Cooperative Engagement Capability (CEC)

The Cooperative Engagement Capability (CEC) is a system of hardware and software that allows ships to share radar data on air targets. Radar data from individual ships of a Battle Group are transmitted to other ships in the group via a line-of-sight, data distribution system . Each ship uses identical data processing algorithms resident in its cooperative engagement processor so that each ship will have essentially the same display of track information on aircraft and missiles. An Aegis ship can launch an anti-air missile at a threat aircraft, or anti-ship cruise missile (ASCM) within its engagement envelope, based on radar data relayed to it by another ship. SSDS- or ACDS-equipped ships can receive cueing to hostile tracks. Program plans include the addition of E-2C aircraft equipped with the cooperative engagement processor and data distribution system to bring airborne radar coverage plus extended relay capability to CEC. Cooperative engagement processor-equipped units, connected via the data distribution system network, are known as cooperating units.

CEC was demonstrated at sea as early as FY90. Early operational assessments were conducted in FY94, FY95, and FY97. Entry into engineering and manufacturing development was approved at Milestone II in 1995. In accordance with congressional guidance, the Navy certified initial operational capability for CEC (engineering development model equipment upgraded to AN/USG-1 configuration) in late FY96. CEC was designated an Acquisition Category ID program in FY99.

Operational evaluation (OPEVAL) of the surface AN/USG-2 hardware and Baseline 2.0 software was conducted in 3QFY01. DOT&E's test and evaluation report was published on February 1, 2002. The acquisition decision memorandum of April 3, 2002, approved AN/USG-2 for full-rate production and approved low-rate initial production) for the air AN/USG-3 hardware for FY02-03. The AN/USG-2 and AN/USG-3 hardware, with associated software, were designated as CEC Block 1. The acquisition decision memorandum further approved the Navy's plan for the next CEC upgrade, Block 2, which was to be competed for development. During FY03, the Navy reconsidered this approach and elected instead to pursue an upgrade program for CEC, with no further reference to Block 2. The OPEVAL equivalent of the air AN/USG-3 hardware and software was delayed from FY02 to FY04 when deployment of the Battle Group intended for OPEVAL was accelerated.

TEST & EVALUATION ACTIVITY

Test & Evaluation activity consisted of engineering tests, developmental testing, and operational testing of AN/USG-3 equipment in E-2C aircraft in preparation for the FY04 follow-on operational test & evaluation (FOT&E-2) that will support the AN/USG-3 full-rate production decision. An operational assessment was conducted in November 2002 in the Virginia Capes Operating Area. The program is preparing for a two-phase technical evaluation during the first quarter of FY04, followed by FOT&E-2, the USG-3 OPEVAL, in the second quarter of FY04. FOT&E-2 will be conducted with the *USS John F. Kennedy* Strike Group along the east coast and in the Gulf of Mexico.

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TEST & EVALUATION ASSESSMENT

CEC Surface Equipment AN/USG-2 and Baseline 2.0 Software. Although the surface AN/USG-2, with Baseline 2.0 software, was determined to be operationally effective and suitable, issues were identified in the following areas for further examination during FOT&E: Battle Group integration and interoperability, information assurance, maintainability, joint interoperability, production representative

AN/USG-3 equipment, and new combat system integration. While the CEC Program Manager (PM) is attempting to address these issues, correction of certain issues in the area of Battle Group integration and interoperability require changes to the combat systems integrated with CEC. In spite of acquisition decision memorandum-direction to the Navy to fund expeditious solution of problems associated with integration and interoperability, there is no evidence that correction of most of these problems will be demonstrated soon.

FOT&E-2. The primary objective of this testing is to demonstrate improved operational effectiveness and suitability with production-representative AN/USG-3 equipment and software operating in a Strike Group-level CEC network while executing the air defense mission. At a minimum, FOT&E-2 should demonstrate that the air defense mission can be executed without degradation resulting from integration of the production-representative AN/USG-3 and the E-2C radar. This testing requires a CEC-configured Strike Group detecting, tracking, and engaging threat-representative ASCM surrogates during operationally realistic air defense scenarios with actual and simulated Standard and Seasparrow missiles. Given the current immature air defense T&E infrastructure on the east coast and Gulf of Mexico, and with the closure of the Atlantic Fleet Weapons Training Facility outer range in Puerto Rico, DOT&E is concerned about the adequacy of FOT&E-2. DOT&E is particularly concerned that the OT&E is to be integrated with training of a Strike Group that is also using the immature infrastructure.

FOT&E-3. The primary objective of this testing is to demonstrate operational effectiveness and suitability with a Ship Self Defense System Mark 2 combat system operating in a Strike Group-level CEC network while executing air defense. The Navy plans this testing for early FY05 with the *Reagan* Strike Group on the west coast. DOT&E is concerned that the Strike Group deployment may be accelerated, as was the *Nimitz* Battle Group's in FY02, with the testing delayed until the next Strike Group becomes available. DOT&E is also concerned that the Strike Group composition may not be adequately representative of a CEC Strike Group in terms of numbers of CEC-capable ships and aircraft.

OT&E of Network Centric Warfare Systems. The challenge associated with adequate testing of CEC is an example of the challenges facing this generic category of systems. The Navy has applied substantial effort to development of the Distributed Engineering Plant (DEP), an interconnection of land-based combat system sites for interoperability testing. This has been a useful tool for new system development and for software interoperability certification. Future improvements in the DEP will likely provide significant useful data for the overall warfare system test process, but operational testing under realistic combat conditions will, for the foreseeable future, require an ensemble of platforms – both in quantities and types – that truly represent the size and complexity of at-sea battle forces. The DEP is not a substitute for realistic operational test and evaluation, but it may be used to augment testing.

Adequate OT&E that supports acquisition investment decisions for networking systems such as CEC for the Fleet is important. Effective training of the Fleet in preparation for deployment is also essential. When effectively integrated, mutual contribution and benefit can result with both T&E and training bringing resources that can improve the operational realism of the combined training/T&E environment. With the flexibility and surge capability called for by the Navy's new Fleet Response Plan, effective integration of the two will require collaboration at the highest Fleet and Navy acquisition executive levels.