

Integrated Defensive Electronic Countermeasures (IDECM)

Executive Summary

- The Navy completed the Integrated Defensive Electronic Countermeasures (IDECM) Block IV operational assessment (OA) in March 2013.
 - The OA included laboratory testing at the Navy's Electronic Combat System Evaluation Laboratory (ECSEL), Point Mugu, California, against two classified threats and flight testing at the Electronic Combat Range (ECR), China Lake Naval Air Station, California.
 - At the conclusion of the OA, IDECM Block IV demonstrated progress toward being operationally effective but not operationally suitable due to poor reliability.
 - System instability, a high built-in test false alarm rate, and lack of software maturity were the primary causes of poor reliability.
 - DOT&E documented the OA in a classified report in April 2013.
- IDECM Block IV developmental testing confirmed two interoperability shortfalls identified on previous IDECM system blocks, both of which reduce aircrew situational awareness:
 - The interaction between the ALR-67(V)2 and (V)3 radar warning receivers and IDECM Block IV system causes false threat symbols to be displayed.
 - The APG-79 radar is falsely identified by the ALR-67(V)2 and (V)3 radar warning receivers.
- The Navy has focused on resolving or mitigating IDECM Block IV shortfalls with the goal of accomplishing successful operational testing beginning 2QFY14.

System

- The IDECM system is a radio frequency, self-protection electronic countermeasure suite on F/A-18 aircraft. The system is comprised of onboard and off-board components. The onboard components receive and process radar signals and can employ onboard and/or off-board jamming components in response to identified threats.
- There are four IDECM variants: Block I (IB-1), Block II (IB-2), Block III (IB-3), and Block IV (IB-4). All four variants include an onboard radio frequency receiver and jammer.
 - IB-1 (fielded FY02) combined the legacy onboard receiver/jammer (ALQ-165) with the legacy (ALE-50) off-board towed decoy.



- IB-2 (fielded FY04) combined the improved onboard receiver/jammer (ALQ-214) with the legacy (ALE-50) off-board towed decoy.
- IB-3 (fielded FY11) combines the improved onboard receiver/jammer (ALQ-214) with the new (ALE-55) off-board fiber optic towed decoy that is more integrated with the ALQ-214.
- IB-4 (currently in development) is intended to replace the onboard receiver/jammer (ALQ-214(V)3) with a lightweight, repackaged onboard jammer (ALQ-214(V)4 and ALQ-214(V)5).
- An additional program to provide IDECM Block IV the capability to deny or delay targeting of the F/A-18 by enemy radars, known as the Software Improvement Program, is in early development.
- The F/A-18E/F installation includes off-board towed decoys. The F-18C/D installation includes only the onboard receiver/jammer components and not the towed decoy.

Mission

- Combatant Commanders will use IDECM to improve the survivability of Navy F/A-18 strike aircraft against radio frequency-guided threats while flying air-to-air and air-to-ground missions.
- The Navy intends to use IB-3's and IB-4's complex jamming capabilities to increase survivability against modern radar-guided threats.

Major Contractors

- ALE-55: BAE Systems – Nashua, New Hampshire
- ALQ-214: ITT Electronic Systems – Clifton, New Jersey
- ALE-50: Raytheon Electronic Warfare Systems – Goleta, California

Activity

IDECM Block III

- DOT&E completed its IDECM Block III IOT&E report in June 2011, assessing the system as operationally effective and suitable for combat. The Navy authorized IDECM Block III full-rate production (FRP) in July 2011.

IDECM Block IV

- The Navy completed the IDECM Block IV OA in March 2013. The OA included laboratory testing at the Navy's ECSEL, Point Mugu, California, against two classified threats and flight testing at the ECR, China Lake Naval Air Station, California. DOT&E published a classified report on the OA in April 2013.
- The Navy conducted all testing in accordance with a DOT&E-approved Test and Evaluation Master Plan and test plan.
- The Navy held Intermediate Progress Review (IPR) #4 in April 2013 to determine if the system should be approved for FRP decisions 10 and 11. The Navy decided the following at IPR #4:
 - Approve FRP decision 10.
 - Delay the decision on whether or not to exercise FRP 11 until IPR #5.
 - Add IPR #6 following completion of the FOT&E and in support of FRP 12.
 - Postpone the FOT&E six months to continue to mature and test IDECM Block 4 software prior to beginning testing.
 - Accomplish a developmental assisted test phase using developmental test resources and personnel that will result in a Letter of Observation from the Commander, Operational Test and Evaluation Force in 1QFY14.
- The Navy completed a hardware-in-the-loop (HWIL) test at an Air Force facility in February 2013. Data analysis is ongoing and should be complete by January 2014.
- The Navy conducted an additional HWIL test and a dense electromagnetic threat environment test at the ECSEL in October and November 2013, respectively. DOT&E will report on the results of both tests in the IDECM Block IV FOT&E report.
- Integrated developmental and operational test flights at the ECR and the Air Force's Nevada Test and Training Range took place from July through December 2013. The results will be included in DOT&E's IDECM Block IV FOT&E report.

Assessment

- At the conclusion of the OA, IDECM Block IV demonstrated progress toward being operationally effective but not operationally suitable due to poor reliability. System instability, a high built-in test false alarm rate, and lack of software maturity were the primary causes of poor reliability. DOT&E documented the results of the OA in a classified report in April 2013.

- Testing at the ECSEL, which included simulated aircraft and threats and actual IDECM Block IV jammer systems, was inadequate. DOT&E recommended the Navy re-accomplish those tests; the Navy agreed and began re-testing in October 2013.
- IDECM Block IV developmental testing confirmed two interoperability shortfalls identified on previous IDECM system blocks, both of which reduce aircrew situational awareness:
 - The interaction between the ALR-67(V)2 and (V)3 radar warning receivers and IDECM Block IV system causes false threat symbols to be displayed.
 - The APG-79 radar is falsely identified to the ALQ-214(V)4 by the ALR-67(V)2 and (V)3 radar warning receivers.
- The Navy has made progress on resolving or mitigating IDECM Block IV shortfalls with the goal of accomplishing successful operational testing beginning 2QFY14.

Recommendations

- Status of Previous Recommendations. The Navy has adequately addressed several previous recommendations. However, four recommendations from FY12 remain outstanding.

IDECM System

1. The Navy should restructure and reorganize the complex and poorly organized IDECM system software code. This will minimize potential software problems yet to be discovered and simplify future modifications.
2. The Navy should develop hardware and/or software changes to provide pilots with correct indications of whether a decoy was completely severed. This recommendation does not apply to the F/A-18 C/D installation since that installation does not include a towed decoy.
3. The Navy should investigate the effects of IDECM on threat missile fuses.

Electronic Warfare Warfighting Improvements

4. In coordination with the Defense Intelligence Agency, the Navy should update the threat lethal radii and/or the evaluation processes that are used to determine whether simulated shots are hits or misses.
- FY13 Recommendations. The Navy should:
 1. Use an iterative process of fine-tuning the radar warning receivers and the IDECM Block IV system to alleviate the two interoperability shortfalls.
 2. Resolve built-in test and system maturity problems before FOT&E.
 3. The Navy should continue to improve data collection processes and reporting methods to support an adequate suitability assessment.