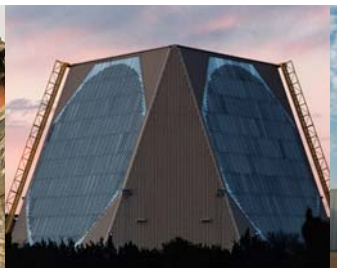




Missile Defense Agency

Fiscal Year (FY) 2017
Budget Estimates

OVERVIEW

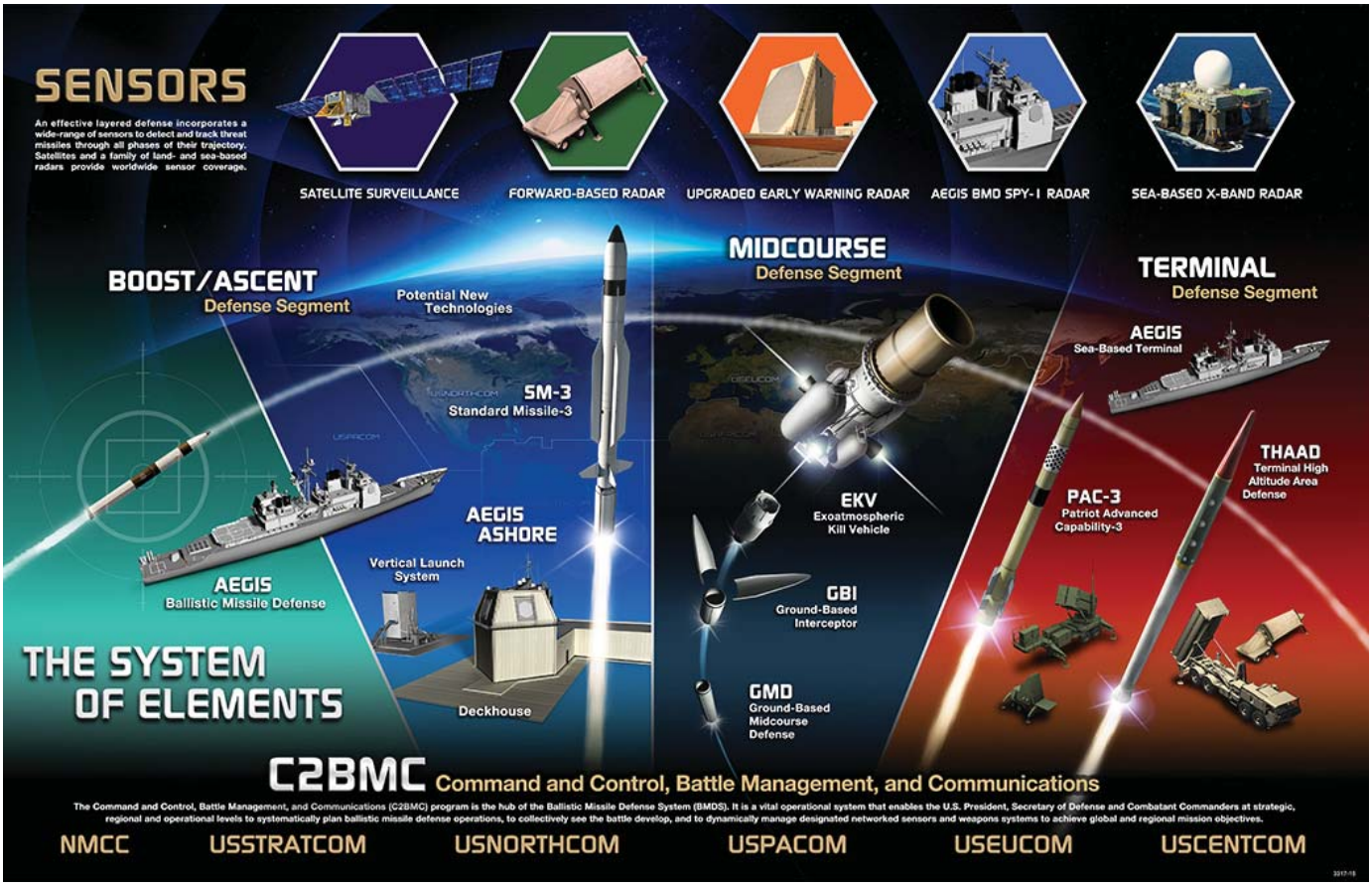




Approved for Public Release
Public Release 16-MDA-8540 – FY2017 President's Budget Overview

Missile Defense Agency (MDA)
Fiscal Year 2017 Budget Overview

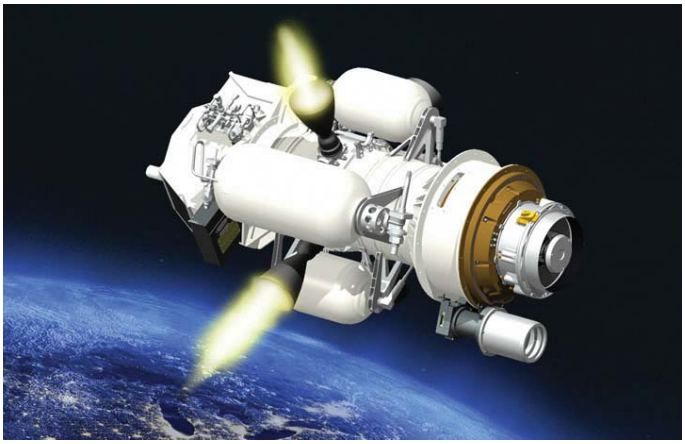
The Missile Defense Agency (MDA) requests $7.5 billion in FY 2017 to strengthen and expand the deployment of defenses for our Nation, deployed forces, allies, and international partners against increasingly capable ballistic missiles. The FY 2017 missile defense program will continue to support the warfighter and needs of the Combatant Commanders (COCOMs) with the development, testing, deployment, and integration of interceptors, sensors, and command and control, battle management and communications (C2BMC) systems that make up the Ballistic Missile Defense System (BMDS). The FY 2017 budget preserves homeland and regional missile defense priorities and invests in advanced technology development and future capabilities to counter the proliferation of increasingly complex threats. These priorities are driven by presidential and Department of Defense strategic guidance and are in line with the priorities set last year.



The Ballistic Missile Defense System

With this budget request, MDA remains committed to operating, sustaining, and expanding our nation's homeland missile defenses and requests $1.0 billion for the Ground-based Midcourse Defense (GMD) program. This request will continue PB16 efforts to increase the number of deployed Ground Based Interceptors (GBI) to 44 by the end of 2017 and

improve overall GBI operational effectiveness, reliability, producibility, maintainability and testability. The budget continues to: fund GMD flight testing in support of Integrated Master Test Plan (IMTP) requirements; enhance the Stockpile Reliability Program (SRP) and component aging testing in order to better understand and maintain the health of the deployed assets. The budget continues GMD fire control and kill vehicle (KV) software development, testing, and deployment to improve discrimination capabilities.



Redesigned Kill Vehicle (*Notional Concept*)

MDA has initiated the redesign of the Kill Vehicle (KV) for the GMD GBI. The Redesigned Kill Vehicle (RKV) will increase performance to address the evolving threat, improve in-flight communications to better utilize off-board sensor data, and enhance Combatant Commanders' situational awareness via hit/kill assessment messages. MDA requests $274 million to continue development of the RKV and begin deployment in the 2020 timeframe and undertake other GBI improvements.

MDA is planning development of an upgraded tactical GBI booster (Configuration 3, or C3) to enhance survivability, mitigate current obsolescence and expand homeland defense capabilities against emerging threats. The C3 booster will utilize a 3-Stage booster design with a 2- or 3-stage selectable mode to expand engagement timelines and increase battlespace.

This budget request continues to implement reliability improvements, obsolescence mitigation, and technology modernization for key components of the GMD ground systems, such as fire control workstations, Command Launch Equipment, GMD Communications Network, and In-Flight Interceptor Communication System (IFICS) Data Terminals (IDT). This modernization will support discrimination improvements, improve cybersecurity resilience, reduce life-cycle cost, increase system reliability, and simplify future technology insertion.

The FY 2017 President's Budget reflects the Department's commitment to building regional missile defense forces that are interoperable with

Ground Based Interceptor Emplacement
Vandenberg AFB, California

systems deployed by international partners. The European Phased Adaptive Approach (EPAA) is the U.S. contribution to NATO BMDS, designed to protect U.S. deployed forces and NATO allies in Europe from ballistic missile attacks from the Middle East. EPAA Phase 1 was deployed in 2011 and provides coverage of NATO territory in southeastern Europe. In support of EPAA Phase 2 deployment, MDA achieved a Technical Capability Declaration (TCD) of Aegis Ashore in Romania in December 2015, with the capability to launch Standard Missile (SM)-3 Block IA and IB variants.

Aegis Ashore Deckhouse
Deveselu, Romania

MDA requests $630 million for EPAA Phase 3 in FY 2017. This includes the deployment of a second Aegis Ashore site in Poland, upgrade of the Aegis Ballistic Missile Defense (BMD) weapon system, and delivery of a new SM-3 variant, the Block IIA. Aegis Ashore construction for the Poland site is scheduled to begin in FY 2016, with a TCD by the end of calendar year 2018. For EPAA Phase 3, Aegis Ashore sites and Aegis BMD ships will be capable of launching SM-3 Block IA, IB, and IIA variants, providing improved defensive coverage against short- through intermediate-range threats.

MDA requests $514 million in procurement for Aegis BMD, which plays a critical role in both homeland and regional defense. MDA will procure 35 Aegis SM-3 Block IB missiles in FY 2017, for a total of 247 SM-3 Block IB missiles procured by the end of FY 2017. MDA will deliver 39 SM-3 Block IB missiles to the Fleet, for a delivery total of 146 missiles.

The procurement budget request continues to support Aegis BMD Weapon Systems, Aegis shipset equipment, and SM-3 Block IB spares. Following a production decision for the SM-3 Block IB in 2nd Quarter FY 2016, MDA will continue to deliver SM-3 Block IBs to the Navy for deployment on land at the Aegis Ashore site in Romania and at sea on multi-mission Aegis ships with BMD capability.

Aegis Ballistic Missile Defense

MDA requests $73 million of Operation and Maintenance funding for the Aegis BMD program to perform missile recertification, repair efforts, demilitarization, and Ordnance Assessment/Surveillance. This funding includes BMD Computer Program, Ship Equipment, and Aegis Ashore - Romania sustainment, as well as Fleet integration support.

MDA requests $106 million in FY 2017 for SM-3 Block IIA development, a cooperative effort between the U. S. and the Japan Ministry of Defense. SM-3 Block IIA development is ongoing and will continue to build upon established joint research investments by the United States and Japan. MDA is committed to delivering the SM-3 Block IIA to the Fleet to meet global threat requirements and support EPAA Phase 3.

MDA requests $26 million in FY 2017 for the AN/SPY-1 Refurbishment Program. MDA is working with the U. S. Navy on an AN/SPY-1 radar refurbishment, focusing on improvements to the AN/SPY-1 radar antenna that, when coupled with the appropriate Aegis Weapon System computer baseline, will increase radar detection sensitivity. The resulting improvement in tracking capability against emerging threats for both Anti-Air Warfare (AAW) and BMD will enhance our nation's Integrated Air and Missile Defense capability. The preliminary requirements and design for the AN/SPY-1 refurbishment are complete; full-scale tests to demonstrate tracking capability against live targets are planned. MDA and the Navy plan to field the refurbished antennas onboard selected Aegis DDG Flight I and II ships starting in the FY 2022 timeframe.

Standard Missile-3 Launch

Terminal High Altitude Area Defense (THAAD) is a transportable, ground-based missile defense system that defends against short- and medium-range ballistic missiles in the terminal stage of flight. THAAD provides Combatant Commanders a rapidly deployable capability to deepen, extend, and complement BMDS homeland and regional defenses. One THAAD unit was deployed to Guam in 2013 in response to North Korean threats in the Pacific Area of Operations.

MDA requests $370 million to continue procurement of THAAD equipment, including 24 THAAD interceptors and one radar training device for the THAAD Institutional Training Base at Fort Sill,

OK. By the end of FY 2017, MDA will deliver 61 additional THAAD interceptors to the U.S. Army, for a total of 205 interceptors delivered. This procurement supports the fielding of THAAD batteries, based on warfighter demand and operational need.

THAAD Interceptor Launch

MDA requests a total of $270 million for THAAD developmental efforts. As part of the expansion of THAAD capability, MDA will continue development of THAAD software upgrades and THAAD participation in the IMTP flight and ground tests. Additionally, MDA will continue concept development and risk reduction activities for THAAD Follow-On capabilities, to include advanced capabilities against emerging threats, complex scenes and countermeasures. These activities will explore and mature the expansion of THAAD system interoperability with air and missile defense systems and extension of THAAD battlespace and defended area.

MDA requests $72 million of Operations and Maintenance funding to support the maintenance and upkeep of all BMDS unique items of the fielded THAAD batteries as well as for all THAAD training devices. By the end of FY 2017 MDA will provide support to seven THAAD batteries.

AN/TPY-2 Radar
Kyogamisaki, Japan

MDA requests $491 million to develop, deploy, test and sustain the AN/TPY-2 radars, the Upgraded Early Warning Radars (UEWR), and the Cobra Dane radar. The Services and Combatant Commands, with logistical support from MDA, operate AN/TPY-2 radars (Forward Based Mode) in Japan (two radars), Israel, Turkey, and United States Central Command (USCENTCOM) in support of regional defense. Some of the radars also provide a significant contribution to the defense of the U.S. homeland by acquiring threats and providing track and discrimination data through the BMDS C2BMC system to the GMD Fire Control. MDA continues to support the AN/TPY-2 radar (Terminal Mode) as part of a forward deployed THAAD battery in Guam.

C2BMC provides persistent tracking, cueing, discrimination, and fire control quality data to Aegis BMD, GMD, THAAD, and missile defense systems of coalition partners to support homeland and regional defense objectives. MDA requests $440 million to complete development and fielding of Spiral 8.2-1 which will enhance C2BMC track, discrimination and battle management capability to

Global Engagement Manager Console at the Missile Defense Integration and Operations Center
Colorado Springs, Colorado

integrate additional space sensors and sustain current Spiral 6.4 C2BMC global capability. Spiral 8.2-3 will enable Aegis BMD to provide a five-fold increase in defended area by providing critical sensor management and track reporting improvements for Aegis BMD Engage-on-Remote (EOR) functionality in support of EPAA Phase 3, improve Overhead Persistent Infrared-based (OPIR) cueing of radars and shooters in all phases of threat engagements, and provide integration with the new Army Integrated Air and Missile Defense Battle Command System (IBCS). C2BMC is conducting requirements analysis for the future Spiral 8.2-5, which will integrate and control the Long Range Discrimination Radar (LRDR) into the BMDS in the 2020 time frame. MDA is also enhancing C2BMC capability in the United States Pacific Command (USPACOM), United States Northern Command (USNORTHCOM), USCENTCOM, and the United States European Command (USEUCOM) to integrate space-, sea-, and land-based BMD sensor data for the BMDS.

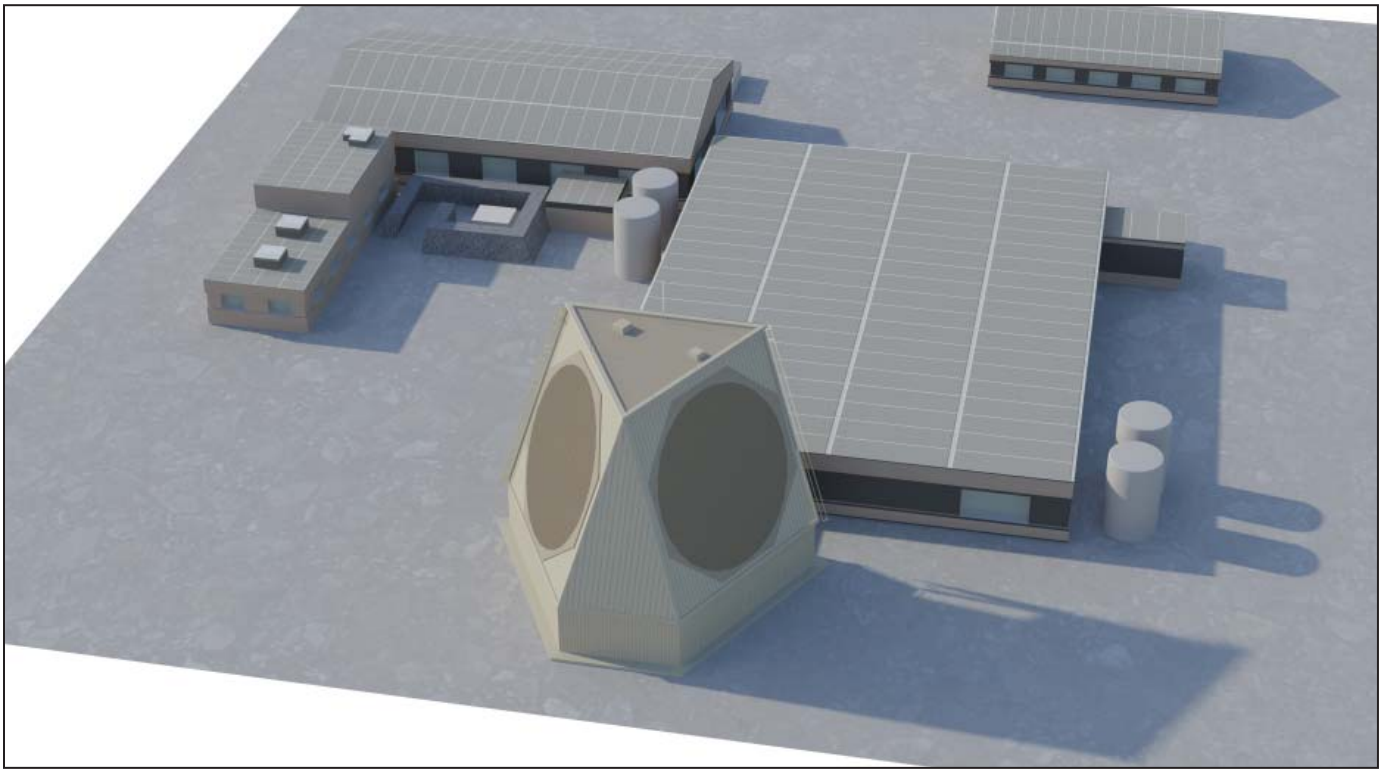
The MDA Cyber Operations Program is vital in its support of the operational development of the BMDS as well as MDA test and General Service systems. The program has several initiatives, including Computer Network Defense (CND), Certification and Accreditation (C&A) activities, and Computer Emergency Response Teams (CERT). MDA is a constituent part of a multi-tiered Computer Network Defense (CND) capability that quickly adapts to near-term changes, continuously evolves to meet long-range threat and

Sea Based X-band Radar

technology trends, and unites all missile defense elements under the coordination and direction of a single lead organization, United States Cyber Command, to conduct multi-component and defense-wide CND operations. The information security framework will be integrated into the agency infrastructure in an effort to connect MDA systems around the world.

MDA requests $69 million for the Sea Based X-band (SBX) radar. The SBX is an advanced radar providing precision mid-course tracking and discrimination capabilities. The SBX supports flight testing to demonstrate discrimination and debris mitigation improvements. The budget includes funds to maintain improved reaction time and conduct contingency operations for defense of the Homeland in the USPACOM and USNORTHCOM areas of responsibility.

The budget requests $162 million to continue the development of the Long Range Discrimination Radar (LRDR). The LRDR is a midcourse sensor that will improve BMDS target discrimination capability against potential countermeasures, while supporting a more efficient utilization of the GMD interceptor inventory. The LRDR site will be constructed as two separate military construction (MILCON) projects.



Long Range Discrimination Radar (*Concept*)

MDA requests $155 million in MILCON for Phase One, a shielded Mission Control Facility and Radar Foundation in FY 2017. Phase Two will provide $150 million for the back-up Shielded Power Plant that includes fuel storage, a maintenance facility, and associated site support in FY 2019.

MDA performs the systems engineering required to design, build, test, assess and field the integrated BMDS. BMD system-level engineering and integration enables interoperability and

drives future capability development from a system perspective to maximize the effectiveness of BMD technologies. MDA employs system and element-level models and simulations to verify system performance and capability to engage and defeat complex threats across a spectrum of scenarios that cannot be tested in live-fire tests. As a result, MDA is able to provide evolving, integrated and layered BMDS performance and capabilities that have been thoroughly assessed and validated through testing and Modeling and Simulation.

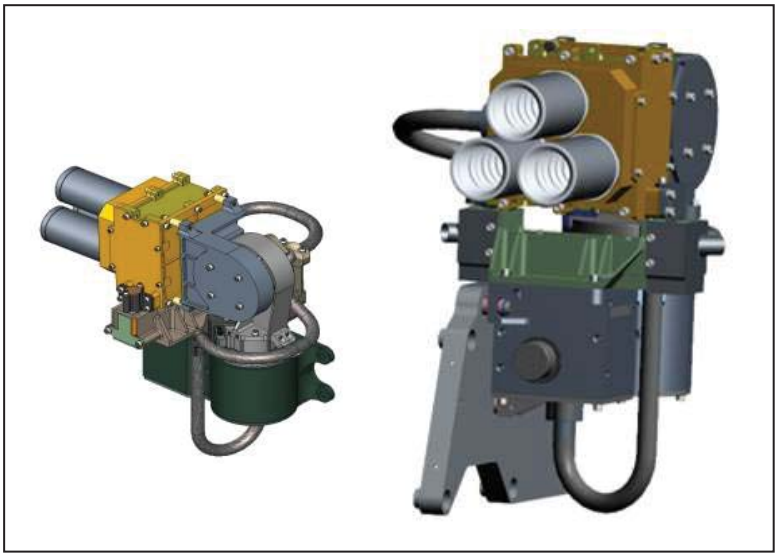
The Agency works collaboratively with Director, Operational Test & Evaluation; Deputy Assistant Secretary of Defense, Developmental Test and Evaluation; Commander, Joint Functional Component Command Integrated Missile Defense; Service and the Joint Interoperability Test Command; and Operational Test Agencies to identify and incorporate all testing requirements into development of the IMTP, a comprehensive, highly integrated, complex, cost-effective series of flight, ground tests, wargames and exercises.

MDA, in conjunction with IMTP developers, executes a fully integrated test program that synchronizes the system under test with the Warfighters trained to operate the system under varying wartime conditions against current and emerging threats. This ensures that BMDS capabilities are credibly demonstrated and validated prior to delivery to the Warfighter.

In addition, MDA develops new capabilities to counter the emerging threats. The FY 2017 budget continues the effort to provide discrimination improvements for homeland and regional defense, which will develop and field an integrated set of Element capabilities to improve BMDS effectiveness and resilience against the evolving threat.

These improved technologies will enhance the capability of the BMDS to discriminate and destroy reentry vehicles with a higher degree of confidence, improving Warfighter shot doctrine and preserving interceptor inventory.

MDA requests $20 million in the BMD Space program for the Space-based Kill Assessment (SKA) experiment. SKA leverages a commercially hosted sensor network that will provide kill assessment data for the BMDS, which was a focus area in section 237 of the FY 2014 National Defense Authorization Act. The commercial host expects to launch the SKA network in FY 2017.



Space-based Kill Assessment Sensor

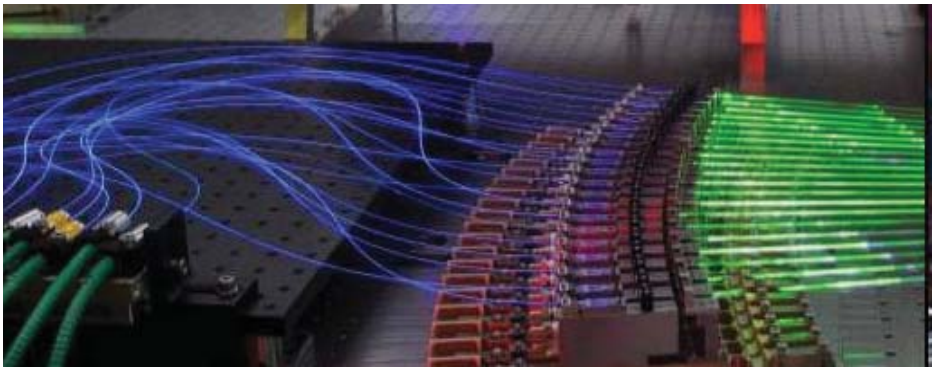
MDA requests $32 million for Space Tracking and Surveillance System (STSS) satellite operations and sustainment. STSS consists of two satellites operating in Low Earth Orbit

Space Tracking and Surveillance System Satellite

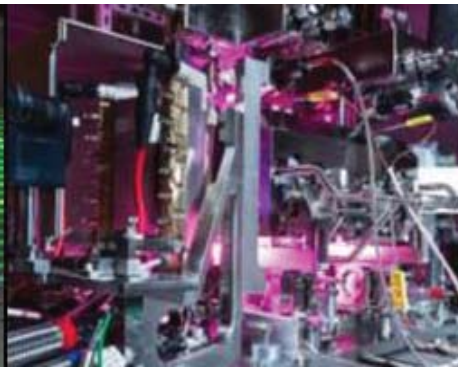
and provides risk reduction data for a potential operational BMDS tracking and surveillance constellation in the areas of sensor management, target signatures, discrimination, and fire control loop closure. STSS will continue participating in MDA test events and data collections providing Battlespace Awareness, Technical Intelligence and Space Situational Awareness to the Warfighter.

MDA is also developing advanced BMD technologies that can be integrated into the BMDS to adapt as the threat changes in the future. The advanced technology investments are informed by capability gap assessments and focus on concepts that bring upgraded capability to the Warfighter. The goal is to provide transformative capabilities that enable the future BMDS to keep pace with new and evolving threats.

MDA requests $72 million in Weapons Technology to build the technological foundation for the next-generation laser system capable of defeating advanced threats and raids more efficiently than existing missile interceptors. Within the Directed Energy Program, we will continue to develop two potential solid-state lasers to demonstrate the technology necessary to scale laser power to hundreds of kilowatts in a compact efficient manner.



Fiber Combined Laser Beam Combiner



Diode Pumped Alkali Laser Testbed

MDA requests $90 million for Technology Maturation Initiatives to build on the foundational successes in Weapons Technology and Discrimination Sensor Technology. MDA will integrate an advanced sensor into the tactically proven Multispectral Targeting System and MQ-9 Reaper combination to address precision track and discrimination performance of airborne sensors. MDA will also award contracts to design a UAV-borne laser for boost phase missile defense. Adding a boost phase layer to the missile defense architecture could increase the performance and efficiency of the BMDS.

Multi-Object Kill Vehicle (*Notional Concept*)

MDA requests $72 million for the Multi-Object Kill Vehicle (MOKV) Program to address a BMDS gap, allowing us to engage a more numerous and increasingly more complex threat early in the flight trajectory. MDA is working with industry to define concepts that will enable each GBI in our inventory to deploy MOKVs in support of an integrated BMDS and homeland defense. Based on the three prime contractor defined interceptor concepts, MDA will focus technology investments that reduce kill vehicle design and development risk and improve performance.

MDA requests $23 million for the Advanced Research Program to conduct innovative research and development with small businesses, universities, and international partners to create and advance future missile defense capability. MDA continues to capitalize on the creativity and innovation of the Nation's small business community and academia to enhance the BMDS.

MDA also requests $18 million for the Advanced Concepts & Performance Assessment effort, which centralizes advanced technology concept modeling, simulation, and performance analysis and delivers independent assessments of government, university, and industry technology concepts that, along with systems engineering requirements, support acquisition strategy decisions and define our technology focus areas. The request will fund the digital simulation and hardware-in-the-loop infrastructure required for testing of an airborne advanced sensor, Kill Vehicle Modular Open Architecture testbed, pre- and post-mission performance predictions and assessments, and mature related tracking, discrimination, and sensor fusion algorithms.

MDA continues to support the development of regional missile defense capabilities and expand work with international partners to include conducting joint analyses to support missile defense acquisition decision, cooperative research and development projects, deployments, and co-production.

This budget continues MDA's longstanding support of U.S.-Israeli Cooperative BMD Programs, to include the co-development of the David's Sling Weapon System, Upper

Arrow 3 Interceptor Launch

Tier Interceptor, and Arrow Weapon System Improvements. In addition, MDA continues previous year efforts in co-producing the Iron Dome Defense System in the FY 2017 budget. MDA works with Israel's Missile Defense Organization on these programs in accordance with jointly signed international agreements.

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