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COMMITTEE ON ARMED SERVICES
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STATEMENT

BY

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BEFORE THE

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STRATEGIC FORCES SUBCOMMITTEE

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Chairman Udall, Senator Sessions, distinguished Members of the Committee, thank you for the opportunity to discuss missile defense test planning, processes, and programs, including my assessment of the Ballistic Missile Defense System, or BMDS.

Over the last year, Aegis Ballistic Missile Defense (BMD), Patriot, and Terminal High-Altitude Area Defense (THAAD) each demonstrated additional progress toward Short-Range Ballistic Missile (SRBM) threat class capability, even though Aegis BMD suffered a Standard Missile-3 Block IA interceptor failure during a flight test late in the year. For the first time, THAAD demonstrated progress toward Medium-Range Ballistic Missile (MRBM) threat class capability when it successfully destroyed a medium-range air-launched target. Ground-based Midcourse Defense (GMD) did not conduct any intercept flight testing during the period and did not demonstrate progress toward Intermediate-Range Ballistic Missile (IRBM) or Intercontinental Ballistic Missile (ICBM) threat class capability. However, GMD did conduct an interceptor only flight test in January 2013 as part of its return to intercept effort. That test demonstrated the potential for selected design changes made to the Capability Enhancement II kill vehicle to correct problems that caused previous test failures. Command, Control, Battle Management, and Communications (C2BMC)

demonstrated the capability to control two operationally-deployed AN/TPY-2 radars in Forward-Based Mode (FBM), using operational communications architectures; personnel; and tactics, techniques, and procedures.

The Missile Defense Agency (MDA) element flight testing included three Aegis BMD intercept tests and one THAAD operational flight test. U.S. Army testing of Patriot was more extensive, including an operational test that was conducted from May 2012 to January 2013. Aegis BMD completed the first two successful intercepts of SRBM targets by the new Standard Missile-3 Block IB interceptor using software build 4.0.1. In February 2013, Aegis BMD conducted the first engagement using remote data from the Space Tracking and Surveillance System. THAAD successfully completed its Initial Operational Test and Evaluation (IOT&E) by simultaneously destroying a foreign military acquisition SRBM and an MDA-developed target with MRBM characteristics flying a short-range trajectory. Patriot successfully completed five different intercept flight tests against SRBMs using a variety of Patriot interceptors including the new Missile Segment Enhancement interceptor under development. Patriot also conducted intercept flight testing during the period for a Foreign Military Sales customer. In addition, the MDA continued its ground test program.

Significant to a system-level characterization of the BMDS, the MDA conducted the first flight test of a regional BMD system. This test included Aegis BMD, Patriot, and THAAD, as well as C2BMC and an AN/TPY-2 (FBM), which comprised the most complex BMD flight test ever attempted in the history of the

DoD. Conceived as a risk reduction test for future operational tests, Flight Test Integrated-01 (FTI-01) included basic system-level integration, but not true layered defense, as the test was designed such that the weapon elements could only engage their intended targets. Because of this, the weapon elements basically operated independently of one another. Nevertheless, the Space-Based Infrared System/Defense Support Program participated in this test and the elements exchanged track data with each other and received acquisition cues from the AN/TPY-2 (FBM) radar via C2BMC. The test design featured near-simultaneous Aegis BMD and THAAD intercepts, a THAAD first-time engagement of an MRBM, a Patriot engagement of an SRBM in the presence of upper-tier post-intercept debris, and Aegis BMD and Patriot defending against cruise missile attacks. While the Standard Missile-3 Block IA interceptor missed its target, the Standard Missile-2 and the three other interceptors achieved successful intercepts. Soldiers performed command and control functions from the Air and Space Operations Center at Hickam Air Force Base, Hawaii. In FTI-01, for the first time, three missile defense weapon elements and an external sensor operated in the same theater engaging a small raid of ballistic missiles and air-breathing targets.

Since Flight Test Standard Missile (FTM)-15 in April 2011, Aegis BMD has experienced one test anomaly and two flight test failures. During FTM-15, the Standard Missile-3 Block IA Third Stage Rocket Motor experienced a failure in a critical component, leading to unexpected behavior just prior to achieving a successful intercept. The faulty component, common to both the IA and IB

interceptors, was subsequently redesigned and flown successfully in FTM-18. During FTM-16 Event 2 in September 2011, a catastrophic failure of the Third Stage Rocket Motor resulted in a failure to intercept. The MDA determined the cause to be an issue with one of the firing parameters and made the necessary software modifications to mitigate the issue. Subsequently, the MDA conducted numerous ground firings of the Third Stage Rocket Motor to verify that it now functions properly and it intends to use the newly-adjusted firing parameter in FTM-19 in May of this year. This was also an issue common to both the IA and IB interceptors. Finally, the MDA is still investigating the cause of the Standard Missile-3 Block IA interceptor failure to intercept during FTI-01.

The test program for Fiscal Year/Calendar Year 2012 was adequate to support the development of the regional BMDS. The need to determine root cause of the FTG-06a failure, as well as develop, analyze, and perform ground tests of the means to correct the failure precluded GMD intercept flight testing during 2012. The MDA conducted tests as planned in the IMTP, Versions 11.2, 12.1, and 12.2 approved by the MDA Director and myself in August 2011, March 2012, and June 2012 respectively. However, except for the THAAD IOT&E, all key flight tests scheduled in IMTP 11.2 moved to later calendar quarters in IMTP 12.1, frequently a full year or more later. All of these changes except one were primarily the result of previous flight test failures and the ensuing investigations that required laboratory and ground testing, hardware corrections, and software changes. The exception was the MDA changing the first operational test of the

BMDS into FTI-01 as a risk reduction test with the operational test re-inserted in the schedule a year later.

The test frequency across all of the BMDS elements remains consistent in the recently approved IMTP version 13.1 as compared with the earlier 12.2 version. For GMD, the MDA maintained the flight test frequency, averaging one flight test per year, a test pace that allows sufficient time to analyze the terabytes of data generated during GMD flight tests. Flight Test Ground-based Interceptor-07 (FTG-07) is planned for later this year, real-world events permitting, and will be flown using the failed intercept FTG-06a profile and a Capability Enhancement-I Exoatmospheric Kill Vehicle with an Aegis BMD forward sensor providing a tracking cue through C2BMC. This will be the second of three risk reduction flights for the GMD return to intercept. FTG-06b is being planned for late this calendar year and will complete the GMD return to intercept plan. The MDA will conduct their first engagement of an ICBM, with the target flying a range of greater than 5,500 kilometers, in FY15. This will also be the first GMD salvo test of two interceptors fired at a single target. The MDA will conduct a multiple simultaneous engagement of two interceptors on two targets in FY18.

In the case of Aegis BMD 3.6.1 and THAAD, sufficient data now exist to calculate quantitative estimates of the probability of engagement success for the tested battlespace (which is less than the full intended battlespace) of the two weapon systems. The probability of engagement success estimates for these two weapon systems are included in my classified 2012 Assessment of the BMDS.

Many of the models and simulations used in the ground tests are still not accredited for performance assessment, thereby limiting quantitative assessments based on their results. Some portions of the battlespace where data are lacking cannot be assessed. Examples include high closing velocity associated with longer range targets for Aegis BMD, salvo intercept time spacing for GMD since it has not yet attempted a salvo launch, and launch on remote track for THAAD. My office and MDA are working to assure the Integrated Master Test Plan (IMTP) supports BMDS modeling and simulation by providing the test data required for rigorous verification, validation, and accreditation (VV&A). However, model and simulation VV&A to support comprehensive quantitative performance assessments will, in many instances, require several more years to complete.

My comments to this committee during my testimony of the last four years, regarding the IMTP development process, remain accurate. The Director of MDA, Vice Admiral Syring, has continued to pursue a rigorous IMTP development process that has produced a rigorous and well-justified set of tests. My office continues to be involved throughout the semi-annual review and revision process leading to each update of the IMTP. This process has worked well during the preparation of the seven previous plans, including the most recent IMTP (version 13.1), that I approved jointly with Admiral Syring in March. The process has enabled each version of the IMTP to be revised in a timely manner consistent with policy changes, flight test results (including unsuccessful intercepts) such as those I have mentioned previously, or, changes in budgetary

resources. The current IMTP is a rigorous plan for obtaining the test information needed to assess BMDS performance quantitatively.

However, as I noted in my previous testimony, the IMTP continues to be success-oriented. The rigorous testing incorporated in the IMTP will inevitably lead to flight test failures. These failures, although often perceived as setbacks, provide information that is absolutely critical to assuring that our ballistic missile defenses will work under realistic and stressing conditions. The IMTP does not, however, include plans for backup or repeat tests that would be needed in the event of flight test mission failures. Therefore, the effects of unsuccessful tests, such as the earlier FTG-06a and FTM-16 Event 2 failures, need to be mitigated through future updates of the IMTP. Thus far, the semi-annual revision process has allowed flexibility in making the necessary adjustments when needed.

Conclusion

The ability to conduct comprehensive quantitative assessments of BMDS capability across the full battlespace for each of the elements is still a number of years away. However, BMDS testing has now produced sufficient data to enable a quantitative assessment of capability for both THAAD and the currently fielded Aegis BMD system covering the limited portions of their tested battlespace. Executing the planned testing in the IMTP will enable the collection of data needed to ultimately validate the models and simulations required to perform those assessments and to demonstrate capability across the full battlespace.