

Ground-Based Midcourse Defense (GMD)

Executive Summary

- Ground-based Midcourse Defense (GMD) has demonstrated a limited capability to defend the U.S. Homeland from small numbers of intermediate-range or intercontinental ballistic missile threats launched from North Korea or Iran.
- In a developmental test environment, the Missile Defense Agency (MDA) conducted the first successful intercept by the Capability Enhancement II (CE-II) exoatmospheric kill vehicle (EKV) since the failure of the CE-II vehicle during intercept flight tests in FY10 and FY11.
- The MDA Director commissioned an Independent Expert Panel, which completed a comprehensive assessment of the Ground-Based Interceptor (GBI) program to identify deficiencies that could preclude predictable, reliable GBI operations.

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 consists of and operates:

- GBIs 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 at Vandenberg AFB, California, and Fort Greely, Alaska; and In-Flight Interceptor Communication System Data Terminals at Vandenberg AFB, California; Fort Greely, Alaska; and Eareckson Air Station, Alaska
- GMD secure data and voice communication system including long-haul communications using the Defense Satellite Communication System, commercial satellite communications, and fiber-optic cable (both terrestrial and submarine)
- COBRA DANE Upgraded Radar at Eareckson Air Station (Shemya Island), Alaska
- Upgraded Early Warning Radars at Beale AFB, California; Royal Air Force Fylingdales, United Kingdom; and Thule Air Base, Greenland
- External interfaces that connect to Aegis BMD; North American Aerospace Defense/U.S. Northern Command Command Center; and the Command and Control, Battle Management, and Communications system at Peterson AFB, Colorado; Space-Based Infrared System/Defense Support Program (SBIRS/DSP) at Buckley AFB, Colorado; AN/TPY-2



(Forward-Based Mode) radar at Shariki Air Base, Japan; and the Sea-Based X-band (SBX) radar, a sea-based mobile sensor platform

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 the GBI to defeat threat missiles during the midcourse segment of flight.

Major Contractors

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

Activity

- The MDA conducted testing in accordance with the DOT&E-approved Integrated Master Test Plan.
- The MDA conducted Ground Test Integrated-04e (GTI-04e) Part 2 in April through May 2014. The MDA used hardware and software representations of the GMD; the SBIRS/DSP; the Command and Control, Battle Management, and Communications; the AN/TPY-2 (Forward-Based Mode) radar; the Aegis BMD radar in its long-range surveillance and track capability; the Upgraded Early Warning Radars; and the SBX radar to investigate GMD capabilities against intercontinental ballistic missile threats.
- The MDA executed an intercept flight test of a GBI equipped with a CE-II EKV against an intermediate-range ballistic missile target in June 2014. During this developmental test, Flight Test GBI-06b (FTG-06b), the MDA demonstrated fixes made to the CE-II EKV subsequent to the FTG-06a Failure Review Board findings. They also demonstrated GBI performance under more challenging threat engagement conditions than previous intercept flight tests.
 - The MDA launched an intermediate-range ballistic missile target from the U.S. Army's Reagan Test Site on Kwajalein Atoll, Republic of the Marshall Islands.
 - The Aegis BMD radar performed long-range surveillance and track. The SBX radar performed long-range detection, tracking, and target discrimination. The SBIRS/DSP also participated in this test.
 - The GFC planned the intercept and a GFC military operator directed launch of the test GBI from Vandenberg AFB, California.
- The MDA Director commissioned an Independent Expert Panel in August 2013 to characterize the deployed GBI

fleet. Their goal was to identify design, manufacturing, and quality deficiencies that would negatively affect predictable and reliable GBI operations. The panel completed their assessment in March 2014.

Assessment

- GTI-04e Part 2 demonstrated upgraded GMD software builds with other BMDS elements and the SBIRS/DSP. The MDA identified limitations and is continuing to investigate.
- During FTG-06b, the MDA demonstrated a long interceptor time-of-flight, medium-closing velocity engagement of an intermediate-range ballistic missile by the CE-II GBI. The system performed all EKV functions to discriminate and intercept a lethal object from a representative intercontinental ballistic missile target scene with countermeasures. All key performance parameters were within prescribed constraints and pre-mission predictions. The intercept was confirmed by multiple data sources.

Recommendations

- Status of Previous Recommendations. The MDA has addressed previous recommendations with the exception of the FY13 recommendation to retest the CE-I EKV in order to accomplish the test objectives from the failed FTG-07 mission. The first opportunity to address this recommendation will be 4QFY17.
- FY14 Recommendation.
 1. The MDA should extend the principles and recommendations contained in the Independent Expert Panel assessment report on the GBI fleet to all components of the BMDS instantiation for Homeland Defense.