E-2D Advanced Hawkeye

Executive Summary
- The Navy conducted E-2D operational testing for Delta System/Software Configuration (DSSC)-Build 3 and Aerial Refueling upgrades throughout 2019.
- The E-2D demonstrated operational Aerial Refueling as a receiver for the first time.
- Operational performance of Naval Integrated Fire Control (NIFC) capabilities in DSSC-3 improved over previous software versions as validated by successful end-to-end live fire testing.
- The Navy increased test efficiency by simultaneously operationally testing E-2D DSSC-3, F/A-18E/F/G, Infrared Search and Track Block 1 AV6+, Long Range Anti-Ship Missile (LRASM), and NIFC.
- DSSC-3 specific operational cybersecurity testing has not been completed.

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 is designed to improve littoral and overland detection performance and Theater Air and Missile Defense capabilities.

- 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-3 included the Automated Identification System, Mode 5 Interrogator, Embedded National Tactical Receiver, Automatic Dependent Surveillance-Broadcast, Accelerated Mid-Term Interoperability Improvement Program, Integrated Fire Control improvements, and the introduction of Aerial Refueling.

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 detection 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

Activity
- DOT&E approved the Test Evaluation Master Plan (TEMP) Revision E in January 2019 in support of the third FOT&E period (OT-D3). The test focused on Aerial Refueling and various upgrades and enhancements to the E-2D and system of systems.
- The Navy submitted the OT-D3 test plan, which DOT&E approved in 2QFY19. In 4QFY19, VX-1 completed operational flight test of DSSC-3 in accordance with the DOT&E-approved TEMP and test plan.
- During March, April, and August, the Navy operationally tested E-2D DSSC-3, F/A-18 E/F/G, Infrared Search and Track Block 1 AV6+, LRASM, and NIFC at the same time.
- The Navy intends to conduct cybersecurity testing in 1QFY20.

Assessment
- Aerial Refueling brings the E-2D a dramatic increase in operational range, endurance, and safety at sea. The Aerial Refueling flight clearance met testing requirements; however, expanding the operational Aerial Refueling flight clearance envelope would give operational commanders more flexibility at sea.
- Following testing, the Navy concluded DSSC-3 met the naval requirements for NIFC capabilities. DOT&E notes that preliminary operational test results demonstrated a significant increase in NIFC capabilities. DOT&E will provide its assessment in 2QFY20.

- Preliminary OT-D3 data and observation support the previous DOT&E assessment that radar reliability and aircraft availability demonstrated similar shortfalls to the IOT&E accomplished in 2006.

Recommendations

The Navy should:
1. Conduct cybersecurity testing in accordance with DOT&E guidance.

2. Increase radar and aircraft reliability in order to improve aircraft availability.
3. Increase the operational Aerial Refueling flight clearance envelope to give operational commanders more flexibility at sea.