Army Integrated Air and Missile Defense (AIAMD)

The Army Test and Evaluation Command (ATEC) completed IOT&E of the Army Integrated Air and Missile Defense (AIAMD) program in October 2022. DOT&E published an evaluation of the system's operational effectiveness, suitability, and survivability in a classified report to inform AIAMD's full-rate production (FRP) decision in April 2023. DOT&E also approved an updated T&E strategy in February 2023 that includes FOT&E scheduled to begin in 4QFY24.

SYSTEM DESCRIPTION

The AIAMD program provides an Integrated Air and Missile Defense (IAMD) Battle Command System (IBCS) to integrate Engagement Operations Centers (EOCs), Sentinel air-surveillance radars, Patriot radars, and Patriot launchers across an Integrated Fire Control Network (IFCN). EOCs provide the operating environment for soldiers to monitor and direct sensor employment and the engagement of air threats. Hardware interface kits connect adapted Patriot and Sentinel components to the IFCN, either through an EOC or through an IFCN Relay. IFCN Relays also provide distributed operations and mobile communications nodes to extend IFCN connectivity. Future hardware and software updates will integrate additional sensors and weapons, such as the Lower-Tier Air and Missile Defense Sensor and the Indirect Fire Protection Capability, with IBCS.

MISSION

Air Defense Artillery forces will use IBCS to provide the timely detection, identification, monitoring, and (if required) engagement of air threats in support of active defense of the homeland, critical assets and locations, and deployed forces.

PROGRAM

AIAMD is an Acquisition Category ID program, developing hardware using the major capability acquisition pathway and conducting agile software development using the software acquisition pathway. In April 2023, the program received approval to enter FRP and approval for conditional materiel release for a CONUS test battalion. The Army intends to integrate new and existing sensors and weapons through a series of future increments.

DOT&E approved the program's T&E Strategy, located in the AIAMD Simplified Acquisition Management Plan, in February 2023. The T&E Strategy covers testing of future IBCS capability updates, including FOT&E scheduled to begin in 4QFY24. In addition to evaluation of capability updates, the FOT&E will evaluate the correction of deficiencies discovered before and during IOT&E. The Army plans to submit T&E annexes annually for DOT&E approval.

» MAJOR CONTRACTORS

- Northrop Grumman Corporation – Huntsville, Alabama
- Raytheon, a subsidiary of RTX (formerly Raytheon Technologies) – Huntsville, Alabama and Andover, Massachusetts
- Lockheed Martin Corporation – Dallas, Texas

TEST ADEQUACY

ATEC conducted a multi-phased IOT&E that started in August 2021 and finished in October 2022. Testing was conducted in accordance with the DOT&E-approved Test and Evaluation Master Plan and associated test plans, and was observed by DOT&E. The IOT&E was adequate to support an evaluation of operational effectiveness, suitability, and survivability to inform the AIAMD FRP Decision.

ATEC conducted the IOT&E at White Sands Missile Range, New Mexico, which included software/hardware-in-the-loop operations with accredited modeling and simulation (M&S) tools; sustained live air operations; and three missile flight tests. ATEC also conducted a cyber adversarial assessment in both software/hardware-in-the-loop M&S and live air environments.

As additional systems are integrated with IBCS, the M&S tools for those sensors and weapons must also be integrated with the AIAMD M&S tools to support credible assessments of operational effectiveness in realistic threat environments.

PERFORMANCE

» EFFECTIVENESS

DOT&E's assessment of system operational effectiveness focused on whether the system provided the capabilities and information necessary for soldiers

to successfully conduct the air defense mission, including detection, identification, monitoring, and (if required) engagement of air threats. Details can be found in DOT&E's classified March 2023 IOT&E report.

» SUITABILITY

DOT&E's assessment of system operational suitability used hardware and software failure rate and repair time data collected during IOT&E to determine system availability and mission reliability. The assessment also covers soldiers' ability to operate the system, from both human-system interaction and training adequacy perspectives. Details can be found in DOT&E's classified IOT&E report.

» SURVIVABILITY

DOT&E's assessment of system survivability used cyber data collected during an August 2021 cooperative vulnerability and penetration assessment and an October 2021 adversarial assessment. Details can be found in DOT&E's classified IOT&E report.

RECOMMENDATIONS

The Army should:

1. Complete and demonstrate the deficiency corrections recommended in DOT&E's classified report.
2. As reported last year, continue developing an integrated suite of M&S tools to support follow-on testing of IBCS with existing and future launchers, sensors, and other systems to provide operationally representative assessments of the combat effectiveness of these increasingly complex IAMD systems.