

Integrated Defensive Electronic Countermeasures (IDECM)

Executive Summary

- The Navy began the Integrated Defensive Electronic Countermeasures (IDECM) Block IV integrated tests in July 2013 and completed the planned testing in April 2014.
 - The integrated tests included laboratory testing at the Navy's Electronic Combat System Evaluation Laboratory, Point Mugu, California, against two classified threats, as well as a dense emitter scenario and flight testing at the Electronic Combat Range (ECR), China Lake Naval Air Station, California, and the Nevada Test and Training Range (NTTR).
- The Navy has convened an F/A-18 wingman compatibility working group that has members from multiple Navy program offices to investigate and resolve deficiencies associated with the aircraft radar, which may be caused by other sub-systems such as IDECM.
- The Navy accomplished an Operational Test Readiness Review (OTRR) for IDECM Block IV FOT&E on June 16, 2014. DOT&E concurred with the Navy in commencing operational testing, but DOT&E had three points of concern:
 - The ambitious schedule for completing flight test at NTTR in only two range periods
 - Only two F/A-18C/D aircraft being available for tests, which could create schedule delays if F/A-18C/D maintenance problems occurred
 - The potential the schedule would need to be extended since threat hardware at both ECR and NTTR had been experiencing failures
- FOT&E began in June 2014 and is scheduled to end in February 2015. DOT&E will produce a classified FOT&E report assessing system operational effectiveness and suitability after the conclusion of the IDECM Block IV FOT&E.

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 an improved onboard receiver/jammer (ALQ-214) with the legacy (ALE-50) off-board towed decoy.
- IB-3 (fielded FY11) combined the improved onboard receiver/jammer (ALQ-214) with a new (ALE-55) off-board fiber-optic towed decoy that is more integrated with the ALQ-214.
- IB-4 (currently in test) 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). IB-4 also replaces the ALQ-126B to provide advanced, carrier-capable jamming to the F/A-18C/D for the first time.
- 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/A-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: Exelis, Inc. – 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 in July 2011.
- The Navy held In Process Review #3 in March 2012 and decided to begin implementing the IDECM Block IV change proposal so that in April 2012, the IDECM Block III production line transitioned to producing IDECM Block IV systems (production lot buy 9).

IDECM Block IV

- The Navy held In Process Review #5 in January 2014 to determine if the IDECM Block IV system should be approved for production lot buy 11 (the program is in full-rate production and In Process Reviews support lot buy decisions). The Navy approved the FY14 production decision and directed the Program Office to accomplish another In Process Review (#6) to support the next production lot buy decision after FOT&E had completed.
- The Navy began the IDECM Block IV integrated testing in July 2013 and completed the planned testing in April 2014.
 - The integrated tests included laboratory testing at the Navy's Electronic Combat System Evaluation Laboratory, Point Mugu, California, against two classified threats as well as a dense emitter scenario, and flight testing at ECR and NTTR. DOT&E will use operationally relevant data from the integrated testing period in conjunction with data from the FOT&E to assess the IDECM Block IV system. The results will be reported in DOT&E's classified IDECM Block IV FOT&E report.
- In May 2014, the Navy accomplished a limited-scope maintenance demonstration at Naval Air Station China Lake, California. The results will be included in DOT&E's classified IDECM Block IV FOT&E report.
- On June 16, 2014, the Navy accomplished an OTRR for IDECM Block IV FOT&E. DOT&E concurred with the Navy in commencing operational testing, with the following caveats:
 - DOT&E expressed concern about the ambitious schedule for completing flight test at NTTR in only two range periods. DOT&E recommended the Navy plan for a third range period.
 - DOT&E expressed concern that the Navy had only two F/A-18C/D aircraft available for test, which could create schedule delays if F/A-18C/D maintenance problems occurred. DOT&E recommended at least three aircraft be available to support testing since many of the runs required at least two aircraft per test event.
 - DOT&E expressed concern that there was the potential the schedule would need to be extended since threat hardware at both ECR and NTTR had been experiencing failures.
- The FOT&E began in June 2014 and is scheduled to end in February 2015. The Navy is conducting testing in accordance with the DOT&E-approved test plan. Numerous

schedule delays have occurred due to threat hardware problems on the test ranges, aircraft maintenance problems, and limited fleet aircraft availability to support testing.

- The Navy has convened an F/A-18 wingman compatibility working group that has members from multiple Navy program offices to investigate and resolve deficiencies associated with the aircraft radar, which may be caused by other sub-systems such as IDECM.

Assessment

- DOT&E assessed the IDECM Block IV system was ready for operational test at the OTRR. The Navy had adequately addressed most of the software immaturity and interoperability deficiencies at that time.
- Laboratory testing was adequate, but using higher fidelity radar cross section (RCS) data for the F/A-18 would provide more operationally realistic results.
- The Navy corrected the deficiency caused by interaction between the ALR-67(V)2 and (V)3 radar-warning receivers and IDECM Block IV system, which caused false threat symbols to be displayed. However, the Navy deferred correcting the deficiency in which 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 to a wingman compatibility working group composed of multiple program offices.
- DOT&E will produce a classified FOT&E report assessing system operational effectiveness and suitability after the conclusion of the IDECM Block IV FOT&E.

Recommendations

- Status of Previous Recommendations. The Navy has adequately addressed some previous recommendations; however, the following 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-18C/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.
- FY14 Recommendation.
 1. The Navy should use the highest fidelity F/A-18 RCS data available when accomplishing analysis of laboratory testing, and develop accredited RCS models that account for the entire F/A-18 airframe configuration.