

## Terminal High-Altitude Area Defense (THAAD)

### Executive Summary

- The Terminal High-Altitude Area Defense (THAAD) system intercepted two short-range targets nearly simultaneously on October 4, 2011.
- The program completed this multiple simultaneous intercept as part of an IOT&E, which included a full battle sequence, from planning through live operations, under operationally realistic conditions. The assessment of this event will support upcoming production and fielding decisions.
- THAAD continued to make progress completing the first phase of the government ground test program, which is a critical component of the Army materiel readiness release process.
- The materiel release decision for transitioning the first two THAAD fire units from the MDA to the Army has been further delayed until FY12. This delay will allow the program to complete more testing before transition, but the program will still test significant additional capabilities after the materiel release decision.
- The MDA targets program returned Coleman air-launched targets to flight in July 2011, which will allow the THAAD program to test against an important set of threat characteristics in FY13.

### 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 Ballistic Missile Defense (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.

### Activity

- Flight Test THAAD Interceptor-12 (FTT-12) occurred on October 4, 2011. The test was a successful multiple simultaneous engagement with nearly simultaneous intercepts of two short-range targets. This test was also an IOT&E supporting the upcoming THAAD materiel release and Beyond Low-Rate Initial Production decisions. The THAAD battery performed battle planning, overseas deployment, emplacement, and operations under operationally realistic conditions (within the constraints of test range safety). As



### 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 short-range and medium-range theater ballistic missile threats to troops, military assets, and allied territories using hit-to-kill technology. Commanders will use the THAAD Kill Vehicle to intercept an incoming threat ballistic missile in the endo-atmosphere or exo-atmosphere, limiting the effects of weapons of mass destruction on battlefield troops and civilian populations.

### Major Contractors

- Lockheed Martin Missile and Fire Control – Dallas, Texas
- Lockheed Martin Space Systems Company – Sunnyvale, California
- Raytheon Integrated Defense Systems – Tewksbury, Massachusetts

- part of the IOT&E, the battery demonstrated system capability against a raid, defeating threats generated by the Simulation Over Live Driver (SOLD).
- The THAAD government ground test qualification program completed hot and cold spectrum missile safety testing and rail impact testing for the launcher. Regression rail impact and dust testing for the battery support center were also performed, after several components were redesigned because of previous test failures. Most THAAD ground qualification testing

is now complete, but planning continues as redesigns and capability and obsolescence upgrades take place.

- THAAD participated in one Aegis BMD flight test event in September 2011, FTM-16 Event 2, with the full battery deployed for FTT-12. The THAAD radar observed the target, and TFCC exchanged data with Command, Control, Battle Management, and Communications (C2BMC) and Aegis BMD. The program also performed mission scenarios using SOLD during the pre-test communication checks.
- Throughout 2011, THAAD completed supplementary testing and analyses to support the THAAD lethality assessment.
- Laboratory hardware-in-the-loop and digital representations of THAAD, with operators-in-the-loop, participated in the Assured Response-04X and -04D exercised in October 2010 and February to March 2011, respectively. These exercises are used to develop and refine Concepts of Operations and tactics, techniques, and procedures.
- Ground Test Integrated-04d in July 2011 included laboratory hardware-in-the-loop representations of THAAD. Interoperability and engagement capabilities against short- and medium-range ballistic missiles were tested using BMDS configurations that are deployed or nearing deployment.
- THAAD also participated in Technical Assessment-04 in July 2011. This event used a digital modeling and simulation environment to assess various theater defense capabilities using near-term BMDS configurations.
- The MDA conducted a Reliability Confidence Test in 4QFY11 at McGregor Range, New Mexico, to demonstrate reliability growth in support of an Army conditional materiel release.

## Assessment

- THAAD made progress in FY11, demonstrating in FTT-12 the ability to perform a multiple simultaneous engagement. The Operational Test Agency also collected essential technical data on intercepts far off the radar boresight and on performance against unique threat characteristics.
- THAAD also demonstrated a full battle sequence, from planning through live operations, under operationally realistic conditions (within the constraints of test range safety) in FTT-12. The assessment of this event will support upcoming production and fielding decisions.

- THAAD's planned lethality test program, which was completed in FY10, provided lethality information against several types of threat payloads. The additional analyses and tests that THAAD conducted to address some remaining lethality data voids supported the characterization of THAAD lethality, but extant lethality knowledge gaps remain to be resolved.
- The Army's Materiel Release Review Board for THAAD has again been delayed, from FY11 to FY12. Army safety review boards recently identified testing that should be complete before the system can be certified, and the testing is not scheduled to complete until 1QFY12. This delay will allow more testing to be completed before the system transitions to the Army. Some THAAD testing, however, will still take place after the Materiel Release Review Board, including flight testing against longer-range targets. The absence of such testing will limit the assessment of proven capabilities delivered to the Army.
- The Reliability Confidence Test in 4QFY11 at McGregor Range, New Mexico, included 233 hours of continuous operation demonstrating reliability growth over that demonstrated in the Limited User Test conducted in FY10.
- The MDA targets program returned Coleman air-launched targets to flight in July 2011, which will allow the THAAD program to test against an important set of threat characteristics in FY13. Target development and testing for the longer-range THAAD flight tests, which start in FY12, is still ongoing.

## Recommendations

- Status of Previous Recommendations. Although the MDA has made progress on the FY09 recommendation to consider additional light-gas gun or sled testing to address lethality data voids and gaps in knowledge, the recommendation will remain open until the lethality assessment is complete.
- FY11 Recommendation.
  1. The MDA should demonstrate THAAD capability to intercept and destroy a medium-range ballistic missile target during one of the next two planned flight tests.