continuing | Continuing |
| • 0603884C: *Ballistic Missile Defense Sensors* | 233.020 | 230.077 | 247.345 | - | 247.345 | 247.643 | 362.850 | 401.267 | 497.503 | Continuing | Continuing |
| • 0603890C: *BMD Enabling Programs* | 406.326 | 408.594 | 449.442 | - | 449.442 | 466.760 | 540.409 | 629.864 | 501.915 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The MDA Integrated Master Test Plan establishes and documents the test requirements for the BMDS with the specific focus on collecting the data needed for the Verification, Validation, and Accreditation of the BMDS models and simulations. This paradigm uses critical factor analysis to drive test design, planning, and execution for accrediting models & simulations, which is used to validate and assess system performance. With this test approach, the MDA will establish confidence that the models & simulations used to evaluate the BMDS represent real world behavior, thereby enabling simulation-based performance assessment to verify system functionality.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MT99 / *Technology Maturation Initiatives Test* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | **Subtotal** | - | - | | - | | - | | - | | - | - | - | - |

**Remarks**

N/A

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technology Maturation Initiatives Test - Command Control Battle Management and Communications | Various | Northrop Grumman, Lockheed Martin, Space and Naval Warfare Center, National Air and Space Intelligence Center, Naval Surface Warfare Center Dahlgren Division : CO, CA, OH, VA | 0.000 | 1.405 | Jan 2016 | 5.224 | | 0.220 | Oct 2017 | - | | 0.220 | Continuing | Continuing | Continuing |
| Technology Maturation Initiatives Test - Pacific Missile Range Facility Test Prep | MIPR | Pacific Missile Range Facility : HI | 0.000 | 0.000 | | 0.124 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Technology Maturation Initiatives Test - Reagan Test Site Prep | MIPR | Reagan Test Site : Kwajalein Atoll | 0.000 | 0.000 | | 0.700 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| Technology Maturation Initiatives Test - Transportation Costs for MQ-9 | MIPR | US Air Force : CA | 0.000 | 0.665 | Mar 2016 | 3.060 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 2.070 | | 9.108 | | 0.220 | | - | | 0.220 | - | - | - |

| Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency | | | Date: May 2017 |
|---|---|---|---|
| Appropriation/Budget Activity<br>0400 / 4 | R-1 Program Element (Number/Name)<br>PE 0604115C / *Technology Maturation Initiatives* | Project (Number/Name)<br>MT99 / *Technology Maturation Initiatives Test* | |

**Test and Evaluation ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|

**Remarks**

N/A

**Product Development ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Technology Maturation Initiatives Test - Airborne EO/IR Test | C/CPFF | General Atomics : CA | 0.000 | 0.000 | | 4.400 | | 0.000 | | - | | 0.000 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.000 | | 4.400 | | 0.000 | | - | | 0.000 | - | - | - |

**Remarks**

N/A

| | Prior Years | FY 2016 | | FY 2017 | | FY 2018 Base | | FY 2018 OCO | | FY 2018 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 2.070 | | 13.508 | | 0.220 | | - | | 0.220 | - | - | - |

**Remarks**

N/A

| Exhibit R-4, RDT&E Schedule Profile: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MT99 / *Technology Maturation Initiatives Test* |

Significant Event Complete ▲ Significant Event Planned △ Milestone Decision Complete ★ Milestone Decision Planned ☆ Element Test Complete ◆ Element Test Planned ◇ System Level Test Complete ● System Level Test Planned ○ Complete Activity ✦ Planned Activity ✧

| | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Hardware in the Loop (HWIL), Shipping, Travel and Range Support for Pacific Dragon | | ✦ | ✦ | | | | | | | | | | | | | | | | | | | | | | | | | |
| HWIL, Shipping, Travel and Range Support for SCD Flight Test Standard Missile (SFTM)-02 | | | | | | ✧ | ✧ | | | | | | | | | | | | | | | | | | | | | |
| HWIL, Shipping, Travel and Range Support for Flight Experiment Advanced Technology (FEV) - 01 | | | | | ✧ | ✧ | ✧ | ✧ | ✧ | | | | | | | | | | | | | | | | | | | |
| HWIL, Shipping, Travel and Range Support for Flight Experiment Advanced Technology (FE) - 1 | | | | | | | | ✧ | ✧ | | | | | | | | | | | | | | | | | | | |
| HWIL, Shipping, Travel and Range Support for Flight Test Standard Missile 3 (FTM)-32 | | | | | | | | | | | | | ✧ | ✧ | | | | | | | | | | | | | | |
| HWIL, Shipping, Travel and Range Support for Flight Test Standard Missile 3 (FTM) - 24 | | | | | | | | | | | | | | | | | ✧ | ✧ | | | | | | | | | | |
| HWIL, Shipping, Travel and Range Support for FTM - 30 | | | | | | | | | | | | | | | | | | ✧ | ✧ | | | | | | | | | |
| HWIL, Shipping, Travel and Range Support for FEV-02 | | | | | | | | | | | | | | | | | ✧ | ✧ | ✧ | ✧ | | | | | | | | |
| HWIL, Shipping, Travel and Range Support for FTM - 38 | | | | | | | | | | | | | | | | | | | | | | ✧ | ✧ | | | | | |

| Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MT99 / *Technology Maturation Initiatives Test* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events** | **Quarter** | **Year** | **Quarter** | **Year** |
| Hardware in the Loop (HWIL), Shipping, Travel and Range Support for Pacific Dragon | 2 | 2016 | 3 | 2016 |
| HWIL, Shipping, Travel and Range Support for SCD Flight Test Standard Missile (SFTM)-02 | 2 | 2017 | 3 | 2017 |
| HWIL, Shipping, Travel and Range Support for Flight Experiment Advanced Technology (FEV) - 01 | 1 | 2017 | 1 | 2018 |
| HWIL, Shipping, Travel and Range Support for Flight Experiment Advanced Technology (FE) - 1 | 4 | 2017 | 1 | 2018 |
| HWIL, Shipping, Travel and Range Support for Flight Test Standard Missile 3 (FTM)-32 | 2 | 2019 | 3 | 2019 |
| HWIL, Shipping, Travel and Range Support for Flight Test Standard Missile 3 (FTM) - 24 | 2 | 2020 | 3 | 2020 |
| HWIL, Shipping, Travel and Range Support for FTM - 30 | 3 | 2020 | 4 | 2020 |
| HWIL, Shipping, Travel and Range Support for FEV-02 | 1 | 2020 | 4 | 2020 |
| HWIL, Shipping, Travel and Range Support for FTM - 38 | 2 | 2021 | 3 | 2021 |

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | | Date: May 2017 |
|---|---|---|---|
| Appropriation/Budget Activity<br>0400 / 4 | R-1 Program Element (Number/Name)<br>PE 0604115C / *Technology Maturation Initiatives* | Project (Number/Name)<br>MC98 / *Cyber Operations* | |

| COST ($ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MC98: *Cyber Operations* | - | 0.140 | 0.168 | 0.172 | - | 0.172 | 0.257 | 0.179 | 0.182 | 0.272 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**Note**

N/A

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

Cyber Operations sustains the MDA DoD Risk Management Framework and Controls Validation Testing activities, analysis of validation results, risk assessments and reviews of proposed Program Manager/Information Assurance Manager Plans of Action and Milestones for the MDA Discrimination Sensor Technology mission systems. It maintains the Certification and Accreditation data repository, capturing the DoD Information Assurance Certification and Accreditation Program documentation (artifacts, validation results, and Information Assurance Risk Assessment results, and Designated Approving Authority accreditation decisions) and Plans of Action and Milestones on all MDA information systems.

This project monitors and tracks Cybersecurity mitigations detailed in Information Technology security Plans of Action and Milestones. Activities include preparation of Certification and Accreditation documentation and accreditation recommendations to the MDA Senior Information Assurance Officer /Certification Authority and Designated Approving Authority. Independent Verification and Validation team actions ensure the availability, integrity, authentication, confidentiality and non-repudiation of the MDA mission, test and administrative systems. Activities in the project are necessary to comply with the Federal Information Security Management Act.

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|
| ***Title:*** Network / System Certification and Accreditation (C and A) | 0.140 | 0.168 | 0.172 |
| ***Articles:*** | - | - | - |
| ***Description:*** This project sustains the MDA DoD Risk Management Framework (RMF)certification and Controls Validation Testing activities for Technology Maturation Initiatives<br>- Conduct cyber security and information assurance engineering and architecture planning for Technology Maturation Initiatives information technology systems<br>- Plan and test the information assurance controls for Ballistic Missile Defense System Technology Maturation Initiatives systems<br>- Develop Technology Maturation Initiatives DoD RMF certification and accreditation packages<br>- Conduct Controls Validation Testing (CVT) for Technology Maturation Initiatives mission systems and provide Plan of Action and Milestones to mitigate information assurance deficiencies<br>- Conduct annual information assurance reviews on the Technology Maturation Initiatives enclaves to assess compliance in implementing and maintaining Information Assurance controls | | | |

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MC98 / *Cyber Operations* |

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|
| Specific and/or unique accomplishments to a FY are as follows:<br><br>***FY 2016 Accomplishments:***<br>SEE ABOVE<br><br>***FY 2017 Plans:***<br>SEE ABOVE<br><br>***FY 2018 Plans:***<br>The increase in FY 2018 reflects the need for Information Assurance Controls Validation Testing recertification every three years. | | | |
| **Accomplishments/Planned Programs Subtotals** | 0.140 | 0.168 | 0.172 |

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

| Line Item | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|
| • 0603176C: *Advanced Concepts and Performance Assessment* | 11.853 | 17.880 | 12.996 | - | 12.996 | 13.741 | 15.048 | 15.319 | 16.361 | Continuing | Continuing |
| • 0603177C: *Discrimination Sensor Technology* | 27.981 | 0.000 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • 0603178C: *Weapons Technology* | 50.263 | 71.843 | 5.495 | - | 5.495 | 0.000 | 0.000 | 0.000 | 0.000 | Continuing | Continuing |
| • 0603179C: *Advanced C4ISR* | 9.661 | 3.626 | 0.000 | - | 0.000 | 0.000 | 0.000 | 0.000 | 0.000 | 0 | 13.287 |
| • 0603180C: *Advanced Research* | 16.987 | 27.733 | 20.184 | - | 20.184 | 20.695 | 21.555 | 21.936 | 22.361 | Continuing | Continuing |

**Remarks**

**D. Acquisition Strategy**

The acquisition strategy for MC98, Cyber operations consists of using MDA civilian employees and the existing competitively awarded contractor support services.

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency | | | Date: May 2017 |
|---|---|---|---|
| Appropriation/Budget Activity<br>0400 / 4 | R-1 Program Element (Number/Name)<br>PE 0604115C / *Technology Maturation Initiatives* | Project (Number/Name)<br>MC98 / *Cyber Operations* | |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Network / System Certification and Accreditation (C and A) - Agency Operations – Civilian Salaries and Travel | Allot | Missile Defense Agency : NM | 0.000 | 0.140 | Oct 2015 | 0.168 | Oct 2016 | 0.172 | Oct 2017 | - | | 0.172 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 0.140 | | 0.168 | | 0.172 | | - | | 0.172 | - | - | - |

**Remarks**

N/A

| | Prior Years | FY 2016 | | FY 2017 | | FY 2018 Base | | FY 2018 OCO | | FY 2018 Total | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 0.140 | | 0.168 | | 0.172 | | - | | 0.172 | - | - | - |

**Remarks**

N/A

| Exhibit R-4, RDT&E Schedule Profile: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MC98 / *Cyber Operations* |

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

| | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Cyber Security Support | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | | | | |
| Controls Validation Certification 1 | | | | | | | | | | | | | | | △ | | | | | | | | | | | | | |
| Controls Validation Certification 2 | | | | | | | | | | | | | | | | | | | | | | | | | | | △ | |

| Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MC98 / *Cyber Operations* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events** | **Quarter** | **Year** | **Quarter** | **Year** |
| Cyber Security Support | 1 | 2016 | 4 | 2021 |
| Controls Validation Certification 1 | 3 | 2019 | 3 | 2019 |
| Controls Validation Certification 2 | 3 | 2022 | 3 | 2022 |

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | | Date: May 2017 |
|---|---|---|---|
| Appropriation/Budget Activity<br>0400 / 4 | R-1 Program Element (Number/Name)<br>PE 0604115C / *Technology Maturation Initiatives* | Project (Number/Name)<br>MD40 / *Program Wide Support* | |

| COST ($ in Millions) | Prior Years | FY 2016 | FY 2017 | FY 2018 Base | FY 2018 OCO | FY 2018 Total | FY 2019 | FY 2020 | FY 2021 | FY 2022 | Cost To Complete | Total Cost |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MD40: *Program Wide Support* | - | 4.171 | 4.564 | 6.620 | - | 6.620 | 9.691 | 9.092 | 9.604 | 9.710 | Continuing | Continuing |
| Quantity of RDT&E Articles | - | - | - | - | - | - | - | - | - | - | | |

**Note**

Beginning in FY 2016, Program Wide Support (PWS) was proportionately allocated to the Technology Maturation Initiatives Program Element. In FY 2017 and FY 2018, PWS reflects a proportional change as a result of an increase in Technology Maturation Initiatives.

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

PWS contains non-headquarters management costs in support of MDA functions and activities across the entire BMDS. It Includes Government Civilians, and Contract Support Services. This provides integrity and oversight of the BMDS as well as supports MDA in the development and evaluation of technologies that will respond to the changing threat. Additionally, PWS includes Global Deployment personnel and support performing deployment site preparation and activation and provides facility capabilities for MDA Executing Agent locations. Other MDA wide costs includes: physical and technical security; civilian drug testing; audit readiness; the Science, Technology, Engineering, and Mathematics (STEM) program; legal services and settlements; travel and agency training; office, equipment, vehicle, and warehouse leases; utilities and base operations; data and unified communications support; supplies and maintenance; materiel and readiness and central property management of equipment; and similar operating expenses. PWS is allocated on a pro-rata basis and therefore, fluctuates by year based on the adjusted RDT&E profile (which excludes: 0305103C Cyber Security Initiative, 0603274C Special Programs, 0603913C Israeli Cooperative Program and 0901598C Management Headquarters).

| B. Accomplishments/Planned Programs ($ in Millions, Article Quantities in Each) | FY 2016 | FY 2017 | FY 2018 |
|---|---|---|---|
| ***Title:*** Program Wide Support | 4.171 | 4.564 | 6.620 |
| ***Articles:*** | - | - | - |
| ***Description:*** N/A | | | |
| ***FY 2016 Accomplishments:***<br>- Beginning in FY 2016, Program Wide support was redistributed across RDT&E Program Elements with a proportional allocation to the Technology Maturation Initiatives Program Element. | | | |
| ***FY 2017 Plans:***<br>N/A | | | |
| ***FY 2018 Plans:***<br>N/A | | | |
| **Accomplishments/Planned Programs Subtotals** | 4.171 | 4.564 | 6.620 |

| Exhibit R-2A, RDT&E Project Justification: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD40 / *Program Wide Support* |

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

N/A

**Remarks**

**D. Acquisition Strategy**

N/A

**E. Performance Metrics**

N/A

| Exhibit R-3, RDT&E Project Cost Analysis: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD40 / *Program Wide Support* |

**Support ($ in Millions)**

| Cost Category Item | Contract Method & Type | Performing Activity & Location | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Program Wide Support - Agency Operations Management | Allot | Various : Multi: AL, VA | 0.000 | 0.000 | | 0.091 | Jul 2017 | 0.132 | Jul 2018 | - | | 0.132 | Continuing | Continuing | Continuing |
| Program Wide Support - Agency Operations and Support Services | C/CPFF | Various : Multi: AL, VA | 0.000 | 4.171 | | 4.473 | Aug 2017 | 6.488 | Aug 2018 | - | | 6.488 | Continuing | Continuing | Continuing |
| | | **Subtotal** | 0.000 | 4.171 | | 4.564 | | 6.620 | | - | | 6.620 | - | - | - |

**Remarks**

N/A

| | Prior Years | FY 2016 Cost | FY 2016 Award Date | FY 2017 Cost | FY 2017 Award Date | FY 2018 Base Cost | FY 2018 Base Award Date | FY 2018 OCO Cost | FY 2018 OCO Award Date | FY 2018 Total Cost | Cost To Complete | Total Cost | Target Value of Contract |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Project Cost Totals** | 0.000 | 4.171 | | 4.564 | | 6.620 | | - | | 6.620 | - | - | - |

**Remarks**

N/A

| Exhibit R-4, RDT&E Schedule Profile: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD40 / *Program Wide Support* |

Significant Event Complete ▲ Significant Event Planned △ | Milestone Decision Complete ★ Milestone Decision Planned ☆ | Element Test Complete ◆ Element Test Planned ◇ | System Level Test Complete ● System Level Test Planned ○ | Complete Activity ✦ Planned Activity ✧

| | FY 2016 | | | | FY 2017 | | | | FY 2018 | | | | FY 2019 | | | | FY 2020 | | | | FY 2021 | | | | FY 2022 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| MD40 Program-Wide Support | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ | ✧ |

| Exhibit R-4A, RDT&E Schedule Details: FY 2018 Missile Defense Agency | | Date: May 2017 |
|---|---|---|
| **Appropriation/Budget Activity**<br>0400 / 4 | **R-1 Program Element (Number/Name)**<br>PE 0604115C / *Technology Maturation Initiatives* | **Project (Number/Name)**<br>MD40 / *Program Wide Support* |

## Schedule Details

| | Start | | End | |
|---|---|---|---|---|
| **Events** | **Quarter** | **Year** | **Quarter** | **Year** |
| MD40 Program-Wide Support | 1 | 2016 | 4 | 2022 |