

**Unclassified Statement of**

**Vice Admiral James D. Syring, USN  
Director, Missile Defense Agency**

*Before The*

**Senate Appropriations Committee**

**Defense Subcommittee**

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**Vice Admiral J.D. Syring, USN  
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Good morning, Chairman Durbin, Vice Chairman Cochran, distinguished Members of the subcommittee. I appreciate this opportunity to testify before you today. Our current budget request of \$7.459 billion for Fiscal Year (FY) 2015 will continue the development of defenses for our Nation, deployed forces, allies, and international partners against increasingly capable ballistic missiles. The FY 2015 missile defense program will support the warfighter and needs of the Combatant Commanders (COCOMs) with the development and deployment of interceptors, sensors, and the command, control, battle management and communications (C2BMC) system that make up the integrated Ballistic Missile Defense System (BMDS). Our PB 2015 request supports needed improvements in homeland defense and continues strong support of regional defense initiatives. Our FY 2015 program plans include continued investments in advanced technologies and future capabilities to keep pace with the increasingly complex threat.

**Ballistic Missile Threat**

The threat continues to grow as our potential adversaries are acquiring a greater number of ballistic missiles, increasing their range and making them more complex, survivable, reliable, and accurate. The missile defense mission is becoming more challenging as potential adversaries incorporate BMD countermeasures. Space-launch activities in Iran and North Korea involve multistage systems that serve to further the development of ballistic missile technology for longer-range systems, including

intercontinental ballistic missile (ICBM)-applicable technologies and systems. As the Director for National Intelligence testified last year, “Iran has demonstrated an ability to launch small satellites, and we grow increasingly concerned that these technical steps... provide Tehran with the means and motivation to develop larger space-launch vehicles and longer-range missiles, including an ICBM.” Iran could develop and test an ICBM capable of reaching the United States by 2015. 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) capable of reaching Guam and the Aleutian Islands. 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. Iran has publicly demonstrated the ability to launch simultaneous salvos of multiple rockets and missiles. Demonstrating that it is capable of modifying currently deployed ballistic missile systems, Iran has flight-tested a Fateh-110 ballistic missile called the Khalij Fars by adding a seeker to improve the missile’s accuracy against sea-based targets. This ballistic missile has a range of 300 km, which means it is capable of threatening maritime activity throughout the Persian Gulf and Strait of Hormuz.

### **Support for the Warfighter**

Our overriding goal is to provide support to the warfighter. With this budget we will maintain our commitment to build out homeland defenses to 44 Ground Based Interceptors (GBIs), pending a successful return to intercept this summer, and focus on Ground-based Midcourse Defense (GMD) system reliability and GBI performance. We will also maintain our commitment to deploy Phases 2 and 3 of the European Phased

Adaptive Approach (EPAA). We are continuing efforts to improve the performance of the Aegis Weapons System and deliver Standard Missile (SM-3) Block IB guided missiles. We will also deploy a second forward-based X-band AN/TPY-2 radar in Japan, improving homeland and regional defense capabilities and increasing our global operational AN/TPY-2 radar posture, and build and improve the C2BMC infrastructure at fielded sites. We plan to procure interceptors for Terminal High Altitude Area Defense (THAAD) and, pursuant to our agreement with the Army, fund additional AN/TPY-2 spares and an additional THAAD Battery.

Last year we conducted or participated in over 17 multi-event exercises and wargames, which are critically important to the warfighter and the intensive engineering efforts across the Agency. MDA also worked collaboratively with Combatant Commanders, Office of the Secretary of Defense (OSD) and the Services to complete a strategy and roadmap providing a series of near-, mid- and far-term architecture options for the BMDS that are the basis for program planning for the rest of this decade. In response to the continued fielding by U.S. adversaries of air, missile, and rocket capabilities, in May 2013 MDA assumed the responsibility of Technical Authority for Integrated Air and Missile Defense (IAMD), and as such will lead the Department's joint IAMD engineering and integration efforts, including interface definition and control as well as technical requirements allocation.

Finally, we continue to work closely with the Director, Operational Test & Evaluation (DOT&E) and with independent testers and the Services. From October 2012 to the present, we have executed 10 high profile flight tests, 14 if you include our involvement with and contributions to Israeli flight tests. The highlight was Flight Test

Operational – 01 (FTO-01), the historic and unparalleled operational test of our regional layered ballistic missile defenses this past September, which involved THAAD and Aegis BMD, ground- and sea-based forward deployed sensors, and C2BMC. The two targets were launched on operationally realistic trajectories towards a defended area near the Reagan Test Site in the Pacific Ocean. This was a highly successful operational test involving MDA, the Operational Test Agency, Joint Functional Component Command for Integrated Missile Defense, and U.S. Pacific Command, as well as U.S. Army Soldiers from the Alpha Battery, 2<sup>nd</sup> Air Defense Artillery THAAD, U.S. Navy Sailors aboard the USS Decatur and British sailors aboard the HMS Daring, and Airmen from the 613<sup>th</sup> Air and Operations Center. Similar to the Flight Test Integrated – 01 test conducted in October 2012, FTO-01 provided the warfighters confidence in the execution of their integrated air and missile defense plans and the opportunity to refine operational doctrine and tactics, techniques and procedures.

In FY 2015 we have 15 flight tests in the Integrated Master Test Plan. As the BMDS matures, we are continuing to increase the complexity in our flight test program by: conducting more system-level operational tests; increasing the number of BMDS assets in those tests; increasing the numbers, types and ranges of the threat representative targets we use; conducting more simultaneous launches; and replicating potential wartime scenarios to realistically exercise warfighting chain of command to evaluate command and control concepts of operation and tactics, techniques and procedures. We also have system-level ground tests that combine the warfighter chain of command with the developmental system and test under varying conditions to improve confidence in the system being deployed to Combatant Commands. We are entering a

period of unprecedented complexity and increased testing tempo based on that complexity. Our flight tests will also involve an increasingly stressful set of threat representative targets as well as longer range interceptors for our regional capabilities. Over the coming years, U.S. government stakeholders – to include Soldiers, Sailors, Marines, and Airmen – and allies will have a larger role and impact in our test program than ever before.

### **Homeland Defense**

MDA's highest near-term priority remains the successful GMD intercept flight test of the newest GBI Exo-atmospheric Kill Vehicle (EKV) – the Capability Enhancement (CE)-II EKV. Based on our analysis of the data from the successful January 2013 non-intercept controlled flight test of the CE-II GBI (CTV-01), we plan to conduct FTG-06b, an intercept flight test, this summer. CTV-01 demonstrated the successful dampening of the vibration environments that affected the navigation system and resulted in the failure of the FTG-06a mission conducted in December 2010. FTG-06b will demonstrate the ability of the CE-II EKV to discriminate and intercept a lethal object from a representative ICBM target scene. An increase in the number of GBIs in the fleet assumes a successful return to intercept of the CE-II EKV.

Last July, with FTG-07, we conducted an intercept flight test of the upgraded CE-I, or first generation, EKV. We made numerous improvements to the CE-I fleet through upgrades since the last successful CE-I flight test in 2008. In FTG-07 the EKV did not intercept the target because the kill vehicle on the GBI did not separate from the booster's third stage. The failure investigation is progressing toward a root cause. Once

the investigation is concluded, we will take steps to make any fixes to the fleet that need to be made for both the CE-I and CE-II EKV's.

Today, 30 operational GBIs protect the United States against a limited ICBM attack from current regional threats, such as North Korea and Iran. Last year we began refurbishment of Missile Field 1 at Fort Greely, Alaska (FGA) to develop silo capacity to support delivery of an additional 14 GBIs, continued emplacing GBIs in Missile Field 2 (MF 2), and continued conducting GBI component testing and refurbishing currently deployed GBIs to test and improve their reliability. We are requesting approximately \$1.3 billion in FY 2015 for homeland defenses. We remain committed to a "fly before you buy" acquisition approach. Pending a successful outcome of the GMD intercept flight test this summer, we will resume taking delivery of GBIs and emplace them in MF 2 and MF 1 as we progress towards 44 by the end of FY 2017. Beginning in FY 2016, we will acquire replacement GBIs to support GMD operations, testing, and spares, pending the outcome of flight testing.

Construction of the GBI In-Flight Interceptor Communication System (IFICS) Data Terminal (IDT) at Fort Drum, New York is proceeding on schedule. Once it is operational in late-2015, the east coast 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 by increasing system performance in specific engagement scenarios.

We currently operate a forward-based X-band radar, the AN/TPY-2 radar, in Shariki, Japan, which is in the northern part of that country. In September 2012 the Secretary of Defense directed the deployment of a second AN/TPY-2 X-band radar in

Japan to provide improved tracking coverage for launches out of North Korea. Working with our Japanese partners, we expect to complete the deployment of the second AN/TPY-2 radar in Kyogamisaki in southern Japan by the end of this calendar year. We will also deploy a new C2BMC capability which will enhance the overall performance of the radars when operating in a mutually supporting dual radar mode.

We will take additional steps to keep pace with the threats to the U.S. homeland. We have requested \$99.5 million in FY 2015 to redesign and improve the GBI EKV. The redesigned EKV will be built with a modular, open architecture and designed with common interfaces and standards, making upgrades easier and broadening our vendor and supplier base. The new EKV's will improve reliability and be more producible, testable, reliable, and cost-effective and eventually will replace the kill vehicle on our current GBI fleet. We are currently assessing concepts, acquisition options, and timelines to test and field the redesigned EKV. Our goal is to begin flight testing the redesigned EKV in FY 2018. We also request \$79.5 million, which includes \$29 million in MILCON funding for planning and design, to begin development of a Long Range Discrimination Radar (LRDR), with deployment planned in 2020. The new long-range, mid-course tracking radar will provide persistent coverage and improve discrimination capabilities against threats to the homeland from the Pacific theater. This new radar also will give more geographic flexibility to deploy the Sea-Based X-band (SBX) radar for contingency and test use.

MDA requests \$122 million in FY 2015 to support the Discrimination Improvements for Homeland Defense (DIHD) efforts. The goal of this effort is to develop and field an integrated set of capabilities to improve BMDS reliability, lethality,

and discrimination. The end result will be a deployed future BMDS architecture more capable of discriminating and destroying a reentry vehicle. Our plans in this area will support a near-term DIHD capability (2016) and a DIHD capability fielding in 2020.

We are requesting \$64 million in FY 2015 for continued Sea-Based X-band (SBX) radar operations. In collaboration with the Services, Joint Staff, STRATCOM and the COCOMs, we maintained the SBX radar in Limited Test Support Status, where the radar continues to support the BMDS test program and remains available for contingency deployment under the operational command of PACOM. In 2013 SBX supported real world operations, with 49 days at-sea, and the FTG-07 GMD test with a total of 110 days at-sea and demonstrated an autonomous acquisition capability.

We are also examining locations for a possible additional CONUS interceptor site. The current GBI sites at Fort Greely, AK and Vandenberg AFB, CA provide capability necessary to protect the homeland. While there has been no decision by the Department to move forward with an additional CONUS interceptor site, such a site would add battle space and interceptor capacity should it be deemed necessary to proceed with deployment. Our CONUS Interceptor Site study determined the following sites are viable candidates and they are to be included in the Environmental Impact Statement: Fort Drum, New York; Naval Air Station Portsmouth SERE Training Area, Rangley, Maine; Ravenna Training and Logistics Site, Ohio; and Fort Custer Combined Training Center, Michigan. The Environmental Impact Statement, which will take approximately 24 months to complete, will assess environmental impacts at each of the sites, to include potential impacts to land use, water resources, air quality,

transportation, socioeconomics and other factors established by the National Environmental Policy Act.

For FY 2015 we are requesting approximately \$38.6 million for our network of strategic radars. We will continue missile defense upgrades of the Early Warning Radars in Clear, Alaska and Cape Cod, Massachusetts. We expect to complete the Clear radar upgrade in 2017 and the Cape Cod upgrade in 2018. Last year MDA worked with the Air Force to begin upgrading the Early Warning Radar (EWR) at Clear, Alaska to give it a missile defense capability, providing improved ballistic missile defense sensor coverage over the continental United States and reducing sustainment and operating costs. We also transferred sustainment responsibility for the Beale (California), Fylingdales (United Kingdom), and Thule (Greenland) Upgraded Early Warning Radars back to the United States Air Force.

### **Regional Defenses**

Deployment of regional defenses to protect our deployed forces, allies and international partners remains one of our top priorities. Our FY 2015 budget request funds the continued development and deployment of defenses against SRBMs, MRBMs, and IRBMs in support of Combatant Commanders' near-term and future priorities. MDA will continue to focus on threats from the Asia-Pacific and Middle East regions as we continue to support the European Phased Adaptive Approach to protect our deployed forces and our allies.

#### *Terminal High Altitude Area Defense*

In FY 2013 MDA delivered 37 THAAD Interceptors and expended two in flight tests, for a total of 84 delivered to Army war stock. We also delivered hardware for

fielding of the third THAAD battery: 2 Tactical Station Groups, 6 Launchers, and a set of Peculiar Support Equipment. Training of the soldiers who will operate the third THAAD battery has begun and we expect it to be completed in FY 2015. This year we expect to deliver the fourth THAAD battery. In collaboration with the Services, Joint Staff, STRATCOM and the COCOMs, we achieved first operational deployment of the THAAD capability for the defense of Guam. In recent tests we demonstrated THAAD's ability to intercept an MRBM as part of an integrated operational test with Aegis BMD (FTO-01), the second intercept of this class of target since FTI-01. THAAD has put together a remarkable record of success, successfully intercepting 11 out of 11 targets with the operationally configured interceptor.

For FY 2015, MDA is requesting \$464 million for THAAD procurement, which includes the purchase of 31 THAAD interceptors. We also are requesting \$300 million in RDT&E funding in FY 2015 and \$76 million for THAAD operations and maintenance. We will continue to enhance THAAD's ability to operate through post-intercept debris, enable launch of THAAD's interceptors using sensor data provided by other BMDS sensors, and maintain capability against current and evolving threats. THAAD will conduct two flight tests in FY 2015. In FTT-18 THAAD will demonstrate an intercept of a separating IRBM target using the THAAD radar, launcher, fire control and communication, interceptor closed loop operations, and engagement functions. In FTO-02 THAAD will engage a SRBM with associated objects and demonstrate advanced radar algorithms.

### *Aegis Ballistic Missile Defense*

Last year MDA completed six BMD Weapons System installations on Aegis ships: two Aegis BMD 3.6; three Aegis BMD 4.0; and one Aegis BMD 5.0 (USS JOHN PAUL JONES) in conjunction with the Navy's Aegis Baseline 9 installation. The USS JOHN PAUL JONES will replace the USS LAKE ERIE as the BMD deployable test ship to support MDA and Navy testing of Integrated Air and Missile Defense capabilities. We now have a total of 30 BMD capable Aegis ships in the Fleet. In 2013 we delivered 10 SM-3 Block IAs and 16 SM-3 Block IBs. By the end of 2015, over 65 SM-3 Block IBs will be delivered.

We are requesting \$929 million in RDT&E funding in FY 2015 to continue development, testing, and installation of Aegis BMD capabilities to defeat longer range and more sophisticated ballistic missiles launched in larger raid sizes. We request \$435 million in FY 2015 for Aegis BMD procurement, which includes \$348 million for 30 SM-3 Block IB guided missiles and \$12 million for operations and maintenance of SM-3 Block IAs. In response to the Combatant Commanders' demand for more BMD ships with the latest tested capability, Navy and MDA have incorporated Aegis BMD into the Navy's Aegis DDG Modernization Program and new construction DDGs. We will continue upgrading the capability of existing BMD ships and integrating new and modernized ships to the BMD fleet, with a planned operational availability of 43 Aegis BMD ships in FY 2019. MDA coordinates BMD upgrades and installs with the Navy, and this plan will adjust if needed based on the Navy's new construction, Aegis modernization, and availability schedules. The homeport transfer of four Aegis BMD ships to Rota, Spain began this past February with the USS DONALD COOK. Another Aegis BMD ship,

USS ROSS is scheduled to transfer later this year, and the remaining two Aegis BMD ships will transfer in 2015.

With the Japan Ministry of Defense, we completed multiple SM-3 Block IIA component Cooperative Development Project Critical Design Reviews, including: Staging Assembly, Steering Control Section, Guidance System, Third Stage Rocket Motor, Sensors, Kinetic Warhead Guidance Electronics Unit Assembly, Divert and Attitude Control System, and Kinetic Warhead, culminating with an overall missile system Critical Design Review, in October 2013. Also in October, the SM-3 Block IIA completed Propulsion Test Vehicle-01 in which the missile and new composite canister both demonstrated successful and safe ignition and egress from the vertical launching system.

Last year was a significant year for Aegis BMD testing, with five for five successful intercept tests and successful transmission of Long Range Surveillance and Track data through C2BMC to the GMD system in FTG-07. FTM-20 (February 2013) demonstrated the ability of the Aegis BMD 4.0 Weapon System to Launch on Remote using data from the Space Tracking and Surveillance System (STSS) demonstrator satellites. FTM-20 employed an SM-3 Block IA against a unitary medium-range target. High quality infrared fire control data from STSS was provided through C2BMC. C2BMC generated very high quality fire control quality data and passed the track data over operational communications links to the firing Aegis ship to conduct a launch on remote engagement. This complex test proved the value of an integrated C2 and sensor network and the use of space-based sensors to expand the BMD battle space. FTM-19 (May 2013) supported the development and assessment of the Aegis BMD 4.0

Weapon System and the SM-3 Block IB prior to an FY 2014 full-rate production decision. A second Aegis BMD ship successfully acquired the target and conducted a simulated engagement using space-based sensor data.

In a span of 23 days, Aegis BMD was a principal player in three major operational flight tests: FTO-01, FTM-21 and FTM-22, which all achieved successful intercepts. FTM-21 (September 2013) and FTM-22 (October 2013) fired SM-3 Block IBs to validate operational effectiveness and suitability of the Aegis BMD 4.0 Weapon System and the SM-3 Block IB. FTM-22 was our fifth consecutive successful intercept mission using the 4.0 Weapons System and SM-3 Block IB and an important milestone for Phase 2 of the EPAA. FTM-21 and FTM-22 also completed Director Operational Test and Evaluation Initial Operational Test and Evaluation flight testing requirements for the 4.0 Weapons System and the SM-3 Block IB.

To complete Initial Operational Test and Evaluation requirements for the 4.0 weapons system, we also conducted a tracking exercise, FTX-18, over the Atlantic Ocean in January 2014, which confirmed the capability of the 4.0 weapons system to track and engage a raid of three ballistic missile targets with simulated SM-3 Block IBs. In this event, multiple Aegis BMD baselines participated, yielding comparative raid performance data, including the Aegis Ashore Romania deckhouse at Lockheed Martin in Moorestown, New Jersey. The Aegis Ashore system will be deployed to Romania later this year.

We also continue development of a Sea Based Terminal capability to provide protection of maritime forces against advanced anti-ship ballistic missiles and increased layered defense for forces ashore. Using an incremental development approach, we are

incorporating BMD capability into the Navy's Baseline 9 architecture, to include terminal defense with the SM-6 guided missile and the BMD 5.0 weapon system. In 2013, we completed the initial design phase and initiated software development for missile and weapon system modifications. We plan to test and certify the first increment of Sea Based Terminal capability in 2015. We also finalized the requirements for the second increment of Sea Based Terminal capability, scheduled to certify in 2018.

The FY 2015 Aegis BMD flight test program will include almost all of the Standard Missile variants, with firings of SM-3 Block IBs from ships as well as the PMRF Aegis Ashore Missile Defense Test Center, execution of raid scenarios with engagements in both Anti-Air Warfare and BMD warfare areas, Launch on Remote for long-range engagements, developmental Controlled Test Vehicle firings of the SM-3 Block IIA missile, and tracking exercises for the Sea Based Terminal weapon system configuration.

#### *European Phased Adaptive Approach*

We will continue to support the EPAA to provide coverage of European NATO territory from Iranian ballistic missile threats by investing resources for EPAA development, testing and deployment. Phase 1, which provides coverage of NATO territory in Europe with the deployment of Aegis BMD 3.6 ships with SM-3 IAs and a SPY-1 radar in the Mediterranean, the AN/TPY-2 radar (Forward Based Mode) to U.S. European Command (EUCOM) in Turkey, and the C2BMC Spiral 6.4 system at Ramstein AFB in Germany, has been operational since the end of 2011.

Our goal in EPAA Phase 2 is to provide robust capability against SRBMs and MRBMs. The architecture includes the deployment of the Aegis BMD 4.0 and 5.0

weapon systems with SM-3 Block IBs at an Aegis Ashore site in Romania and at sea. A formal ground-breaking ceremony for the Aegis Ashore site took place in Deveselu, Romania in October 2013. The start of construction of the Aegis Ashore site in Deveselu, Romania this year involves the delivery of the deckhouse from Moorestown, N.J. to Romania. The site will be integrated into the EUCOM command and control network, tested and operational by December 2015. MDA requests \$123 million in FY 2015 to continue development of the Aegis Ashore sites in Romania and Poland. We also request \$226 million in FY 2015 for the continued procurement of equipment for Aegis Ashore in Poland.

Four months after disassembly and transport of the Aegis Ashore equipment to the Pacific Missile Range Facility (PMRF) began, an Aegis Light Off ceremony was held on 6 December, 2013 to commemorate the first time the Aegis Combat System was powered on, with Sailors manning the consoles and the system brought on-line at the PMRF deck house facility. Last month we conducted the first test, a controlled test vehicle test, from Aegis Ashore test facility at PMRF, successfully firing the SM-3 IB against a simulated target. We plan to conduct additional flight tests at this facility in 2015.

Deployment of Phase 3 will enhance and expand protection for European NATO countries and U.S. forces through the region from MRBMs and IRBMs from the Middle East. In support of EPAA Phase 3, the SM-3 Block IIA, which we are co-developing with the Japanese government, and an upgraded version of the Aegis Weapons System are on schedule to be available for deployment in 2018 at Aegis Ashore sites in Romania and Poland, and at sea. MDA requests \$264 million in RDT&E funding in FY

2015 to continue the bilateral, cooperative effort. The upgraded Aegis Weapons System and C2BMC system with engage on remote AN/TPY-2 radar (forward based mode) capability combined with the faster, longer reaching SM-3 IIA will expand Aegis BMD battle space to counter more sophisticated threats and will extend coverage to NATO allies in Europe threatened by longer range ballistic missiles.

Working closely with Navy, we will deliver the upgraded 5.1 Aegis BMD Weapons System as a part of the Navy's Baseline 9 architecture on ships for deployment worldwide in 2018 to support Combatant Commanders requirements to counter an expanded threat set. This past year we continued development of the Aegis BMD 5.1 fire control system.

*Command, Control, Battle Management, and Communications and Sensors*

In 2013 we continued to support warfighter operations of the EUCOM BMDS capability for regional defense. In partnership with the Combatant Commands, we maintain the capability to engage multiple simultaneous threat attacks in the region. As the foundation of BMDS, the MDA C2BMC team supported the warfighter in real world operations across multiple Areas of Responsibility, which included deployments to the Middle East, Turkey, and Kwajalein. Last year we fielded software upgrades to U.S. Northern Command (NORTHCOM), U.S. Strategic Command (STRATCOM), U.S. Pacific Command (PACOM) and Central Command (CENTCOM) and installed Spiral 6.4 MR-2 at PACOM, NORTHCOM, and STRATCOM. This year we completed software upgrades to CENTCOM and EUCOM. We also delivered the Distributed Training System to CENTCOM for Air and Missile Defense Exercise 13-2.

For the first time, in 2013, we conducted a flight test with successful debris mitigation (FTO-01) and also generated fire control quality track data from space sensors for a live fire Launch-on-Remote Aegis BMD 4.0 Weapons system and SM-3 Block IA engagement (FTM-20). In addition to continuing the enhancement of global BMD survivable communications and support for operations and sustainment of C2BMC at fielded sites, in FY 2015 we will integrate Space Based Infrared System Increment 2 capabilities into C2BMC to support cueing of BMD sensors worldwide. We will also improve sensor data integration and battle management in C2BMC to support Aegis BMD cueing and launch-on and engage-on remote capability.

In support of homeland and regional defense, we continued to sustain AN/TPY-2 operations and supported the deployment of additional AN/TPY-2 radars and the C2BMC infrastructure. For the second AN/TPY-2 radar deployment to Japan, we identified candidate sites, conducted site surveys, selected sites, obtained agreements with the host nation, and initiated site design efforts. We deployed the AN/TPY-2 (Terminal Mode) as part of a THAAD battery in the PACOM Area of Responsibility. Last year we relocated the AN/TPY-2 radar in CENTCOM to a permanent location. Additionally, we accepted the AN/TPY-2 radar Number 8 and provided it to the 3<sup>rd</sup> THAAD Battery; awarded a production contract for AN/TPY-2 Number 12; awarded a production contract for an additional Prime Power Unit; and awarded a contract for AN/TPY-2 spares.

We request \$393 million in FY 2015 to develop and deploy BMDS sensors (includes Long Range Discrimination Radar), and \$183 million to operate and sustain the nine AN/TPY-2 radars and support the UEWRs and Cobra Dane radar. We request

\$444 million in FY 2015 to operate and sustain C2BMC at fielded sites and continue C2BMC program spiral development of software and engineering to incorporate enhanced C2BMC capability into the battle management architecture and promote further interoperability among the BMDS elements, incorporate boost phase tracking, and improve system-level correlation and tracking. We will also continue communications support for the AN/TPY-2 radars and C2BMC upgrades. We request \$31 million for continued operation of the Space Tracking and Surveillance System and Near-Field InfraRed (NFIRE) satellite system in FY 2015. We continue to operate the two STSS-D satellites to conduct cooperative tests with other BMDS elements and demonstrate the capability of the satellites to cue and track against targets of opportunity to provide high precision, real-time tracking of missiles and midcourse objects that enable closing the fire control loops with BMDS interceptors. We also continue to operate the NFIRE satellite, which has the capability to collect near-field phenomenology data for use in developing plume to hard-body handover algorithms for boost phase interceptor programs.

### **Developing New Capabilities**

We are developing fiscally sustainable advanced technology that can be integrated into the BMDS to adapt to threat changes. Our investments are focused on technology that brings upgradeable capability to the warfighter. Our advanced technology investments are determined by systems engineering, which permits us to evaluate and determine which emerging technical solutions will best address gaps in the BMDS and enhance its overall capability and performance. The goal of our technology investment strategy is to deploy a future BMDS architecture more capable of

discriminating and killing reentry vehicles with a high degree of confidence, allowing the warfighter to dramatically improve shot doctrine. One of our greatest challenges is the ability to bring multiple sensor phenomenology (i.e., reflective and thermal properties of the missile) into the missile defense architecture. Relying purely on terrestrial radar for precision tracking and discrimination of the threat is a potential weakness our enemy could exploit in the future. Adding persistent electro-optical sensors to our architecture is a high payoff solution for this gap.

MDA requests \$45 million in FY 2015 for Discrimination Sensor Technology. We will integrate advanced sensors on existing unmanned aerial vehicles and demonstrate their ability to create a precision track that shooters can use to target their interceptors quickly and accurately. We will test the first precision track sensors at PMRF this fall. In parallel, we will begin integration and ground test of an advanced sensor upgrade to these precision track sensors with follow-on flight testing in FY 2016. MDA's Discrimination Sensor Technology development and test plan is a cost-effective, stepping stone to MDA's long-term goal of persistent discrimination coverage from a space platform.

Additionally, Air Force Space Command (AFSPC) and MDA are collaborating on future space sensor architecture studies and sensor performance assessments across a broad set of joint mission areas and on Analyses of Alternatives (AoA) studies with threat definition, technical evaluations, and cost analysis support. MDA is supporting AFSPC in its review of concepts that will inform an AoA for the future of protected military satellite communications and overhead persistent infrared systems. As an

example, MDA is exploring the potential of BMDS-focused space sensors that also provide data contributing to Air Force missions such as Space Situational Awareness.

MDA requests \$14 million in Weapons Technology in FY 2015 to combine the knowledge gained from our Discrimination Sensor Technology effort with our high-power directed energy program to build the foundation for the next-generation laser system capable of addressing advanced threats and raids at a much lower cost than existing missile interceptors. We are pursuing a unique set of laser technology to execute missile defense missions from high-altitude, low-mach airborne platforms operating in the clear, low turbulence stratosphere. We have been developing two promising solid-state lasers: one at Lawrence Livermore National Laboratory and the other at the Massachusetts Institute of Technology's Lincoln Laboratory collaboratively with the Defense Advanced Research Projects Agency (DARPA). Both lasers achieved record power levels within the last year. MDA will continue high energy efficient laser technology development with the goal of scaling to power levels required for a broad spectrum of speed of light missile defense missions. This year, we are working with several aircraft prime contractors defining concepts for integrating a multi-kW class laser into a mid-altitude, unmanned aerial vehicle. A laser test platform addresses a broad spectrum of mission applications and we will continue our collaboration with our service partners, the Air Force Research Laboratory, and DARPA for joint development and test opportunities.

MDA requests \$26 million in FY 2015 for the Common Kill Vehicle (CKV) Technology effort. MDA's strategy is to achieve as much commonality among future GMD kill vehicles and other future kill vehicles for Aegis BMD and THAAD. In FY 2014

this CKV technology effort will help establish the requirements foundation for the redesigned GMD EKV, which we are now planning as the first phase (Phase I) of our overall kill vehicle development strategy. Our FY 2014 joint government and industry concept definition effort will also assess the ability of industry to meet those requirements. In follow-on CKV efforts, or Phase II, we will make investments that reduce the costs of production and weapon system operations through new kill vehicle architectures and scalable technology that improves the effectiveness and performance of our interceptor fleet against an evolving threat. Our investments in large format focal plane arrays, smaller inertial measurement units and high performance propulsion components as well as new kill vehicle architectures are key enablers. This technology development allows us to engage a more numerous and increasingly more complex threat, eventually establishing the technology foundation for killing multiple lethal objects from a single SM-3 or GBI.

MDA requests \$16 million in FY 2015 for the Advanced Research area which conducts leading-edge research and development with small businesses, universities, and international partners to create and advance future missile defense capability. This effort includes managing the Small Business Innovation Research and Technology Applications programs to help MDA-funded small businesses to transition their technology to missile defense applications. MDA is also seeking to leverage the creativity of our nation's universities by sponsoring academic research focused on developing breakthrough capabilities for missile defense.

MDA requests \$9 million in FY 2015 for the Advanced Concepts & Performance Assessment effort, which 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. This effort has greatly improved our assessment of advanced BMD technologies to address evolving threats for the warfighter. We work directly with universities, Federally Funded Research and Development Centers, University Affiliated Research Centers and innovative small businesses to develop cutting edge data collection, modeling techniques, hardware-in-the-loop, and high performance computing platforms to speed the assessment of innovative technology concepts.

### **International Cooperation**

MDA is engaged with over twenty countries and international organizations, such as NATO. Our major international efforts reflect the Department's goals in the Asia-Pacific, Middle East, and Europe: building partner BMD capacity, supporting the strategic shift to Asia-Pacific, and executing EPAA deployments.

#### *Building Partner BMD Capability*

Since I last testified before the committee, we had several successes in our cooperative development programs with our Israeli partners. Through our cooperative efforts, Israel is developing a layered and robust BMD capability. In November 2013 the Israel Missile Defense Organization (IMDO) and MDA achieved a second successful intercept using the David's Sling Weapon System. This past January we successfully conducted the second fly-out of the Arrow-3 upper tier interceptor. These programmatic milestones provide confidence in future Israeli capabilities to defeat the evolving ballistic missile threat in the Middle East. Another recent and significant accomplishment for the Department is the precedent-setting international agreement with Israel regarding

coproduction of the Iron Dome missile defense system that was signed on March 5, 2014. The agreement supports increasing U.S. industry co-production of Iron Dome components.

Our largest co-development effort is with Japan on the SM-3 Block IIA interceptor. Japan has committed significant funding for their part of this co-development project. Japanese and U.S. components will be fully integrated and flight tested in the coming years. The Japanese dedication to this program ensures we will remain on track to deliver SM-3 Block IIA in support of the EPAA Phase 3 in the 2018 timeframe.

After spending a year establishing processes, procedures, and an information technology infrastructure, the Defense Security Cooperation Agency designated MDA a Foreign Military Sales (FMS) Implementing Agency in February 2012 for the THAAD missile defense system and the AN/TPY-2 radar. MDA is currently executing one FMS case with the United Arab Emirates for two THAAD batteries and accompanying launchers, radars, and interceptors. We are actively engaged with several nations, particularly those in the Gulf region, to provide program information and pricing and cost data that may inform future decisions to procure THAAD as an upper tier missile defense capability.

#### *Supporting the Strategic Shift to the Asia-Pacific*

As I have already stated, along with the cooperative efforts on the SM-3 Block IIA, the United States and Japan are working together to support the deployment of the second U.S. forward-based AN/TPY-2 radar. Our Japanese partners should be commended for their efforts in supporting this deployment to the Japan Air Self-Defense

Force (JASDF) base in Kyogamisaki in southern Japan. This radar will enhance both regional BMD capability and improve defense of the U.S. homeland.

MDA also supported the deployment of a THAAD missile defense system to Guam for the defense of U.S. deployed forces in the region. This is our first long-term deployment of a THAAD battery.

### *Executing EPAA Deployments*

Last October MDA and other Department leaders participated in a groundbreaking ceremony for the Aegis Ashore site in Romania. Site preparation work has started, and we are on schedule with military construction activities demonstrating real steps to deliver EPAA Phase 2 in the 2015 timeframe.

In addition to programmatic planning and deployment activities, MDA is also supporting EUCOM efforts to ensure the necessary Implementing Arrangements are in place to support EPAA fielding timelines. In the near-term, this means coordinating on and, where possible, streamlining the construction, site activation, and equipment acceptance processes in Romania. We are also laying the groundwork for these efforts in Poland. Again, all activities are on track to support the stated EPAA timelines.

We are also working through NATO to ensure U.S. C2BMC and NATO command and control networks are fully interoperable. The United States and NATO test existing and future ballistic missile defense capabilities through a series of ongoing test campaigns in order to evaluate current capabilities and reduce risk for future development.

MDA will continue to engage NATO and regional Allies in support of U.S. national security strategy through international cooperation in missile defense. For instance, the

United States is working with NATO on a study to identify cooperative opportunities for European nations to develop and procure missile defense capabilities to complement the U.S. EPAA contribution to NATO BMD.

MDA remains engaged and committed to expanding work with our international partners, to include conducting joint analyses to support partner missile defense acquisition requirements, cooperative research and development projects, co-development, deployments, FMS, and co-production. It is an honor to work with dedicated international partners on activities that benefit both U.S. and international contributions to missile defense architectures.

## **Cybersecurity**

MDA has been working diligently to enhance the cybersecurity posture of missile defense networks and improve the protection of ballistic missile defense information. MDA has developed new policies, partnered extensively with industry and other Department of Defense organizations, and has continuously increased investments in cybersecurity to ensure our networks and information remain secure against cyber attacks.

I have coordinated policy Memoranda with the DoD Chief Information Officer's office and the Under Secretary of Defense for Acquisition, Technology, and Logistics and signed MDA Policy Memoranda on "Securing Ballistic Missile Defense Information on Government and Non-Government Networks and Systems." These require MDA program executives, program managers, contracting officials, and contractors to follow existing guidelines and implement new cybersecurity measures. We published MDA Manual titled: "Procedures for Protection of Critical Program Information and Mission-

Critical Functions and Components within the Missile Defense Agency." We conducted a cybersecurity industry day titled: "The Emerging Role of Cybersecurity in Missile Defense Agency Acquisitions." This served to inform MDA industry partners of new cybersecurity requirements and threats and elicited feedback from industry representatives on how they can meet the new cybersecurity requirements. MDA also expanded a partnership with DOT&E to test and experiment with cybersecurity on MDA systems. This partnership leverages DOT&E resources and teams MDA with special cyber expertise and extensive knowledge of current threats.

The MDA Computer Emergency Response Team (CERT) performs continuous monitoring of MDA government information systems to protect and defend the confidentiality, integrity and availability of MDA networks and data. MDA is enhancing the established integrated security architecture, aligned to the Defense Enterprise Security Architecture that constantly improves methods to protect, monitor, analyze, detect, and respond to unauthorized activity within MDA information systems. Cyber boundary protection measures include state-of-the-art firewalls, intrusion detection and prevention systems, and email spam/virus prevention capabilities. The Missile Defense Agency will continue to work closely with Federal agencies, industry partners, and others to identify and implement measures to further increase the security of missile defense information while continuously seeking to improve technologies and capabilities that protect MDA critical program information.

I am proud to report we completed our first experiment with DOT&E in February. In the first experiment, MDA successfully demonstrated cybersecurity improvements that are in development. As a result of extensive interactions with a live cyber

Operational Force during the first experiment, MDA will pursue new ways to strengthen cybersecurity that will be demonstrated in future experiments.

## **Conclusion**

Mr. Chairman, we have stayed focused on our core mission. We will continue our work with the warfighter to develop, test, and field a networked, global BMD system that is flexible, survivable, and affordable and invest in promising and potentially game-changing technology programs to ensure the BMDS will be capable of defeating the complex threats we expect to face in the future. In order to ensure we are using the taxpayer's dollars wisely and deploying effective missile defense capabilities, we will continue to test elements of the system to demonstrate that they work before we commit to their fielding. It is vital that we provide the warfighters the cost-effective and reliable weapon systems they need to do their job. I remain dedicated to committing the manpower and resources to correcting the issues in our GMD program, executing a successful intercept flight test this summer, and keeping the focus on reliability in our operational homeland defenses. We continue to make good progress in our work with our international partners, and I want to increase my focus on those important efforts.

I look forward to answering the committee's questions. Thank you.