

# E-2D Advanced Hawkeye



In FY23, the Navy conducted integrated testing (IT) and operational testing (OT) on E-2D Delta System Software Configuration Build 4 (DSSC-4). DSSC-4 improves the Advanced Hawkeye's command and control capability and is the fourth in a series of biennial hardware and software upgrades to the E-2D. The Navy expects to complete DSSC-4 OT in 2QFY24. The Navy began upgrading fleet aircraft to the DSSC-4 configuration in 3QFY23 to support an FY24 operational deployment.

## SYSTEM DESCRIPTION

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The E-2D Advanced Hawkeye is a carrier-based, airborne tactical command and control platform that enables offensive and defensive carrier strike group tactics including airborne early warning. Its sensors and communications systems are designed to detect, track, and identify air and surface targets in blue-water, littoral, and overland environments. The following subsystems and capabilities enable the Advanced Hawkeye to perform its mission:

- AN/APY-9 phased array radar that combines mechanical and electronic scan modes
- Tactical Targeting Network Technology (TTNT) data link
- Multifunctional Information Distribution System (MIDS)
- Cooperative Engagement Capability (CEC)
- Communications suite
- Electronic support measures
- Electronic protection
- Aerial refueling

The E-2D Advanced Hawkeye Program also includes all simulators, interactive computer media, and documentation to conduct maintenance, as well as aircrew initial and follow-on training.

## MISSION

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The E-2D Advanced Hawkeye provides all-weather, airborne early warning, airborne battle management, and command and control functions, and supports Naval Integrated Fire Control and theater air and missile defense missions for the carrier strike group and joint force commander. Additional missions include surface surveillance coordination, air interdiction, offensive and defensive counterair control, close air support coordination, time-critical strike coordination, search and rescue coordination, and communications relay.

## PROGRAM

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The E-2D is an Acquisition Category IC program that is in its fourth FOT&E period (OT-D4). DSSC-4 improves beyond line-of-sight communications and sensor integration, and it incorporates the TTNT data link. During OT-D4, the Navy is assessing DSSC-4 upgrades and the Hawkeye Integrated Training System. DSSC-4 serves as the baseline integration of capabilities that the Navy plans to fully deliver in DSSC-5 and later upgrades.

IT, which started in FY22, continued through the first half of FY23. The Navy conducted a DSSC-4 operational test readiness review in January 2023 but delayed the start of OT to correct critical software deficiencies. OT commenced in May 2023. The Navy began upgrading fleet aircraft to the DSSC-4 configuration

in 3QFY23 to support an FY24 operational deployment.

The current Test and Evaluation Master Plan (TEMP) Revision F covers DSSC-4 and the follow-on upgrade, DSSC-5. The Navy is working on a TEMP update to address changes in the planned capabilities of DSSC-5, which is scheduled to begin OT in 4QFY24.

The TEMP presents a modeling and simulation (M&S) framework for developing and testing DSSC capabilities using the E-2D Systems Test and Evaluation Laboratory (ESTEL). The Navy intends to certify ESTEL capabilities in an incremental fashion; however, as of this writing, the ESTEL is not accredited for use during OT.

### » MAJOR CONTRACTOR

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- Northrop Grumman Aeronautics Systems – Melbourne, Florida

## TEST ADEQUACY

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The evaluation of DSSC-4 will occur through a cumulative collection of IT and OT data. The evaluation will determine fielding risks and delivered capabilities for DSSC-4.

In FY23, the Navy conducted DSSC-4 IT and OT in accordance with DOT&E-approved data collection and operational test plans; DOT&E observed the testing. To maximize data collection opportunities in operationally representative environments, the Navy largely



used an enterprise testing approach that incorporated test events from other programs. IT and OT leveraged two Aegis Combat Systems Ship's Qualification Trials (CSSQT) at the Point Mugu Sea Range, California; an Aegis CSSQT at the Atlantic Test Ranges, Maryland; and the joint force, GRAY FLAG exercise at Point Mugu, California. In addition, the Navy conducted dedicated OT flights on the Atlantic Test Ranges using an Aegis land-based test site at Wallops Island, Virginia.

In December 2022, the Navy conducted a DSSC-4 cyber survivability test at Patuxent River, Maryland. That test included a cooperative vulnerability and penetration assessment (CVPA) and an adversarial assessment (AA).

In 4QFY23, the Navy conducted DT on the DSSC-4 Hawkeye Integrated Training System in Sterling, Virginia. OT for this system is expected to take place in 2QFY24.

## PERFORMANCE

### » EFFECTIVENESS, SUITABILITY, AND SURVIVABILITY

Not enough data are yet available to evaluate DSSC-4's operational effectiveness and suitability. Shortfalls in DSSC-4 systems maturity, aircraft availability, and test resource availability have slowed the collection of adequate data during OT-D4. Although reliability, maintainability, logistics, and availability data collection is

still in progress, DOT&E observed that the overall rate at which DSSC-4 test aircraft were available and capable of executing IT and OT was lower than that required to execute the test schedule in the data collection and test plans. As the E-2D's OT environment often requires large, complex test events incorporating external systems of systems, the Navy should address E-2D availability and reliability challenges to maximize the efficiency of these events.

Data analyses from the cyber survivability CVPA and AA tests are ongoing.

DOT&E will provide an assessment of DSSC-4 after OT is complete.

## RECOMMENDATIONS

The Navy should:

1. Continue to leverage large-force exercises and Navy Aegis test events to maximize E-2D OT data collection opportunities in operationally representative environments.
2. Increase aircraft availability and reliability in operational test to facilitate efficient execution of large, complex test events.
3. Develop a TEMP update to address planned DSSC-5 capabilities not covered in the current TEMP Revision F.
4. Accredite the ESTEL for use during OT of future DSSC builds.