

Terminal High-Altitude Area Defense (THAAD)

Executive Summary

- The Missile Defense Agency (MDA) conducted one Terminal High-Altitude Area Defense (THAAD) flight test in August 2019, intercepting one ballistic missile target using a remote launcher configuration.
- THAAD participated in six Ballistic Missile Defense System (BMDS) ground tests, providing information on THAAD interoperability and functionality within the BMDS for various regional/theater scenarios.
- Testing in FY19 demonstrated that THAAD training and documentation deficiencies, previously reported in DOT&E Annual Reports, persist.

System

- THAAD complements the lower-tier Patriot system and the upper-tier Aegis Ballistic Missile Defense (BMD) system. It is designed to engage threat ballistic missiles in both the endo- and exo-atmosphere.
- THAAD consists of five major components:
 - Missiles
 - Launchers
 - AN/TPY-2 Radar (Terminal Mode)
 - THAAD Fire Control and Communications
 - THAAD Peculiar Support Equipment
- THAAD can provide and accept target cues for acquisition from Aegis BMD, from other regional sensors, and through command and control systems.

Mission

The U.S. Northern Command, U.S. Indo-Pacific Command (USINDOPACOM), U.S. European Command (USEUCOM), and U.S. Central Command (USCENTCOM) intend to use THAAD to intercept short- to intermediate-range ballistic



missile threats in their areas of responsibility. The U.S. Strategic Command deploys THAAD to protect critical assets worldwide from these same threats.

Major Contractors

- Prime: Lockheed Martin Corporation, Missiles and Fire Control – Dallas, Texas
- Interceptors: Lockheed Martin Corporation, Missiles and Fire Control – Troy, Alabama
- AN/TPY-2 Radar (Terminal Mode): Raytheon Company, Integrated Defense Systems – Tewksbury, Massachusetts

Activity

- The MDA conducted all testing in accordance with the DOT&E-approved Integrated Master Test Plan.
- The THAAD Project Office continued an accelerated program of capability development and delivery to support the USINDOPACOM Joint Emergent Operational Need (JEON).
- Six BMDS ground tests using THAAD hardware-in-the-loop and software-in-the-loop (digital representations) provided information on THAAD interoperability and functionality in various regional/theater scenarios:
 - In January, March, and May 2019, the MDA examined USINDOPACOM defense using THAAD 3.0 software.
 - In June 2019, the MDA examined USINDOPACOM defense using THAAD 3.2 Engineering Release 1 (ER1) software, and in August 2019, the MDA conducted a partial repeat of this test using a sample of test cases and THAAD 3.2 ER2 software. The THAAD 3.2 ER2 software completed formal testing after the ground test and is now the THAAD 3.2 formally released software build.
- In September 2019, the MDA collected data to support a USCENTCOM request for analyses to evaluate the AN/TPY-2 forward-based radar and THAAD battery locations.
- The MDA conducted one integrated developmental/operational flight test, Flight Test THAAD Weapon System-23 (FTT-23) in August 2019, at the Reagan Test Site, Kwajalein Atoll, to test THAAD remote launch capability. The THAAD battery consisted of THAAD Configuration 2 hardware, THAAD 3.2 ER1 software, one remote launcher equipped with three interceptors, one remote launcher with no

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interceptor inventory, THAAD Remote Launch Kit, THAAD Fire Control and Communications, and the AN/TPY-2 radar (Terminal Mode) with x86 architecture.

- The THAAD program continued to address deficiencies from the first conditional materiel release in FY12 and the conditional software materiel release for THAAD 2.2.0 that affect fielded hardware and software. The Army issued an urgent materiel release of the THAAD 3.0 system software build to USINDOPACOM.

Assessment

- During ground tests, the MDA demonstrated aspects of THAAD functionality in different theater scenarios to support BMDS Increment 5 and the USINDOPACOM JEON. The BMDS Operational Test Agency reported findings that affect THAAD interoperability, track management, and radar functions. Details are classified; see the DOT&E “FY19 Assessment of the BMDS” report to be published in February 2020.
- In FTT-23, the MDA demonstrated THAAD’s ability to intercept a medium-range ballistic missile target using a

remote launcher separated from the THAAD radar and fire control unit. The MDA conducted FTT-23 with a non-operational software build, THAAD 3.2 ER1, to adhere to a schedule-driven timeline for capability delivery. During ground testing prior to FTT-23, the MDA discovered problems in THAAD 3.2 ER1 and developed a new THAAD 3.2 ER2 software build to incorporate fixes. Instead of delaying FTT-23 to use THAAD 3.2 ER2, the MDA conducted the flight test using THAAD 3.2 ER1, and verified THAAD 3.2 ER2 fixes in follow-on ground testing.

- Testing in 2019 demonstrated that THAAD training and documentation deficiencies persist. DOT&E has been reporting these problems since FY12 and detailed them in the FY17 DOT&E Annual Report.

Recommendation

1. The MDA and the Army should improve the quality of THAAD training and documentation and their delivery to THAAD soldiers.