

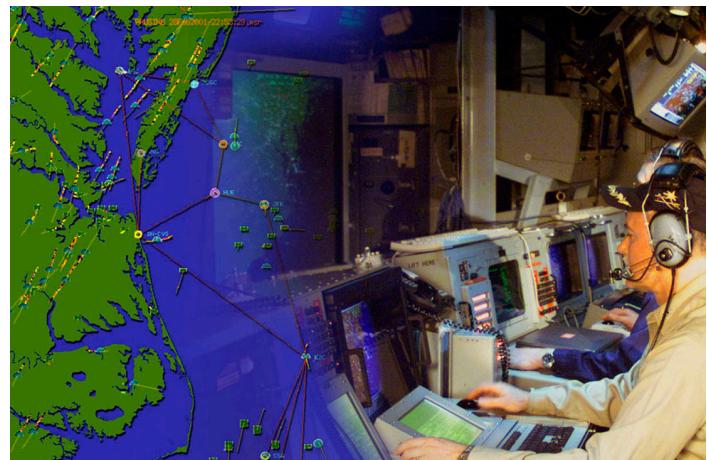
Cooperative Engagement Capability (CEC)

Executive Summary

- The Navy's Operational Test and Evaluation Force (OPTEVFOR) executed FOT&E of the USG-3B Cooperative Engagement Capability (CEC) in 2019.
- The USG-3B CEC FOT&E was inadequate because it was not conducted in accordance with the DOT&E-approved test plan.
- Though testing was not adequate to draw conclusions regarding effectiveness and suitability, results indicate that some deficiencies identified in earlier operational testing may have been corrected.
- While testing time was limited, results indicate that the USG-3B CEC is available and maintainable, but not reliable.

System

- CEC is a real-time sensor-netting system that enables high-quality situational awareness and integrated fire control capability.
- There are four major U.S. Navy variants of CEC:
 - The AN/USG-2/2A is installed on select Aegis cruisers and destroyers, *San Antonio* (LPD 17)-class and LHD amphibious ships, and *Nimitz* (CVN 68)-class aircraft carriers. The Navy is currently retiring the AN/USG-2/2A and replacing them with the AN/USG-2B CEC.
 - The AN/USG-2B, an improved version of the AN/USG-2/2A, is installed or planned to be installed on CVN 68 and *Gerald R. Ford* (CVN 78)-class aircraft carriers, *Zumwalt* (DDG 1000)-class destroyers, selected Aegis cruisers/destroyers, and selected amphibious assault ships.
 - The AN/USG-3 is installed on the E-2C Hawkeye 2000 aircraft. The AN/USG-3 is being retired as the aircraft are retired.
 - The AN/USG-3B is installed on the E-2D Advanced Hawkeye aircraft.
- The two major hardware components are the Cooperative Engagement Processor, which collects and fuses sensor data; and the Data Distribution System, which exchanges data between participating CEC units.



- CEC increases Naval Air Defense capabilities by integrating sensors and weapon assets into a single, real-time network that:
 - Expands the battlespace
 - Enhances situational awareness
 - Increases depth-of-fire
 - Enables longer intercept ranges
 - Improves decision and reaction times

Mission

Naval Commanders employ platforms equipped with CEC to:

- Improve battle force air and missile defense capabilities by combining data from multiple battle force air search sensors on CEC-equipped units into a single, real-time, composite track picture.
- Provide accurate air and surface threat tracking data to ships equipped with the Ship Self-Defense System.

Major Contractor

Raytheon Technologies Missiles and Defense –
St. Petersburg, Florida

Activity

- OPTEVFOR executed FOT&E of the USG-3B CEC in June 2019. Four events in the DOT&E-approved test plan were not completed. Multiple deviations from the test plan occurred within the completed events, including:
 - Failure to collect CEC data on board the aircraft for two events
 - Incorrect target flight altitudes
 - Incorrect Identification Friend or Foe Mode usage

- These deviations preclude DOT&E from determining the effectiveness or suitability of the CEC USG-3B.
- The Navy did not execute cybersecurity testing during this phase of FOT&E because the Program Office did not fund it.
- DOT&E issued a classified report on the USG-3B CEC FOT&E in November 2020.

FY20 NAVY PROGRAMS

- The Navy is updating the extant CEC Test and Evaluation Master Plan (TEMP) to address FOT&E of the USG-2B on board Aegis, DDG 1000, and CVN 78 class ships.
- The Navy is developing a new TEMP for CEC Block II, which will introduce new capabilities and more ambitious requirements for capabilities it shares with the current CEC build.

Assessment

- The USG-3B CEC FOT&E was inadequate to draw conclusions regarding effectiveness and suitability, but results indicate that some deficiencies identified in earlier operational testing may have been corrected.
- While testing time was limited, results indicate that the USG-3B CEC is available and maintainable, but not reliable. Additional data are required to determine the overall suitability of the USG-3B CEC.
- The Navy has not demonstrated the ability of the USG-3B CEC to support the E-2D's Theater Air and Missile Defense mission and Battle Management Command and Control mission.

Recommendations

The Navy should:

1. Conduct cyber survivability testing on the USG-3B CEC as installed on the E2-D aircraft.
2. Collect additional USG-3B CEC data sufficient to conclusively assess the system's suitability.
3. Take action on the recommendations contained in DOT&E's classified FY21 report to Congress on the CEC USG-3B FOT&E.
4. Submit to DOT&E for approval the updated CEC TEMP that encompasses:
 - FOT&E of the USG-2B CEC with the Aegis, DDG 1000, and CVN 78 combat systems
 - FOT&E of the USG-3B CEC to demonstrate the system's ability to support the E-2D's Theater Air and Missile Defense mission and Battle Management Command and Control mission
5. Complete and submit to DOT&E for approval a new CEC TEMP that describes the test strategy for CEC Block II.