

Ground-Based Midcourse Defense (GMD)

Executive Summary

- Capability Enhancement II (CE-II) kill vehicle problems limited advancement of the Ground-based Midcourse Defense (GMD) flight test program. No flight tests were conducted during FY12.
- The Missile Defense Agency (MDA) did make progress on GMD return-to-intercept by conducting a ground test campaign consisting of 11 electrical and mechanical tests designed to further characterize CE-II kill vehicle component capability and performance. The MDA has scheduled a two-flight test series in FY13 designed to confirm fixes to the CE-II kill vehicle.

System

GMD is a Ballistic Missile Defense System (BMDS) element that counters intermediate-range and intercontinental ballistic missile threats to the U.S. Homeland. The GMD BMDS includes:

- Cobra Dane Upgrade Radar at Eareckson Air Station (Shemya Island), Alaska
- Upgraded Early Warning Radars (UEWR) at Beale AFB, California; Royal Air Force (RAF) Fylingdales, United Kingdom; and Thule Air Base, Greenland
- Ground-based Interceptor (GBI) missiles at Fort Greely, Alaska, and Vandenberg AFB, California
- GMD ground system including GMD Fire Control (GFC) nodes at Schriever AFB, Colorado, and Fort Greely, Alaska; Command Launch Equipment (CLE) at Vandenberg AFB, California, and Fort Greely, Alaska; and In-Flight Interceptor Communication System Data Terminals (IDTs) at Vandenberg AFB, California, Fort Greely, Alaska, and Shemya Island, Alaska
- GMD secure data and voice communication system including long-haul communications using the Defense Satellite Communication System (DSCS), commercial satellite communications, and fiber optic cable (both terrestrial and submarine)
- External interfaces that connect to Aegis Ballistic Missile Defense (BMD); North American Aerospace Defense – U.S. Northern Command (NORAD-NORTHCOM) Command Center (N2C2) and Command, Control, Battle Management, and Communications (C2BMC) at Peterson AFB, Colorado; Space Based Infrared System/Defense Support Program (SBIRS/DSP) at Buckley AFB, Colorado; and AN/TPY-2 (Forward-Based Mode [FBM]) radar at Shariki Air Base, Japan



- Sea-Based X-Band (SBX) radar, which is a sea-based mobile sensor platform primarily for use as a test asset, but can be operationally deployed as needed

Mission

Military operators for the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command (the Army service component to U.S. Strategic Command) will use the GMD system to defend the U.S. Homeland against intermediate-range and intercontinental ballistic missile attacks using its weapon, the GBI, to defeat threat missiles during the midcourse segment of flight.

Major Contractors

- The Boeing Company, Integrated Defense Systems, Missile Defense Systems – Huntsville, Alabama
- Orbital Sciences Corporation – Chandler, Arizona
- Raytheon Missile Systems – Tucson, Arizona
- Northrop Grumman Information Systems – Huntsville, Alabama

Activity

- The MDA conducted a GMD return-to-intercept ground test campaign (G-52-L) during 2QFY12. It consisted of 11 individual electrical and mechanical tests designed to further characterize CE-II kill vehicle component capability and performance.
- The MDA used hardware and software representations of the GFC IDTs and GBIs in the Ground Test Focused-04e (GTX-04e) in May 2012. The MDA conducted the GMD portion of the test to demonstrate functionality, interoperability, and performance of the GFC software version 6B2.1.

Assessment

- The MDA made progress on GMD return-to-intercept. It redesigned and tested Exo-atmospheric Kill Vehicle (EKV) components and established more stringent component and manufacturing process requirements. Analysis and ground test results indicate the previous mission failure root causes have been identified and fixed, but a demonstration flight test is required to validate that conclusion.
 - The MDA has scheduled a two-flight test series designed to validate these fixes. The GMD Control Test Vehicle-01 (GM CTV-01) has been scheduled for 2QFY13 as an interceptor-only diagnostic flight test to further characterize kill vehicle behavior in a representative flight environment. The Flight Test GMD-06b (FTG-06b) has been scheduled for 3QFY13 as a repeat of the FTG-06a flight test.
 - These current test windows represent the latest in a series of incremental slips over FY12. At the beginning of FY12,

GM CTV-01 was scheduled to be flown in the middle of 3QFY12 and FTG-06b was scheduled for the middle of 4QFY12. Major causes of the slips were additional analysis time needed by the Failure Review Board, developmental issues with new inertial measurement unit firmware and isolation cradle hardware, and component manufacturing and quality concerns.

- GTX-04e demonstrated the capability to provide dynamic positioning updates to the GMD IDT onboard the SBX radar platform; the MDA had previously demonstrated this capability for the IDT at Fort Greely, Alaska, and Vandenberg AFB, California. Further, the MDA confirmed the transmission and data flow of a new message set from the AN/TPY-2 (FBM) radar to the new GFC software via the C2BMC.

Recommendations

- Status of Previous Recommendations. The MDA has started but not completed the FY11 recommendation to repeat the FTG-06a mission to verify root causes, Failure Review Board results, and permanent fixes for the deficiencies found during the flight test. They have identified root cause issues, implemented solutions, and scheduled a two-flight test series in FY13 designed to demonstrate GMD return-to-intercept. The FY07 recommendation to re-examine the GMD-specific lethality simulation needs has been transferred to the BMDS system-level assessment since it applies to all elements.
- FY12 Recommendations. None.