

Joint Chemical Agent Detector (JCAD)

Executive Summary

- The Joint Chemical Agent Detector (JCAD) M4A1, referred to as the M4E1 during testing, is operationally effective and suitable.
- Overall, the M4A1 detects lower levels of chemical warfare vapors than the previous production model, the M4. JCAD provides warning of the presence of chemical warfare vapors in sufficient time to take protective measures.
- The detector is reliable, easy to maintain, and has a high availability rate.

System

- JCAD is a hand-held device that automatically detects, identifies, and alerts operators to the presence of nerve and blister vapors, as well as one blood chemical agent vapor and one toxic industrial chemical vapor.
- JCAD is a non-developmental item modified from a commercially available device. It operates as a stand-alone detector. It is carried by personnel and placed onto various platforms, including ground vehicles, fixed-site installations, and collective protection shelters. It supplements or replaces the Automatic Chemical Agent Detector Alarm and the Improved Chemical Agent Monitor.
- The JCAD will be issued to:
 - Army squads
 - Marine platoons
 - Air Force base reconnaissance and ground-service personnel
 - Navy shore installations and riverine or land-based units

Mission

- Operators use JCAD to determine the presence of chemical warfare agent and toxic industrial chemical vapors by:
 - Checking personnel for contamination
 - Monitoring in and around a stationary vehicle or shelter's interior and exterior, or aircraft while on the ground

Activity

- The program office awarded a new competition-based contract for procurement of the JCAD. Smiths Detection, the original contractor, won the contract with a modified version of the JCAD referred to as the JCAD M4E1.
- DOT&E approved an updated Test and Evaluation Master Plan on July 22, 2010, to address developmental and operational testing of the JCAD.
- The Army Test and Evaluation Command conducted developmental and operational testing of the new production model JCAD (M4E1) from June to October 2010 in



- Operators equipped with JCAD, and installation emergency management personnel operating remote JCAD arrays, alert personnel to take personal protection measures and unit force protection measures such as contamination avoidance or an increase in mission-level protective posture.

Major Contractor

Smiths Detection – Edgewood, Maryland, and Watford, United Kingdom

- accordance with the approved Test and Evaluation Master Plan.
- DOT&E provided an Operational Assessment of the JCAD M4E1 to support the decision to change the production line to produce the new model.
- On March 30, 2011, the Joint Program Executive Office for Chemical and Biological Defense approved a production cut-in decision for JCAD M4E1 and directed first article testing to verify changes to the system made after the operational test.

- On April 21, 2011, DOT&E approved the Overarching Test Plan for the First Article Test of the JCAD M4E1.
- The Army Test and Evaluation Command conducted JCAD M4E1 first article testing from April to June 2011 to demonstrate the effectiveness of software modifications to address shortcomings identified during earlier developmental and operational testing.
- Based upon the results of the First Article Test, the Army type classified the JCAD M4E1 as the JCAD M4A1 and accepted delivery of production systems.

Assessment

- Based on results from the operational test and First Article Test, the JCAD M4A1 is operationally effective and suitable.
- Overall, the M4A1 detects lower levels of chemical warfare vapors than the M4. The M4A1 and the M4 provide warning of the presence of chemical warfare vapors in sufficient time for individuals to take protection measures to preclude

exposure to levels that cause incapacitating health effects, and to levels that cause noticeable effects.

- The detector demonstrated a mean time between operational mission failure of 385 hours in monitor mode (versus a requirement of 750 hours) and 135 hours in survey mode (no stated requirement) during operational testing. First article testing of the JCAD with software modifications to address reliability shortcomings improved reliability in the monitor mode to 803 hours mean time between operational mission failure at the 80 percent lower confidence bound.
- The detector demonstrated an availability rate over 98 percent (versus a requirement of 92 percent).

Recommendations

- Status of Previous Recommendations. There were no FY10 recommendations.
- FY11 Recommendations. None.