

E-2D Advanced Hawkeye

Executive Summary

- In 3QFY16 DOT&E completed its assessment of the E-2D Advanced Hawkeye's first FOT&E period, OT-D1. The focus of OT-D1 was to evaluate the Initial Operational Capability hardware/software configuration, Delta System/Software Configuration (DSSC) Build 1. DOT&E concluded that OT-D1 showed the E-2D had no significant performance difference compared to IOT&E. OT-D1 was adequate to assess E-2D suitability and effectiveness for legacy E-2C missions. Unlike in IOT&E, OT-D1 also executed adequate E-2D carrier testing. An evaluation of E-2D's capability to perform the Theater Air and Mission Defense (TAMD) mission cannot be conducted until future FOT&E periods as that capability is still immature.
- DOT&E approved Change 1 to the E-2D Test and Evaluation Master Plan (TEMP) revision D. The change supports the second FOT&E period (OT-D2), DSSC Build 2, and addresses operational performance relevant to the E-2D system of systems, and E-2D cybersecurity testing.
- The Navy conducted E-2D developmental testing for DSSC-2 between 2QFY16 and 3QFY16. The developmental testing demonstrated DSSC-2 meets required technical performance parameters.

System

- The E-2D Advanced Hawkeye is a carrier-based airborne early warning and command and control aircraft.
- Significant changes to this variant of the E-2 include: upgraded engines, to provide increased electrical power and cooling relative to current E-2C aircraft; a strengthened fuselage, to support increased aircraft weight; replacement of the radar system, communications suite, and mission computer; and incorporation of an all-glass cockpit, which permits the co-pilot to act as a tactical fourth operator in support of the system operators in the rear of the aircraft.
- The radar upgrade replaces the E-2C mechanically scanned radar with a phased-array radar that has combined mechanical and electronic scan capabilities.
- The upgraded radar provides significant improvement in littoral and overland detection performance and TAMD capabilities.

Activity

- The Navy conducted developmental testing for DSSC-2 from 2QFY16 to 3QFY16.
- Change 1 to the E-2D TEMP revision D supports the second FOT&E period (OT-D2), which is scheduled for 4QFY16. Change 1 to revision D E-2D focuses on DSSC-2 upgrades



- The E-2D Advanced Hawkeye Program includes all simulators, interactive computer media, and documentation to conduct maintenance, as well as aircrew shore-based initial and follow-on training.
- DSSC-1 included E-2D upgrades and updates to multiple systems such as the radar system, mission computer display, and communication systems. DSSC-2 includes further E-2D upgrades such as improvement in satellite communications, radar, and tracking systems. Future DSSC Builds will focus on the E-2D's Naval Integrated Fire Control – Counter Air (NIFC-CA) capabilities.

Mission

The Combatant Commander, whether operating from the aircraft carrier or from land, will use the E-2D Advanced Hawkeye to accomplish the following missions:

- Theater air and missile sensing and early warning
- Battlefield management, command, and control
- Acquisition, tracking, and targeting of surface warfare contacts
- Surveillance of littoral area objectives and targets
- Tracking of strike warfare assets

Major Contractor

Northrop Grumman Aerospace Systems – Melbourne, Florida

- and also includes cybersecurity testing. DOT&E approved the Change 1 TEMP in August 2016.
- DOT&E provided cybersecurity guidance for the OT-D2 cybersecurity test plan and all subsequent test plans and TEMPs for future FOT&E periods.

FY16 NAVY PROGRAMS

- The Navy submitted the OT-D2 test plan and a separate cybersecurity test plan, which were both approved by DOT&E in 4QFY16. OT-D2 was completed in 1QFY17 and the operational test report is forthcoming.
- The Navy continues to correct deficiencies with E-2D Cooperative Engagement Capability performance with a plan to have deficiencies remedied in FY19 with fielding of DSSC Build 3.

Assessment

- Following developmental testing for DSSC-2, the Navy concluded that DSSC-2 met the naval requirements for NIFC-CA capabilities. The Navy's Program Executive Officer – Tactical Aircraft Programs subsequently removed NIFC-CA Increment 1 from DSSC-2 for operational testing. The Navy plans to include the NIFC-CA From the Air capability in Increment 2 and include this capability with release to the fleet with DSSC-3 in FY19. Developmental testing demonstrated that the Increment 1 capability lacked sufficient military utility against modern threats. To date, NIFC-CA testing scope has been extremely limited. This limited scope has resulted in a lack of statistical confidence to assess this potential future capability.
- DOT&E's OT-D1 report in 3QFY16 showed that E-2D has no significant performance difference compared to IOT&E and has similar shortfalls on most radar reliability, availability, and

weapon system metrics. OT-D1 was adequate to assess E-2D suitability and effectiveness for legacy E-2C missions. An evaluation on E-2D's capability to perform the TAMDM mission cannot be made until future FOT&E periods as that capability is immature.

- E-2D's second FOT&E, OT-D2, was completed in 1QFY17. OT-D2 included a separate cybersecurity test plan which was also completed in 1QFY17. An operational test report is forthcoming.
- A full assessment of E-2D operational capabilities will require systematic updates and future operational testing.

Recommendations

- Status of Previous Recommendations. The Navy continues efforts to improve radar and mission system performance, improve radar and overall weapon system reliability and availability as recommended in FY15. However, these recommendations have not been resolved and thus the Navy should continue to address them.
- FY16 Recommendations. The Navy should:
 1. Incorporate all DOT&E guidance in its cybersecurity testing for OT-D2 and all subsequent FOT&E periods.
 2. Provide complete training on all components of the E-2D system and mission.
 3. As future DSSC updates occur, conduct FOT&E.