

Ground-Based Midcourse Defense (GMD)

Executive Summary

- The Missile Defense Agency (MDA) did not conduct a GMD intercept flight test during FY08 due to developmental test hardware problems associated with the Exoatmospheric Kill Vehicle (EKV).
- The MDA added Flight Test Other-03 (FTX-03), a non-intercept sensors-only flight test event completed in July 2008, primarily to test and evaluate multiple sensor correlation and fusing of target track data. Flight test operational realism during FTX-03 was adequate at the current level of technological maturity of GMD and met, or partially met, seven of the nine DOT&E-approved operational realism criteria.
- The MDA and the Ballistic Missile Defense System (BMDS) Operational Test Agency (OTA) Team conducted two ground tests and one digital simulation test of the GMD within the BMDS. These tests were adequate for characterization of GMD behavior; however, they were not adequate for evaluation of GMD performance due to the lack of verified, validated, and accredited (VV&A) models and simulations for that purpose.
- Collection of interceptor reliability, availability, and maintainability data was not adequate to make an assessment of GMD suitability.

System

GMD is the principal element used by the Ballistic Missile Defense System (BMDS) for the homeland defense mission. The current distributed GMD configuration consists of the following systems:

- Cobra Dane Upgrade Radar at Eareckson Air Station (Shemya Island), Alaska
- Upgraded Early Warning Radars (UEWR) at Beale Air Force Base, California, and Fylingdales, United Kingdom
- Ground-based Interceptor (GBI) missiles at Fort Greely, Alaska, and Vandenberg Air Force Base, California
- GMD Fire Control (GFC) nodes reside at the Missile Defense Integration and Operations Center, Schriever Air Force

Activity

- The MDA conducted FTX-03 in July 2008 primarily to test and evaluate multiple sensor correlation and fusing of target track data. BMDS operational sensors (AN/TPY-2 (FBM), Aegis AN/SPY-1, SBX, and UEWR-Beale) acquired and tracked the long-range, threat-representative target missile and transmitted data to the operational GFC, which generated a weapon task plan. Warfighters from the Army's 100th Missile Defense Brigade and 49th Missile Defense Battalion



Base, Colorado; and Fort Greely, Alaska. The GFC includes In-Flight Interceptor Communications System (IFICS) Data Terminals (IDTs) at Vandenberg Air Force Base, California; Fort Greely, Alaska; and Shemya Island, Alaska.

- External interfaces include Aegis BMD; Cheyenne Mountain Directorate, Colorado; Command, Control, Battle Management, and Communications (C2BMC), Peterson Air Force Base, Colorado; Space-Based Infrared System (SBIRS), Buckley Air Force Base, Colorado; and AN/TPY-2 (FBM) radar, Shariki Air Base, Japan.

Mission

U.S. Strategic Command operators will use the GMD system to defend U.S. territory, deployed forces, friends, and allies against threat ballistic missiles (intercontinental- and intermediate-range missiles).

Prime Contractors

- Boeing
- Orbital
- Raytheon

crews participated in the test. As planned, the interceptor was simulated.

- The MDA and the BMDS OTA Team conducted two major ground tests during FY08:
 - Ground Test Distributed-2 (GTD-02) in November 2007 was an integrated ground test using the currently fielded hardware and communications to test functionality, interoperability, and performance of the currently

fielded GMD using multiple simulated threat scenarios. Warfighters from the Army's 100th Missile Defense Brigade and 49th Missile Defense Battalion performed their wartime duties in this realistic exercise of the fielded BMDS capability.

- Ground Test Integrated-03 (GTI-03) in June 2008 was an integrated ground test using the various BMDS element laboratories to test functionality, interoperability, and performance of the currently fielded GMD capability using multiple simulated threat scenarios. Some of the test scenarios were conducted using warfighters deployed from the Army's 100th Missile Defense Brigade and 49th Missile Defense Battalion. GTI-03 was the second element of the MDA's three element annual ground test campaign that will conclude in early CY09 with GTD-03.
- The MDA conducted Performance Assessment 07 (PA07) in September/October 2007. PA07 was a fully digital simulation test which simulated performance of the currently fielded BMDS including GMD. Multiple simulated threat scenarios stimulated digital simulations of the BMDS and its elements. A digital representation of GMD received inputs from the digital threat models, environmental models, and other BMDS models. The digital GMD representation used these inputs to simulate GMD response and performance.
- In response to emerging contingencies, a series of ground tests were conducted to assess the capability of the currently configured GMD system against potential threats to the United States and Pacific Rim allies. The BMDS OTA Team participated in these efforts, gaining valuable insights into the capabilities and limitations of the currently deployed system.
- threat-representative target by four operational sensors; data transmission from the sensors to the GFC; GFC data correlation and engagement planning; human in control; and limited execution of warfighter tactics, techniques, and procedures.
- Ground tests GTD-02 and GTI-03, and digital simulation test PA07, were adequate for characterization of GMD behavior and provided insight into potential GMD functionality, interoperability, and performance. However, conformance of test article performance in test to GMD operational performance was not supported by independent accreditation of the models and simulations employed in test. Verified and validated data for GTD-02 and PA07 was either not available, or did not meet, BMDS OTA Team acceptability criteria. Data for GTI-03 was delivered to the BMDS OTA Team post-test in September and was under review at the close of FY08. Verified and validated model and simulation data of threat performances and signatures, environments, radar atmospheric propagation, radar antenna and front-end processing performances, and interceptor performance are used to accredit ground tests and digital simulation tests for use in performance assessments. The MDA and the BMDS OTA Team are working to establish mutually agreed upon data acceptability criteria for model and simulation verification and validation in support of the BMDS OTA Team's accreditation program.
- The MDA implemented a program to systematically collect reliability and availability data for the fielded GMD assets. This is a significant step forward; however, the collection of the interceptor reliability, availability, and maintainability data to date has not been adequate to make an assessment of GMD suitability. Due to a failed developmental test telemetry component within the GMD interceptor, the MDA restructured the flight test program. Flight tests are critical to determining interceptor reliability.

Assessment

- The MDA conducted limited combined developmental/operational flight testing of the GMD with continued emphasis to incorporate operational realism.
- Flight test operational realism was adequate in FTX-03 and met, or partially met, seven of the nine DOT&E-approved operational realism criteria. As planned, no interceptor was employed in this test. A target subsystem malfunction, currently under investigation, precluded completing the evaluation of all the planned test objectives. FTX-03 demonstrated real-time acquisition and track of a

Recommendations

- Status of Previous Recommendations. The MDA has addressed five of the previous nine recommendations. Although the MDA has made progress, four previous recommendations remain valid.
- FY08 Recommendations. None.