Unclassified Statement of

Vice Admiral J.D. Syring, USN

Director, Missile Defense Agency

Before the

Senate Appropriations Committee

Subcommittee on Defense

Wednesday, April 13, 2016

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Good morning, Chairman Cochran, Vice Chairman Durbin, distinguished Members of the subcommittee. I appreciate this opportunity to testify before you today.

Our current budget request of $7.5 billion for Fiscal Year (FY) 2017 will continue the development 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 with the development, testing, deployment, and integration of interceptors, sensors, and the command, control, battle management and communications (C2BMC) system for the Ballistic Missile Defense System (BMDS).

Ballistic Missile Threat

The threat continues to grow as potential adversaries acquire a greater number of ballistic missiles, increasing their range, incorporating BMD countermeasures, and making them more complex, survivable, reliable, and accurate. Space-launch activities involve multistage systems that further the development of technologies for intercontinental ballistic missiles (ICBMs). In addition to the Taepo Dong 2 space launch vehicle/ICBM, North Korea is developing and has paraded the KN08 road-mobile ICBM and an intermediate-range ballistic missile (IRBM) with a range greater than 3,000 km. Last October North Korea paraded a previously unseen, new, or modified road-mobile ICBM. North Korea has recently assumed an aggressive posture, having conducted rocket and ballistic missile launches in addition to the launch of the Taepo Dong 2

space launch vehicle/ICBM this past February. Today it fields hundreds of Scud and No Dong missiles that can reach U.S. forces forward deployed to the Republic of Korea and Japan.

Iran has successfully orbited satellites and announced plans to orbit a larger satellite using a space launch vehicle (the Simorgh) that could be capable of intercontinental ballistic missile ranges if configured as such. Iran also has steadily increased its ballistic missile force, deploying next-generation short- and medium-range ballistic missiles (SRBMs and MRBMs) with increasing accuracy and new submunition payloads. Tehran's overall defense strategy relies on a substantial inventory of theater ballistic missiles capable of striking targets in southeastern Europe and the Middle East, including Israel. Iran continues to develop more sophisticated missiles and improve the range and accuracy of current missile systems, and it has publicly demonstrated the ability to launch simultaneous salvos of multiple rockets and missiles. Demonstrating it is capable of modifying currently deployed ballistic missile systems, Iran has flight-tested a Fateh-110 ballistic missile in an anti-ship role. By adding a seeker to improve the missile's accuracy against sea-based targets, Iran could threaten maritime activity throughout the Persian Gulf and Strait of Hormuz.

Support for the Warfighter

Our priority is to continue to deliver greater missile defense capability and capacity to the Warfighter for employment in support of Combatant Command priorities. This budget maintains the commitment to build out homeland defenses to 44 Ground Based Interceptors (GBIs) by the end of 2017 and enhance GBI reliability. To strengthen regional defenses, we plan to deliver a total of 39 SM-3 Block IBs to the Navy in FY 2017 for use on Aegis BMD ships and at the Aegis Ashore site, for a total of 146 delivered since December 2013. MDA also will deliver in FY 2017

61 additional Terminal High Altitude Area Defense (THAAD) interceptors to the Army, for a total of 205 delivered since May 2011.

On 18 December last year, we delivered the Aegis Ashore system in Romania in support of Phase 2 of the European Phased Adaptive Approach (EPAA). The technical capability declaration included the Aegis Ashore Romania missile defense complex, Aegis BMD 5.0 (Capability Upgrade, or CU) weapon system, as an integrated component of Aegis Baseline 9, and Standard Missile (SM)-3 Block IB (with a Threat Upgrade). This is the first EPAA land-based interceptor component, and it is mission capable today. On 30 December 2015, the U.S. Navy accepted ownership of the Aegis Ashore site in Romania. U.S. Warfighter acceptance is expected in May 2016. MDA will continue to support the Navy and NATO through the operation of the system. Also, plans remain on track to deliver a second Aegis Ashore site in Poland along with an upgraded missile defense system and the initial Standard Missile-3 (SM-3) Block IIA missiles by the end of 2018 to support EPAA Phase 3.

MDA routinely provides Warfighter operational support by performing the mission essential functions of BMDS configuration control, asset management, and operational readiness reporting and by providing an operational-level interface to United States Northern Command (USNORTHCOM), European Command (USEUCOM), Central Command (USCENTCOM), and Pacific Command (USPACOM) and facilitating increased Warfighter participation in development of future missile defense capabilities. MDA will continue to lead the integration of evolving MDA, Service, and COCOM command and control capabilities through systems engineering analysis and development of technical integration requirements and interface control documents to address the continued fielding by U.S. adversaries of air, missile, and rocket capabilities.

MDA executes a fully integrated test program that synchronizes the system 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. We continue to work closely with independent testers within DoD -- the Director, Operational Test and Evaluation; Deputy Assistant Secretary of Defense, Developmental Test & Evaluation; Service Operational Test Agencies; and Combatant Commands, represented by the Joint Forces Component Commands Integrated Missile Defense -- to develop an Integrated Master Test Plan to execute a robust, cost-effective flight test program. Our flight tests feature operationally realistic conditions and integrate U.S. government stakeholders – to include Soldiers, Sailors, Airmen, and Marines – and allies to prove BMD capabilities before they are fielded. From October 2014 to the present, we have executed 25 flight tests. For the remainder of FY 2016 we will conduct six more flight tests, and in FY 2017 16 flight tests. In addition to 22 element level ground tests, we conducted 11 developmental and operational system-level ground tests from October 2014 to the present. There are three more system-level ground tests scheduled for this fiscal year, and four more planned for FY 2017. Last year we also conducted or participated in more than 20 multi-event exercises and wargames, which are critical to the Warfighter and the intensive engineering efforts across the Agency.

Increasing Reliability and Confidence in the System

Before I review our FY 2017 program, I want to give you a brief overview of what we are doing within the current program to increase reliability and confidence in the system and how we are developing technologies to get ahead of what is sometimes referred to as the kinetic (hit-to-kill) cost curve.

We are working hard to find more cost-effective ways to do the missile defense mission. There are challenging scenarios where adversaries will be able to launch large numbers of relatively cheap and increasingly complex missiles and our only option is to intercept them with very expensive weapon systems. MDA is making critical investments in future system development that we believe will significantly improve system performance and effectiveness. By improving reliability, enhancing discrimination, and expanding battle space to make possible a re-engagement firing strategy, I believe we can reduce the cost per kill. We also need to investigate solutions that help reduce reliance on expensive kinetic intercept solutions.

Reliability is paramount and a critical part of how the warfighter decides upon a shot doctrine, that is, the estimation of how many shots it will take to defeat a credible threat. With a highly reliable interceptor, fewer shots would be required. As we are able to decrease the number of shots we must take against each threatening missile, we can increase overall warfighter confidence in the effectiveness of the system. The work we are doing to improve GBI reliability and develop the Redesigned Kill Vehicle (RKV) will help us reach this objective. We can also improve the missile defense cost curve by increasing the number of kill vehicles we place on a single interceptor. This is the rationale behind the Multi-Object Kill Vehicle (MOKV) program – the more kill vehicles we can put on an interceptor, the greater raid capacity our Ground-based Midcourse Defense system will have. I will address both of these efforts in more detail below.

We must also take steps to improve the discrimination and assessment capabilities of the system. The better Warfighters are able to determine the lethal payload in a target cluster and assess whether it has been actually hit, the fewer interceptors they will need to expend. With our investments in radars while developing advanced electro-optical sensors, we are striving for a diverse sensor architecture that eventually will provide highly accurate midcourse tracking and

discrimination. Development of the Long Range Discrimination Radar and our advanced discrimination sensor technology and space-based kill assessment programs will improve system target discrimination and assessment capabilities. Improved sensor coverage and interceptor capabilities will help the warfighter expand the battle space in order to reengage threats as needed.

The development of non-kinetic technologies, such as directed energy, and new concepts of operation, such as boost-phase intercept and left-of-launch missile defeat, are game-changing and would have a dramatic effect on the need to rely exclusively on expensive interceptors.

I will address all of these development efforts and initiatives below.

Homeland Defense

MDA remains committed to operating, sustaining, and expanding our nation's homeland missile defenses and requests $1.32 billion in FY 2017 for the Ground-based Midcourse Defense (GMD) program, or $440 million below what we requested in PB 16. The FY 2017 budget request is lower than the FY 2016 budget due to the fact that the FY 2016 budget provided a significant increase to historical funding to improve overall reliability and performance and extend the service life of the GMD system. Last year's larger request was driven by the developmental content required to reach 44 GBIs by the end of 2017, the first full year of the RKV program, ground system modernization, completion of Capability Enhancement (CE)-II Block 1 design and full-rate manufacturing as well as CE-II upgrades, development, and procurement. This year we will continue efforts to expand the GBI fleet to 44 by the end of 2017 for Enhanced Homeland Defense, continue flight and system ground testing, undertake RKV and C3 Booster development, enhance the Stockpile Reliability Program, expand the battle space to enable later GBI engagements, upgrade the GMD ground system, and deploy upgraded GMD fire control software to enhance our ability to use land-based sensor discrimination data. We will

continue to add precision and confidence in our reliability assessments by performing failure modes and process analyses, reliability testing, short-circuit and grounding analyses, and verification of our on-going development efforts.

Increasing GBI Capacity

We resumed interceptor manufacturing following the successful intercept in the June 2014 FTG-06b flight test. Since October 2014 we have delivered eight GBIs equipped with the CE-II Exo-atmospheric Kill Vehicle (EKV) identical to the configuration flown in that test. We have also removed eight previously delivered CE-II GBIs and are modifying them to match the FTG-06b configuration. These upgraded GBIs began delivery in March 2016. We are completing development of the CE-II Block 1 EKV and Configuration 2 (C2)/Consolidated Booster Avionics Unit (CBAU) for the Integrated Boost Vehicle (IBV) to address parts obsolescence and eliminate several reliability concerns found in the older GBIs. Our confidence in the CE-II Block 1 IKV design changes was enhanced by the results of the GM Controlled Test Vehicle flight test (GM CTV-02+) earlier this year. We expect the FTG-15 intercept test planned for the end of this calendar year using a CE-II Block 1 EKV and C2/CBAU IBVto boost that confidence level even further. Upon a successful FTG-15 flight test, we plan to deliver ten GBIs configured with CE-II Block 1 EKV and C2/CBAU IBV.

GMD Testing

This past January we successfully executed GM CTV-02+, a non-intercept flight test involving the launch of a GBI from Vandenberg Air Force Base and an air-launched IRBM target over the Pacific Ocean. We were able to exercise fully the new Alternate Divert Thruster in the CE-II EKV in a flight environment and undertake an early evaluation of near term discrimination

improvements for homeland defense. The EKV used SPY-1, SBX, and AN/TPY-2 data for target selection.

The next intercept flight test of the GMD system will take place later this calendar year. FTG-15 will be the first intercept flight test for the CE-II Block 1 EKV and the C2/CBAU IBV. It also will be the first intercept of an ICBM range target by the GMD system or any other BMDS element. A successful test will allow MDA to meet the commitment to deliver 44 GBIs by the end of 2017. Following FTG-15, MDA, in collaboration with DOT&E, plans to conduct the FTG-11 operational intercept flight test in the first quarter of FY 2018, which will demonstrate the full capability of the GMD system with a two GBI salvo for an engagement of an ICBM.

Redesigned Kill Vehicle

The primary objective for the RKV is to improve reliability. Its development will make homeland defenses more robust. We plan to employ a modular design made up of mature subsystems and components to improve producibility, maintainability, and reduce unit cost. The RKV program will strive for performance improvements by incorporating on-demand communications between the kill vehicle and the ground, a wide field of view seeker, improved data processing and discrimination algorithms, and enhanced survivability. We established a cross-industry team to develop the RKV. We will then compete the production of an RKV-equipped GBI all-up round. The program schedule includes a controlled test vehicle flight test of the RKV in 2018 (GM CTV-03) and first intercept flight test in 2019 (FTG-17) to demonstrate the RKV, with a second intercept flight test in 2020 (FTG-18). We plan initial deliveries of the RKV in the 2020 time frame.

In order to achieve full capability of the RKV, improvements are needed in other areas of the GMD program. We will modify the booster so that it can fly in either a selectable two-stage or

three-stage mode and match survivability of the RKV. Additionally, we will upgrade the GMD fire control software to enable mixed engagements with RKV and EKV capabilities, utilize improved sensor data for on-demand communications, and provide improved situational awareness information to the Warfighter. We will modify components of the In-Flight Interceptor Communications System Data Terminals (IDT) to enable on-demand communications.

Ground System Upgrades

The Ground System hardware at Fort Greely and Vandenberg Air Force Base is 1990s technology installed in the early 2000s. We have parts obsolescence challenges and the operating systems are no longer supported by the original manufacturers. Without an upgrade, ground system reliability would decay and impact GBI availability to the Warfighter.

Plans include the refurbishment of Missile Field 1 at Fort Greely, upgrades to the GMD ground system hardware, improvements to the fire control software, and substantial reliability testing and assessments to characterize the reliability and performance of the system. The work on Missile Field 1 began last year. We will complete the refurbishment and reactivation of Missile Field 1 in 2016 to provide sufficient silos for 44 GBIs. We have cleaned out the rust and mold in the utilidor and upgraded the climate control system to match what we have in Missile Field 2 and Missile Field 3. (A utilidor is an underground man-made structure used in extreme cold climates to run utilities lines between facilities. If the utilities -- communications lines, power, heating and ventilation (HVAC) -- were buried into the ground the freeze and thawing of the ground would crush the plastic casings.) The old Mechanical Electrical Building (MEB) was demolished and the new MEB completed in March 2016. We will complete replacement of Command and Launch Equipment, GMD Fire Control (GFC) equipment, and IDT equipment by 2017. The Fort

Drum, New York IDT construction is complete and now operationally available to the Warfighter. This new IDT will enable communication with GBIs launched from Fort Greely, Alaska and Vandenberg Air Force Base in California over longer distances and improve defenses for the eastern United States.

We are also initiating a longer term effort to replace the GMD Communications Network equipment by 2019. We will deliver two significant upgrades to the GFC software. The first, GFC 6B3, provides the Warfighter the capability to operate with 44 GBIs, improves discrimination capability, and adds several warfighter requested upgrades to improve operational capability. The second, GFC 7A, improves fail-over between redundant systems and system availability by removing the aging Command and Launch Equipment and streamlining the GMD fire control system architecture. Ground Systems Build 7B is also underway and will be in full development in 2017. The 7B build includes upgrades for two- or three-stage selectable boosters and associated flyouts, improved nuclear weapons effects planning, improved battle management, additional target discrimination capabilities, and the new RKV On-Demand Communications.

Homeland Defense Sensors

Last year we integrated, tested, and delivered the capability for the Warfighter to manage the second PACOM AN/TPY-2 radar in Japan and introduced the boost phase cue capability of that radar site into the BMDS. This radar and the new C2BMC capability will enhance the overall performance of the two Japan radar sites when operating in a mutually supporting AN/TPY-2 dual radar mode, providing improved tracking coverage for all ballistic missile launches out of North Korea.

The Cobra Dane Early Warning Radar is now operating new software to enhance object classification for the Discrimination Improvement for Homeland Defense (DIHD)-Near Term

capability. We will continue missile defense upgrades of the Early Warning Radars in Clear, Alaska and Cape Cod, Massachusetts. We completed Cape Cod UEWR facilities design in August 2015 and began facility modifications in September 2015. We expect to complete the Clear radar upgrade in second quarter FY 2017 and the Cape Cod upgrade in the fourth quarter of FY 2017.

With our budget request of $68.8 million in FY 2017 for the Sea Based X-band (SBX) radar, we will continue to support flight testing with SBX to demonstrate improvements to discrimination and debris mitigation and be available for contingency operations. SBX will continue development of Discrimination Improvements for Homeland Defense. This past year the U.S. Coast Guard and American Bureau of Shipping five-year recertification of SBX vessel was completed. SBX also completed significant industrial work, including overhaul of two thrusters and three diesel generators, hull preservation, upgrade of the radar cooling system, and replacement of obsolete computer components.

In FY 2017 we request $162.0 million to continue the development of the Long Range Discrimination Radar (LRDR), the new midcourse tracking radar that will improve discrimination capabilities against threats to the homeland from the Pacific theater. LRDR will provide larger hit assessment coverage enabling improved warfighting capability to manage GBI inventory and improving the capacity of the BMDS. The Deputy Secretary of Defense approved designation of the U.S. Air Force as the Lead Service for the LRDR this past August. Supported by system trade studies and with concurrence from the USSTRATCOM, USNORTHCOM and USPACOM Commanders, the Clear Air Force Station, Alaska was selected as the future site of the LRDR. We are also requesting $155.0 million MILCON in 2017 for construction of the LRDR System Complex at Clear AFS, to include the mission control facility, the radar foundation, site

infrastructure and security, along with the necessary utilities to provide initial operations of the radar. We request the MILCON be fully funded to ensure an on-time delivery of the facilities, which in turn allows the Radar Prime contractor to erect the radar equipment shelter and install the radar components to meet the 2020 operational requirement. The LRDR System Complex Phase 2 project is planned in 2019 to provide a permanent shielded power plant for the radar system.

Homeland Defense C2BMC

We request $439.6 million in FY 2017 for Command, Control, Battle Management and Communications (C2BMC). We are fielding C2BMC Spiral 8.2-1 capabilities to NORTHCOM and PACOM in the 4th quarter of FY 2017 to support an enhanced homeland defense capability. This will allow C2BMC to integrate data from multiple TPY-2 radars, SBX, UEWRs, Cobra Dane, and space sensors to increase system raid size and tracking capacity by a factor of five. It will also improve the system information security posture. We also are developing C2BMC Spiral 8.2-5 to support LRDR sensor management and enhanced engage-on-remote and support a more robust homeland defense by December 2020.

Regional Defenses

Our FY 2017 budget request continues to prioritize deployment of regional defenses to protect our deployed forces, allies and international partners against SRBMs, MRBMs, and IRBMs in support of Combatant Commanders' near-term and future priorities.

Terminal High Altitude Area Defense

We have delivered and started training for the fifth Terminal High Altitude Area Defense (THAAD) Weapon System Battery and completed training on the fourth battery now under Army

control. To meet the demand for THAAD, MDA recently delivered 12 THAAD interceptors for U.S. batteries and 24 for THAAD batteries operated by the United Arab Emirates (UAE). This past year we also delivered the latest evolution in THAAD software, SW B2.2.1 Debris Mitigation Phase I capability and flight-tested SWB2.7.0. MDA continued to provide maintenance and supply support of the first deployed THAAD battery (comprising the THAAD system and AN/TPY-2 radar) in Guam.

This past fall THAAD added two more successful intercepts, improving its hit-to-kill record since 2006 to 13 for 13. FTO-02 Event 2a was our first operational test of integrated regional BMD capabilities, with the THAAD and Aegis BMD weapon systems sharing common defended areas. Two air-launched ballistic missile targets and one cruise missile target were launched in this scenario. The THAAD battery destroyed the first ballistic missile target, demonstrating its advanced algorithm capability and satisfying a condition for the Army's materiel release of the THAAD weapon system. Following receipt of the remote cue, the Aegis BMD ship, USS JOHN PAUL JONES, operating in the Integrated Air Missile Defense mode, launched to engage the second target, but the SM-3 Block IB Threat Upgrade missile experienced an anomaly early in flight. The THAAD battery crew, which also had launched a second THAAD interceptor at the medium-range ballistic missile, located this second target and destroyed it. The crew of the USS JOHN PAUL JONES then used the SM-2 Block IIIA guided missile to destroy a cruise missile target. The test, conducted at Wake Island, also involved the THAAD Terminal Mode AN/TPY-2 Radar, the Forward Based AN/TPY-2 Radar, and Aegis BMD Spy-1 Radar, and the C2BMC infrastructure, as well as space sensor assets. Warfighters representing the entire chain of command operated the BMDS system while using tactics,

techniques and procedures and successfully defended against air and missile attacks. This test was a valuable demonstration of the benefits of layered, integrated missile defenses.

In FY 2017 THAAD will participate in two flight tests, FTT-18 and FTT-15. In FTT-18 THAAD will demonstrate an intercept of a separating IRBM target using the THAAD radar, launcher, fire control and communication, interceptor operations and engagement operations. Turbulent weather in the Pacific Ocean precluded the timely execution of FTO-02 E2, which forced the delay of FTO-02 E2a. The turbulent weather forced the delay of FTO-02 E2 into the FTT-18 window in late fourth quarter FY 2015, effectively forcing the re-planning of FTT-18 into FY 2017. In FY 2017, we will conduct FTT-15 to demonstrate the capability of the system to do an endo-atmospheric intercept against an MRBM target with associated objects.

For FY 2017, MDA is requesting $369.6 million for THAAD procurement, which includes the purchase of 24 THAAD interceptors. By the end of FY 2017, MDA will deliver an additional 61 THAAD interceptors to the U.S. Army, for a total of 197 interceptors in inventory (this total does not include interceptors expended in flight-testing including two we plan to expend in FTT-18 and FTT-15). We will deliver and initiate training for the 7th THAAD Battery and complete training for the 6th THAAD Battery and turn it over to the Army by the end of FY 2017. We will also complete the training of the 2nd UAE THAAD Battery and continue to support the forward deployed THAAD battery in Guam.

We are requesting $270.3 million in RDT&E funding in FY 2017 as part of the continued development and testing of THAAD baseline 2.0 capabilities. THAAD will continue activities to explore and mature the design concept of expanding THAAD system interoperability with air and missile defense systems and expanding the battlespace and defended area of the current baseline

THAAD Weapon System. We are also requesting $72.1 million for THAAD operations and maintenance for delivered batteries.

Aegis Ballistic Missile Defense

Aegis BMD continues to be the backbone of the Nation's regional defense for our deployed forces, allies, partners and friends, and directly supports and expands our homeland defenses with long range surveillance and track capability. The FY 2017 budget request supports continued advancement of the system to counter the growing threats.

In FY 2015, MDA expanded global BMD capability for the Aegis Fleet. Together with the U.S. Navy, we completed four BMD Weapons System upgrades on Aegis ships -- two Aegis BMD 3.6 to 4.0 ships (ships with 4.0 can cover a wider threat set compared to the initial weapon system), and two Aegis BMD 3.6 to Aegis Baseline 9.C1 (BMD 5.0 Capability Upgrade (CU)) ships (ships with Baseline 9 and 5.0 CU can conduct the anti-air warfare and ballistic missile defense missions concurrently). We also commenced four additional upgrades, one from 3.6 to 4.0 and three from 3.6 to Aegis Baseline 9.C1 (BMD 5.0 CU). All upgrades were done to the existing BMD fleet of 33 BMD-capable Aegis ships. To meet an ever-growing demand by the Combatant Commanders, we continued delivery of Standard Missile-3s, including eight Block IAs and 20 Block IBs. FY 2015 also marked the end of manufacturing for SM-3 Block IA rounds. We completed 26 Block IA recertifications and will continue to support maintenance for the deployed SM-3 Block IA rounds. In 2016, we expect to complete analysis that would support the extension of service life of the SM-3 Block IAs from 8 to 12 years, leaving these critically needed assets in the Fleet 50% longer.

MDA conducted several critical flight tests this past year to prove the operational effectiveness of Aegis BMD and support certification of the at-sea and ashore versions of Aegis

Baseline 9 (BMD 5.0 CU) Weapon System. Starting with FTM-25 on November 6, 2014, we successfully executed integrated air and missile defense (IAMD) by intercepting one short-range ballistic missile target with an SM-3 Block IB, while simultaneously engaging two air-breathing threats with SM-2 Block IIIAs. For this test, the Aegis Baseline 9 ship, USS JOHN PAUL JONES, was configured in IAMD mode, which provides the ship the ability to manage SPY-1 radar resources to conduct both anti-air warfare and ballistic missile defense concurrently. All three targets were successfully intercepted, and we met all primary and secondary objectives.

In FTX-19, conducted in February 2015 off the coast of Virginia at NASA's Wallops Island facility, MDA successfully simulated engagements against a raid of three short-range targets using the Aegis BMD 4.0 Weapons System, demonstrating coordinated SM-3 engagements between two Aegis BMD ships utilizing the Distributed Weighted Engagement Schema between two Aegis ships coordinating engagements. This weapon system functionality will be used, particularly in raid scenarios, when more than one ship is able to engage inbound threat missiles, and it determines a Preferred Shooter solution for SM-3 engagements. During this test, an Aegis Baseline 9 (BMD 5.0 CU) ship also participated, performing IAMD by simultaneously conducting simulated engagements of the three SRBM targets and four simulated anti-air warfare targets.

In July MDA and the Navy conducted a series of four flight test events to verify the Sea-Based Terminal capability. The Sea Based Terminal program delivers an added layer of defense for Aegis BMD to engage short range threats in the terminal phase of flight and defend the sea base and high value assets ashore. During this series, the USS JOHN PAUL JONES used Aegis Baseline 9 (BMD 5.0 CU) to search, detect, track, and discriminate two short-range ballistic missile targets and two cruise missile targets. In four separate flight test events we verified the

Sea Based Terminal capability using the SM-6 Dual I and the SM-2 Block IV missiles, successfully destroying the short-range ballistic missile and cruise missile targets and demonstrating the ability of Aegis Baseline 9 (BMD 5.0 CU) and the SM-6 to conduct both terminal ballistic missile defense and anti-air warfare. This campaign marked the first flight of the SM-6 Dual I missile, and it was the first demonstration of the tactical interface between the Aegis Baseline 9.C1 Weapons System and the SM-6 and SM-2 Block IV guided missiles. The SM-6 is a dual-use (anti-air warfare and BMD) missile that provides an accurate and highly capable BMD capability. It will replace the legacy SM-2 Block IV for terminal defense as those missiles reach the end of their service life. We are planning additional flight tests in 2016 for SM-6 Dual I missiles, which will enter the fleet inventory this spring.

This past December we successfully conducted the Standard Missile-3 (SM-3) Block IB Threat Upgrade (TU) controlled test vehicle (CTV) test, which we launched to engage a simulated ballistic missile target. The simulated engagement was controlled by the Aegis Ashore Missile Defense Test Complex with Aegis Baseline 9 (BMD 5.0 CU) to verify G-switch operation of the SM-3 Block IB TU. This test put us in a confident position later in the day to conduct the operationally realistic FTO-02 E1a intercept test. The Aegis Ashore missile defense test complex at the Pacific Missile Range Facility in Hawaii fired the SM-3 Block IB interceptor for the first time to collide with and destroy an air-launched MRBM target. This operational flight test was the first to demonstrate an intercept using the Aegis Ashore test complex and demonstrated important modernization updates to the Aegis Weapon System.

In FY 2017, we will continue our commitment to develop, test, and deliver global naval capability to the Warfighter and support defense of our deployed forces and European NATO allies through supporting operational readiness of EPAA Phase 2 and delivery of Phase 3. In FY

2016, following successful flight testing of the redesigned SM-3 Third Stage Rocket Motor nozzle to increase overall missile reliability, MDA anticipates a full-rate production decision for the SM-3 Block IB. Anticipating that authorization, we request $463.8 million in FY 2017 to procure 35 SM-3 Block IBs and supporting material, for a total of 256 procured (235 Defense Wide Procurement plus 21 RDT&E) and 146 delivered by the end of FY 2017. To recertify SM-3 rounds that have been previously delivered and deployed to the Fleet, MDA requests $38.9 million in FY 2017 for sustainment of SM-3 assets.

We request $106.0 million for the SM-3 Block IIA Cooperative Development (SCD) effort with the Japan Ministry of Defense. In FY 2015, the SM-3 Block IIA executed a controlled test vehicle, in which controlled first-stage flight through nosecone separation was successfully demonstrated. In December of 2015, a second controlled flight test was conducted to further test the Kinetic Warhead and Throttleable Divert and Attitude Control System. We will complete flight testing for the SCD Project with two intercept tests scheduled for the fourth quarter in FY 2016 and second quarter in FY 2017. In FY 2017, we will begin transition to testing the SM-3 Block IIA within the U. S. BMDS architecture with the upgraded Aegis Baseline 9 weapon system and BMD 5.1, for at sea and ashore deployment, and we request $254.7 million in RDT&E funding to continue manufacturing rounds to support flight testing and EPAA Phase 3.

MDA is strongly committed to further enhancing capability of the Aegis BMD weapon system to give Sailors the tools needed to successfully execute their mission. In FY 2015, we delivered the BMD 4.0.3 weapon system, which further enhances Aegis BMD's homeland defense role by improving long range surveillance and tracking capability to provide data to the GMD system for longer range and more sophisticated threats. MDA requests $28.3 million in FY 2017 for the BMD 4 series weapon systems to bring advanced threat and raid scenario capability

to the legacy Aegis BMD Fleet. Having certified the Aegis Baseline 9.C1 (BMD 5.0 CU) weapon system in November of 2015, MDA is shifting focus towards delivering BMD 5.1 capability on schedule and requests $92.4 million to continue software development and testing to certify in FY 2018 and meet the delivery timeline of the SM-3 Block IIA for deployment on ships and at Aegis Ashore sites. In addition to weapon system development, MDA requests $50.1 million to procure weapon system equipment for installation and upgrade to the BMD Fleet and $19.9 million to sustain BMD specific equipment on the existing Fleet.

Adding an additional layer to the Aegis BMD weapon system, we are using an incremental development approach integrated within the Navy's Baseline 9 architecture to develop and deliver a Sea Based Terminal capability. By expanding the capability of the SM-6 guided missile and BMD 5 series weapon systems, we are delivering capability to protect maritime forces against anti-ship ballistic missiles and provide layered defense for forces ashore. We will further test the first increment of Sea Based Terminal with follow-on performance testing in FY 2016 during FTX-21. Sea Based Terminal Increment 2 is on schedule to be certified and operational in the 2018-2019 timeframe.

European Phased Adaptive Approach

We will continue to support the EPAA as a U.S. contribution to NATO BMD to provide full coverage and protection of NATO European territory, populations, and forces from the increasing threat of ballistic missile proliferation from outside of the Euro-Atlantic area by investing resources for EPAA development, testing and deployment. It is important to emphasize that this capability is not capable of threatening, nor is it intended to threaten, Russia's strategic nuclear deterrent. EPAA Phase 1 was implemented in 2011 with the fielding of an AN/TPY-2 radar in Turkey and stationing of an Aegis BMD ship in the Eastern Mediterranean. EPAA Phase

2 achieved technical capability declaration in 2015, which enhances U.S. and NATO capabilities with the addition of Aegis Ashore in Romania, additional deployment of Aegis BMD ships home-ported in Rota, Spain, more capable Aegis BMD SM-3 Block IBs, and an upgraded Baseline 9 weapon system with BMD 5.0 CU. With Aegis Ashore Romania turned over to the Navy for operations, in FY 2017 we have requested $13.9 million for sustainment of the system. To augment needed ship stationing requirements of EPAA Phase 2, MDA is providing sustainment support for BMD specific equipment to the four ships that shifted home ports to Rota, Spain.

Although not directly in support of the BMDS architecture for EPAA Phase 2, MDA assisted the Maritime Theater Missile Defense Forum and U. S. Navy in a multi-national, two month long event. At-Sea-Demonstration 15 (ASD-15) met its objective to prove multi-national interoperability for air and ballistic missile defenses. During the seven weeks of live fire events, four IAMD scenarios were exercised. The capstone IAMD event was an SM-3 Block IA intercept of a short range threat by the USS ROSS cued by Netherlands' HNLMS DE ZEVEN PROVINCIEN, with simultaneous engagements of air breathing targets by the USS THE SULLIVANS and Canada's HMCS MONTREAL. United Kingdom and Spanish ships sent track data for analysis back to Dahlgren, Virginia. In all, ASD-15 demonstrated the power of a multi-national maritime task force to share information and work cooperatively in a complex integrated air and missile defense environment.

EPAA Phase 3 will improve defensive coverage against medium- and intermediate-range threats with the deployment of a second operational Aegis Ashore site in Poland, equipped with the upgraded Aegis Baseline 9 weapon system with BMD 5.1 and capability to launch SM-3 Block IIAs. These Aegis Weapon System upgrades are further enhanced by spiral upgrades to the C2BMC network enabling Engage on Remote capability and extended defensive coverage for

NATO Europe. In FY 2016 we requested $169.2 million for the construction of the Aegis Ashore site in Poland. The MDA MILCON contract for the Redzikowo, Poland Aegis Ashore site was awarded on February 10, 2016, and construction start was March 2016. We request $57.5 million in FY 2017 for procurement of Aegis Ashore equipment. We plan to complete this site by the end of 2018 and will upgrade the Aegis Ashore Romania site to BMD 5.1 when operationally feasible.

Command, Control, Battle Management, and Communications and Sensors

C2BMC provides persistent tracking, cueing, discrimination, and fire control quality data to Aegis BMD, GMD, THAAD, and coalition partners to support homeland and regional defense objectives. We continue to support Warfighter command, control and battle management needs across the globe by providing the strategic BMD planner, which provides Combatant Commanders situational awareness tools to support weapons release authority for homeland defense and control and tasking of forward-based AN/TPY-2 radars. C2BMC operators and maintainers are deployed forward in some of the world's highest threat spots and continue to provide around-the-clock support to the local commanders.

As the BMDS integrating element, C2BMC has demonstrated proven interoperability across regional BMD architectures. Of note this past year in the regional defense area, we integrated with Aegis Ashore to support Aegis Launch on Remote capability required for EPAA Phase 2 declaration in December 2015. MDA also fielded Cross-Area of Responsibility capability to USEUCOM and USCENTCOM C2BMC, allowing each Combatant Command to take advantage of the other's BMD assets. We also supported enhancements to the BMDS to keep pace with emerging threats worldwide by investing in the development, integration, and testing of advanced algorithms to improve discrimination capabilities and enhance the use of

space-based sensor data using the BMDS Overhead Persistent InfraRed (OPIR) Architecture (BOA). MDA's C2BMC engineers continued to make progress in the Simultaneous Correlation of Unambiguous Tracks (SCOUT) algorithms and Aggregated Discrimination. SCOUT is a multiphase activity to develop a physics-based capability to identify the lethal object(s) of a threat complex in a moderately complex countermeasure environment.

We will field C2BMC Spiral 8.2-1 to USNORTHCOM and USPACOM in the fourth quarter of FY 2017 in support of enhanced homeland defense. Spiral 8.2-1 is a complete hardware update to the C2BMC System that will allow C2BMC to integrate data from multiple TPY-2 radars, SBX, UEWR, Upgraded Cobra Dane, and BMDS OPIR architecture. It will increase system raid size and tracking capacity by a factor of five and will improve the system Information Assurance/Cyber security posture. Continued development, integration and testing of C2BMC Spiral 8.2-3 (Engage on Remote) will support the EPAA Phase 3 capability declaration in December 2018. Development of C2BMC Spiral 8.2-5 (LRDR Sensor Management and Enhanced Engage on Remote) will enable us by December 2020 to reach a robust homeland defense capability. Finally, we will continue to support incremental improvements to the BMDS to keep pace with emerging threats world-wide by investing in the development, integration and testing of advanced algorithms to improve discrimination capabilities and to enhance the use of space based sensor data using the BMDS OPIR architecture.

We request $32.1 million for continued operation of the Space Tracking and Surveillance System (STSS) in FY 2017. STSS satellites operate in low earth orbit and continue to collect valuable test data. STSS collected data on the most complex scenes to date during the FTX-20 test event in October 2014. (FTX-20 involved the launch of a separating MRBM and the

simulation of an exo-atmospheric engagement by an Aegis Baseline 9.C1 configured destroyer. GM CTV-02+ involved a non-intercept test of a Ground Based Interceptor against a complex target scene presented by an air launched IRBM.) STSS also successfully tracked and collected data during Glory Trips 215 and 212, and participated in two other Air Force Global Strike Command flight tests of the Minuteman III.

In FY 2015, we began the process of decommissioning the Near-Field Infrared Experiment (NFIRE) satellite that MDA launched in April 2007. This satellite captured high resolution phenomenology data from the exhaust plumes of boosting ballistic missiles. The NFIRE satellite was decommissioned in August 2015 and safely deorbited this past November. Looking to the future, we completed the Critical Design Review for the Spacebased Kill Assessment (SKA) in January 2015 and the SKA Flight Model Manufacturing Review in April 2015; delivered the first shipset of flight models to the payload integrator in November 2015 and the second shipset in January 2016. The SKA experiment is comprised of a network of sensors hosted on commercial satellites to collect data on missile intercepts, make an independent kill assessment, and pass that information on to the BMDS to support a multi-sensor kill assessment of the target. In FY 2017 we will complete the integration and testing of SKA payloads onto hosted payload modules and satellites and conduct on-orbit deployment, checkout, calibration and commissioning of the SKA sensor network.

The Services and COCOMs, with logistical support from MDA, are operating forward based X-band radars (AN/TPY-2(FBM)) in Japan, Israel, Turkey, and United States Central Command. All of these radars contribute to regional defense, and some also provide a significant contribution to the defense of the U.S. homeland. Last year we completed the integration and performance characterization testing of the 2nd AN/TPY-2 radar to Japan, located at

Kyogamisaki (Site KCS). In order to reduce noise levels at a seaside community near the KCS site, we completed muffler installation on Mobile Electric Power (MEP) -810 power generators in March 2015. MDA increased environmental protection for the radar equipment by coordinating and receiving approval for construction and modification of the Prime Mission Equipment/Rubb structure at Site KCS. In FY 2015 we delivered new operational mission profiles that provided cooperative coverage/capability for USEUCOM and USCENTCOM sensors and successfully completed operational flight testing of new capabilities in operational flight tests (FTO-02 events) and ground test campaigns, improving cross-Area Of Responsibility operational mission profiles, debris mitigation logic and increases operational availability. Last year we completed the THAAD Reliability Growth Test and critical maintenance periods on Radars #2, #3 and #5 at Guam. We also delivered Radar #11 to THAAD Battery #6 and continued production of Radar #12 (the final U.S. production AN/TPY-2).

We request $653.4 million in FY 2017 to develop, deploy, test, and sustain BMDS sensors (this includes $162.0 million for the continued development of the Long Range Discrimination Radar), and $172.6 million to sustain the twelve (terminal mode and forward-based mode) AN/TPY-2 radars and support the UEWRs and Cobra Dane radar. We expect to complete development efforts for the next incremental software build (CX3.0), which will expand electronic protection functionality and further improve discrimination and debris mitigation capabilities to handle more advanced threat set requirements. We will also develop common U.S. and FMS software architecture for AN/TPY-2 to improve synergy and achieve cost savings for future software builds. In FY 2017 we also will deliver the operational Float Antenna Equipment Unit (AEU) to improve Warfighter operational/maintenance flexibility; continue fleet-wide depot maintenance to retrofit Electronics Equipment Units with new signal data processors; and retrofit

a product redesign for AN/TPY-2 AEU transformers with upgraded reliability improvements across the fleet. AN/TPY-2 radars will participate in three BMDS flight tests (FTG-11, FTG-15, and FTT-18).

Developing New Capabilities

MDA is developing technology to address gaps in the BMDS and drive the cost of defending the homeland down dramatically. MDA's goal for these investments is to deploy a future BMDS architecture more capable and cost-effective that instills warfighter confidence in the ability of the BMDS to defeat missile attacks. Our vision is to shift the calculus of our potential adversaries by introducing directed energy into the BMDS architecture. This would revolutionize missile defense by dramatically reducing, if not eliminating, the role of very expensive interceptors. Our long-term goal is to deploy lasers on high altitude, long endurance Unmanned Aerial Vehicle (UAV) platforms to destroy ICBMs in the boost phase. To achieve this vision we must demonstrate two key elements: laser scaling with high efficiency and excellent beam quality, and high altitude, long endurance aircraft to carry the laser system.

We request $71.8 million in Weapons Technology to continue development and test of our high-powered directed energy program to build the foundation for the next-generation UAV-borne laser system. A UAV-borne laser would be capable of acquiring, tracking and eventually destroying an enemy missile at a much lower cost than the existing BMDS. Within the Directed Energy project, we will collaborate with our Air Force and DARPA partners to develop and demonstrate the technology necessary to scale laser power to a level required for speed-of-light missile defense. In FY 2015, the Massachusetts Institute of Technology's Lincoln Laboratory (MIT/LL) Fiber Combining Laser achieved 44 kilowatts (kW) continuous power with near perfect beam quality, a record for fiber combined lasers. In 2017, MIT/LL will demonstrate a 30 kW,

low Size Weight and Power (~ 7 kg/kW) fully packaged fiber laser. They also will demonstrate a flight qualified 1 kg/kW fiber amplifier traceable to BMDS high energy laser system requirements. The Lawrence Livermore National Laboratory (LLNL) achieved similar success with their Diode Pumped Alkali Laser (DPAL) system, reaching 14 kW, a record for the DPAL system. In FY 2017, LLNL will demonstrate a DPAL system at 30 kilowatts average power, more than double the power ever achieved by a hybrid laser. The Agency also will make technology investments in Divert and Attitude Control Systems for future BMD interceptors and kill vehicles.

In our effort to mature laser technology for missile defense, we awarded five contracts with key aerospace partners to produce concepts for an airborne low power laser demonstrator. We will use these concepts to guide our requirements for the follow-on competitive design contracts in FY 2017 under our Technology Maturation Initiatives program element. MDA requests $90.3 million in FY 2017 for Technology Maturation Initiatives to build on the successes in weapons technology and discrimination sensor technology. Our vision is to add high altitude airborne or space-based electro-optical sensors into the BMDS architecture that can acquire, track, and discriminate ballistic missile targets.

One of the goals of the Discrimination Sensor Technology flight test development program is to demonstrate that the Aegis Weapon System can launch an SM-3, engage and destroy a ballistic missile solely on tracks from remote airborne sensors. Test campaigns exercise the test analog of the BMDS architecture using operationally proven Multispectral Targeting System sensors aboard MQ-9 Reapers as the tracking element. During FTX-20, FTM-25, and GM CTV-02+, the Reapers received cues, acquired and tracked the target and transmitted these tracks to the BMDS C2BMC laboratory at Schriever Air Force Base. C2BMC fused the tracks

and transmitted them via Link 16 to the Aegis Ballistic Missile Test Bed at Space and Naval Warfare Systems Command (SPAWAR) in San Diego, CA where the engagements were simulated in real-time. During GM CTV-02+ the Aegis Weapon System authorized Remote Engage Doctrine within 30 seconds of target burnout.

Over the next two years, we will incrementally demonstrate the value of increasingly more capable electro-optical/infrared sensors while developing tactics and procedures for future operational use. This work will culminate in a real time Aegis SM-3 engagement using tracking information from airborne sensor data in 2017 and again using higher precision, advanced sensor data in 2019. These tests are a crucial step in developing persistent sensor technology to defeat the evolving ballistic missile threat first from aircraft and eventually from space. Finally, MDA will contract with industry to begin the design of an airborne laser demonstrator to quantify the target acquisition, tracking, and handover performance required for boost phase missile defense.

MDA requests $71.5 million for the MOKV effort. We have made considerable progress on the development strategy for the next generation exo-atmospheric kill vehicles. In FY 2015, we awarded three contracts with industry to define concepts for deploying multiple kill vehicles from a single booster. In FY 2016, industry delivered their MOKV concepts, and we are evaluating those concepts. The next step will be to focus on reducing component technical risk in critical areas identified by industry, which is necessary to make this revolutionary concept a reality. By 2017 we will develop and test MOKV command and control strategies in both digital and Hardware-in-the-Loop venues that will prove we can manage the engagements of many kill vehicles on many targets from a single interceptor. We will also invest in the communication architectures and guidance technology that support this game changing approach. Ultimately, MOKVs may revolutionize our missile defense architecture.

MDA requests $23.4 million for Advanced Research and development that capitalizes on the creativity and innovation of the Nation's small business community and academia to enhance the BMDS. We are also fostering research between U.S. and foreign universities of allied nations through international cooperative science and technology projects. We awarded nine new contracts and exercised continuation options on ten additional contracts for innovative new research that can transition onto the BMDS.

MDA also requests $17.9 million for the Advanced Concepts & Performance Assessment effort, which models the capability of advanced BMD technology to address evolving threats to the warfighter. The request will fund the digital simulation and hardware-in-the-loop framework and models required for testing of the Airborne Advanced Sensor, Kill Vehicle Modular Open Architecture test bed, and maturing sensor fusion algorithms.

International Cooperation

The FY 2017 budget request includes funding for regional missile defense capabilities to protect deployed U.S. forces, reassure allies and partners, and build cooperative regional security architectures. MDA is engaged with over twenty countries and international organizations, such as NATO and the Gulf Cooperation Council (GCC). MDA is committed to expanding work with our international partners, to include conducting joint analyses to support partner missile defense acquisition decisions, cooperative research and development projects, deploying BMD assets, Foreign Military Sales (FMS), and co-production efforts. Our major international efforts reflect the Department's goals in the Asia-Pacific, Middle East, and European Areas of Responsibility and will enable implementation of EPAA, build partner capacity, and support the strategic shift to Asia-Pacific.

The investments of our allies and partners in their own missile defense capabilities allow us to build more effective regional security architectures that complement U.S. regional missile defense capabilities. MDA is currently executing an FMS case with the United Arab Emirates for two THAAD batteries and accompanying launchers, radars, and interceptors. MDA is actively engaged with several nations, particularly those in the Arabian Gulf region, to provide program information and cost data that may inform future decisions to procure THAAD and other missile defense systems. We are currently conducting a Ballistic Missile Early Warning Study for the GCC, analyzing sensor and C4I architecture options for defense of the region.

We continue to have a very strong cooperative missile defense partnership with Israel. Over the past year, the Israel Missile Defense Organization (IMDO) and MDA successfully completed the third and fourth series of tests of the Stunner Interceptor for the David's Sling Weapon System (DSWS). IMDO and MDA also achieved the successful first engagement of a ballistic missile target with the Arrow-3 interceptor in December 2015. This was a major milestone in the development of the Arrow Weapon System and provides confidence in future Israeli capabilities to defeat developing threats. The Department continues to support the critical Iron Dome Program to defeat short-range rockets and artillery through co-production efforts.

We are making significant progress with our Japanese counterparts on the SM-3 Block IIA, our largest co-development effort. The development work, which remains on track for first delivery in the 2018 time frame, will expand extended deterrence to our friends and allies and establish an important vehicle for closer defense cooperation ties. Once deployed at the Aegis Ashore site in support of EPAA Phase 3 and on ships, the SM-3 Block IIA will improve and expand defenses against MRBM and IRBM threats.

We continue to work on meeting our EPAA commitments with our NATO Allies. In December 2015, we completed major weapon system construction and achieved Technical Capability Declaration of the Aegis Ashore site in Romania. We anticipate declaring Initial Operating Capability of EPAA Phase 2 as well as beginning work on the Aegis Ashore site in Poland in support of EPAA Phase 3 this year. In addition to our interoperability activities with NATO, MDA continues to work with our European allies collectively as we build upon the synergy and lessons learned from ASD-15 as well as bilaterally to further individual national progress with missile defenses.

Cybersecurity/ Supply Chain Risk Management

We are very cognizant of the growing cyber threat and aggressively working to ensure the Nation's missile defenses are resilient and able to operate in a highly contested cyber environment. Potential adversaries are developing cyber forces as part of their military structure and integrating them into their overall strategy. We are working very closely with the Armed Services, the Combatant Commands, especially Strategic Command's USCYBERCOM, and other agencies in DoD and the Federal Government to counter this growing threat.

We are improving the cyber hygiene of our missile defense capabilities by ensuring our cybersecurity infrastructure has the latest security upgrades and patches. We are assessing our systems, our suppliers, and our overall acquisition processes. We are ensuring robust and secure configurations of our critical software and hardware to reduce the risk of malicious activities. We also have a rigorous cyber and supply chain risk management inspection program to examine everything about our systems from the trusted supply chain to the fielded capability. This helps us ensure the highest possible levels of compliance.

In support of the DoD Cybersecurity Culture and Compliance Initiative signed out by the Secretary of Defense on September 28, 2015, we are developing a cybersecurity program that focuses on the five operational excellence principles: Integrity, Level of Knowledge, Procedural Compliance, Formality and Backup, and Questioning Attitude. These principles are fundamental to the DoD cyber enterprise.

We are also instituting the DoD Cybersecurity Discipline Implementation Plan to mitigate risks for the information systems we own and manage. Our program implements the DoD campaign four lines of effort: 1) Strong Authentication, to degrade the adversaries' ability to maneuver on DoD information networks; 2) Device Hardening to reduce internal and external attack vectors into DoD information networks; 3) Reducing the Attack Surface, to lessen external attack vectors into MDA information networks; and 4) Alignment to Cybersecurity / Computer Network Defense Service Providers, to improve detection of and response to adversary activity. These efforts run across all facets of MDA and the BMDS mission systems and general services infrastructures. We also created five additional Lines of Effort critical to MDA and the BMDS including: 1) Safeguarding BMD information in the defense industrial base; 2) Positioning, Navigation, and Timing; 3) Transitioning to Risk Management Framework; 4) Cybersecurity Testing and 5) Cybersecurity Workforce Management (training and certification).

We are also increasing efforts to establish additional cybersecurity awareness training in support of the DoD Cybersecurity Culture and Compliance Initiative to improve the individual human performance and accountability within the DoD cyber enterprise. This applies to our leaders, service providers, cyber warriors, and all of our general users. Our efforts align to the DoD Cyber Strategy program and are meant to enable and augment the existing mandated cyber training efforts. Our training reinforces DoD training and exists to shift cybersecurity cultural

norms at all levels to increase cybersecurity situational awareness across all personnel and inculcate a high level of personal responsibility.

MDA has established an insider threat program in accordance with the DoD Directive 205.16, "The DoD Insider Threat Program." We are leveraging computer network defense capabilities, in addition to other information streams to proactively detect, mitigate and defeat potential insider threats. This program also ensures that only trusted individuals have access to MDA program information and systems.

The MDA Computer Emergency Response Team (CERT) continues to provide Computer Network Defense (CND) services as an accredited Tier II CND service provider to MDA programs of record. The MDA CERT executes a battle rhythm that includes daily monitoring and collaboration with USCYBERCOM, Joint Forces Headquarters DoD Information Networks, and other sources for latest threats to DoD and the MDA. As a result, the MDA CERT tracked and managed 109 cyber taskings in FY 2015, contributing to the overall cybersecurity posture of MDA networks and resources. From August to November 2015, the Information Security Oversight Office (ISOO) inspected MDA. The ISOO is responsible to the President for policy and oversight of the Government-wide security classification and the National Industrial Security Program and is a component of the National Archives and Records Administration. In addition to security classification and Industrial Security, the ISOO reviewed MDA's cybersecurity program. ISOO's review confirmed that the MDA operates a robust CNSI program, one that enjoys leadership support and utilizes numerous best practices. Nearly all of the program elements are very strong, and the personnel who implement the program are dedicated and innovative. The Agency's Security Classification Guides are developed and updated utilizing a sound process and those that ISOO reviewed were current, very well prepared, and included all of the elements

required by Executive Order 13526 and ISOO Directive 1. As with any program, there are areas for improvement. MDA is working those areas for improvement based on the findings and recommendations.

Over the last year we also conducted two Enterprise Cyber Range Environment (ECRE) experiments with independent, DOT&E red team penetration testing on the Joint Information Operations Range (JIOR). The purpose of these experiments is to determine the BMDS cyber robustness to both external and insider threats. We are planning an additional ECRE for the GMD program in May 2016. MDA also completed 85 cybersecurity inspections worldwide to ensure compliance with DoD and MDA cybersecurity standards. We follow up on these inspections to ensure remediation of all identified cybersecurity risks.

We must build resilient cyber defenses that are capable of detecting and mitigating threats without impeding operations in order to "fight through" the cyber threat. MDA collaborates with the Director of Operational Test and Evaluation to conduct cyber penetration testing on key missile defense capabilities. We then use the results of those tests to conduct risk assessments to prioritize cybersecurity improvements, develop mitigation strategies, and improve cyber training. We are also working to develop better cyber concept of operations to ensure every network defender in every location knows how to react to cyber challenges.

MDA is working hard to incorporate cybersecurity requirements early into our acquisition lifecycle. We are focused on ensuring we are designing and building cybersecurity into missile defenses, rather than adding it after the fact. In addition, we are working closely with our industry partners in the defense industrial base to ensure they can protect both classified and unclassified information they are processing on their systems to ensure that it will not be exposed to potential adversaries. We know that malicious cyber actors are constantly attempting to

exfiltrate information from U.S Industry. We will continue to work with the defense industrial base, the FBI, and other partners to identify these issues and raise the costs of this behavior to those responsible, in coordination with national authorities and in accordance with national policy.

We are working diligently with the COCOMs, Services, and other agencies in the Federal Government to ensure the missile defense capabilities we field will operate successfully in a highly contested cyber environment. We have structured and continue to improve an ongoing robust cybersecurity program to protect information about current and future missile defense capabilities and ensure a persistent state of enterprise cybersecurity readiness. This ensures that the Agency remains a strong mission partner, protects and defends MDA information systems and networks, and optimizes cybersecurity management and processes at a level commensurate with our critical national defense mission.

Program Oversight

There continues to be significant interest in MDA's development and deployment of the BMDS and management of the missile defense program. MDA is highly visible and one of the most scrutinized agencies within the Department of Defense. Each year, throughout the budget hearing cycle and congressional mark-ups and floor debates of the defense authorization and appropriations bills, there is intense congressional oversight of the missile defense program. MDA is also subjected on an annual basis to numerous Government Accountability Office audits, the support of which has required MDA to expend significant time and enormous resources. Dozens of MDA personnel are engaged in supporting 21 GAO audits and answering more than 750 inquiries. Just within the past year MDA has provided nearly 11,000 pages of internal

documents and prepared responses. MDA has concurred or partially concurred with all 21 GAO recommendations in their annual Mandate Report since 2011.

In addition, the National Defense Authorization Act for Fiscal Year 2010 requires that Defense Department financial statements be validated as ready for audit no later than September 30, 2017. The Office of the Under Secretary of Defense (Comptroller), Financial Improvement and Audit Readiness (FIAR) Directorate, initiated the Statement of Budgetary Activity (SBA) Examination for the MDA in April 2015 to evaluate the Agency's readiness for audit. In December 2015, the audit firm conducting the SBA reported that MDA management's assertion is fairly stated, which is a successful audit opinion. The Missile Defense Agency continues to make significant progress with FIAR initiatives and new Department policies. The successful SBA examination confirmed the Agency is on track to meet financial statement requirements and full auditability by the end of Fiscal Year 2017.

MDA also annually delivers the congressionally mandated Baseline Acquisition Review (BAR) reports to Congress and GAO. We released the latest BAR in early March. MDA and the Department also continue to produce and deliver, as required by the annual defense bills, on average, over 30 reports to congress on missile defense.

Conclusion

Mr. Chairman and Members of the Subcommittee, in closing, I want to assure Congress that MDA programs are cost-effective, efficient, and managed in accordance with the Missile Defense Executive Board process set up by the Department to ensure all missile defense programs and operational requirements are validated, adhere to sound acquisition practices, and can meet warfighter demand in a cost effective manner. Our budget request for Fiscal Year 2017 will continue to increase the capability and capacity of fielded homeland and regional missile defense

systems and make measured investments in advanced technology to reverse the adversary's numerical advantage. I look forward to answering the committee's questions. Thank you.