Terminal High-Altitude Area Defense (THAAD)

Executive Summary

- The Terminal High-Altitude Area Defense (THAAD) system intercepted two targets in FY08 flight tests. THAAD intercepted separating targets for the first time.
- THAAD testing was again adversely impacted by the failure of the flight test target. The failure of a foreign military acquisition target during Flight Test THAAD-10 (FTT-10) precluded the first salvo interceptor launch as well as the first flight test of a "cold-conditioned" interceptor.
- THAAD continued execution of the Government Ground Test Program, which is a critical component of the Army Materiel Readiness Release Process.
- THAAD continued integration testing as part of the Ballistic Missile Defense System (BMDS) in FY08. It successfully received a cue from Aegis Ballistic Missile Defense (BMD) during ground tests.
- THAAD executed the seventh of nine high-speed sled tests to characterize lethality against different threat payloads in FY08.
- Affordability re-structuring in FY08 slipped the upcoming four flight tests by more than six months. There are test location issues for two of these flight tests, planned for FY10, which will likely further impact the schedule. Target performance and configuration issues must be resolved to successfully execute the remaining flight tests.
- The MDA intends to transition the first two fire units to the Army in FY10 and FY11.

System

- The THAAD ballistic missile defense system consists of five major components:
  - Missiles
  - Launchers
  - Radars (designated AN/TPY-2 (TM) for Terminal Mode)
  - THAAD Fire Control and Communications (TFCC)
  - Unique THAAD support equipment

- THAAD can accept target cues from the Aegis BMD, satellites, and other external theater sensors and command and control systems.
- THAAD will complement the lower-tier Patriot system and the upper-tier Aegis BMD system.

Mission

U.S. Strategic Command intends to deploy and employ THAAD, a rapid response weapon system, to protect critical assets worldwide. THAAD is designed to destroy the full-range of theater ballistic missile threats to troops, military assets, and allied territories using hit-to-kill technology. Commanders can use the THAAD Kill Vehicle to intercept an incoming threat ballistic missile in the high endoatmosphere or exoatmosphere, minimizing the effects of weapons of mass destruction on battlefield troops and civilian populations.

Prime Contractors

- Lockheed Martin
- Raytheon

Activity

- Flight Test THAAD-08 (FTT-08) took place in October 2007. THAAD successfully intercepted a threat-representative short-range unitary target in the exoatmosphere. The interceptor was "heat conditioned" before the test to simulate operations in a hot environment.
- FTT-09 occurred in June 2008. THAAD successfully intercepted a simple, spin-stabilized, non-reorienting separating target in the low endoatmosphere. This was the first THAAD intercept of a separating target.
- The THAAD government ground test qualification program continued, with the missile component completing a successful 40-foot drop test in April 2008, and the fire control unit and radar beginning mobility testing. Combined contractor/government electromagnetic environmental effects ground qualification testing also continued for the missile and launcher.
- The THAAD LFT&E program continued, with a high-speed sled test using a lethality surrogate of a new threat payload in December 2007, and a series of light gas gun development shots in preparation for FY09 light gas gun data shots. The THAAD program is using the test data to assess the lethality

of THAAD against a variety of targets and to support the development, verification, and validation of simulation tools. Two other sled tests against another new threat payload are scheduled for FY09.
- Ground Test Other-03a (GTX-03a) in February 2008 and Ground Test Integrated-03 (GTI-03) in June 2008 used hardware-in-the-loop systems and simulations to test the interoperability between THAAD, Aegis BMD, Patriot, GMD, C2BMC, and other sensors.
- THAAD participated in two Aegis BMD flight tests: Japanese Flight Test Standard Missile-1 (JFTM-1) in December 2007 and FTM-14 in June 2008. THAAD and Aegis BMD exercised two-way communication and track exchange and correlation. THAAD successfully acquired a target via a cue from Aegis during FTM-14. Lessons learned from these events support modifications to THAAD interoperability and radar software.

Assessment
- In FY08, THAAD made significant progress, with two successful intercept tests of threat-representative targets under various intercept geometries and intercept altitudes. These included the use of a separating target for the first time. Flight tests against threat-representative short- and longer-range targets are scheduled for FY09 and FY10.
- So far, THAAD has successfully completed eight flight tests, five of which were intercept tests. Only FTT-04 and FTT-10 did not meet planned test objectives, both because the intended targets failed in flight.
- The program expanded operational realism during THAAD flight tests, particularly in the planning for FTT-10, by continuing to use warfighters to operate the THAAD radar, launcher, and fire control; denying the Soldiers detailed knowledge of launch times; and upgrading some hardware and software to final configurations.
- Hardware integration issues on the radar Prime Power Unit may cause some schedule delays in the THAAD government ground test qualification program.
- THAAD continued integration into BMDS-level testing. Preparations for FTT-10 also demonstrated communication links between THAAD, Aegis BMD, C2BMC, the Pacific Command Joint Operations Center, the Pacific Air Operations Center, and the 94th Air and Missile Defense Command.
- THAAD expanded its live fire sled test program in FY08 to address two new threat warheads. Even after sled tests complete in FY09, additional testing of these payloads and additional simulation analyses may be required to assess THAAD lethality against these targets and to develop and validate lethality models.
- Although the content of the flight test program has stabilized, some issues remain. Target performance remains a significant challenge to program execution. In FY08, an affordability restructure further delayed the remaining four planned flight tests by more than six months. Target configuration and development for the last two of these tests, planned for FY10, are still in process. Because of the longer range of these targets, it is also likely that the THAAD test program will have to move to the Reagan Test Site in the Marshall Islands to mitigate debris concerns.

Recommendations
- Status of Previous Recommendations. Although the MDA has made progress on the one previous recommendation, further emphasis is required.
- FY08 Recommendations. None.