

Integrated Defensive Electronic Countermeasures (IDECM)

Executive Summary

- DOT&E approved the classified Integrated Defensive Electronic Countermeasures (IDECM) Block IV (IB-4) Test and Evaluation Master Plan (TEMP) in January 2012.
- The Navy authorized the first lot buy of IB-4 systems in March 2012 following its In-Process Review (IPR) #3. At that time, DOT&E assessed that the system was nine months behind schedule and less mature than planned. No effectiveness or suitability results were available to support the lot production decision.
- Since IPR #3 in March 2012, the program has been delayed an additional three months and the operational assessment (OA) has been reduced in scope because of IB-4 software immaturity and unavailability of laboratory resources.
- The IB-4 OA began September 2012 and is expected to conclude by December 2012. It includes flight tests and a laboratory test. The Navy has made progress in hardware testing and software development, and is resolving deficiencies at an increasing rate since the IPR #3. However, the Navy continues to discover system deficiencies at a steady rate, and DOT&E anticipates that the program will need additional time to resolve system deficiencies, thus extending the test schedule.

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).
- 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 on 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 operationally suitable for combat. The Navy authorized IDECM Block III full-rate production in July 2011.

IDECM Block IV

- Developmental laboratory testing began in September 2011 at the Navy's Advanced Weapons Laboratory system integration lab at China Lake, California, and the Navy's Electronic Combat System Evaluation Laboratory (ECSEL) at Point Mugu, California.

NAVY PROGRAMS

- DOT&E approved the classified IB-4 TEMP in January 2012.
- The Navy's Commander, Operational Test and Evaluation Force (COTF) completed a Developmental Test Assist assessment in February 2012, which consisted primarily of observations of contractor and Navy laboratory testing. COTF noted significant hardware, software, and compatibility shortfalls based on its observations (details are classified).
- The Navy approved the first lot production of IB-4 systems in March 2012.
- The Navy conducted developmental ground-mount open-air range testing at the Navy's Slate Range at China Lake, California, and at the Nevada Test and Training Range. The Navy began developmental risk reduction flight testing in May 2012 at China Lake, California.
- The Navy began IB-4 OA testing in September 2012, consisting of flight testing at the Electronic Combat Range in China Lake and laboratory testing at the ECSEL in Point Mugu. The OA was reduced in scope from what was originally described in the January 2012 TEMP. The Navy requested a delay in one of the planned laboratory tests to further mature IB-4 software, and a national priority Air Force program took precedence over IB-4 at one of the laboratory test facilities. DOT&E approved this reduction in scope. The Navy will complete the two deferred tests as described in the DOT&E-approved test plan prior to the start of FOT&E and DOT&E will issue an FOT&E report.
- The Navy plans to complete a redesign of the IDECM receiver near the end of the FOT&E. The Program Office expects the redesigned receiver's effect on system performance to be minimal; DOT&E will work with the Program Office to determine the scope of any necessary additional testing.
- With each future IPR, beginning with IPR #3 (March 2012), the Navy is authorizing purchases of the ALQ-214(V)4 for the F/A-18 E/F and the ALQ-214(V)5 for the F/A-18 C/D.

Assessment

- At the IPR #3, IB-4 was 9 months behind the schedule the Navy presented at the hardware critical design review 30 months earlier. The Navy had not completed several key hardware tests and had not started system effectiveness and suitability testing, which led to a less informed IPR #3. Deficiency report submissions from developmental testing were continuing at a steady rate, with the number of unresolved deficiencies outpacing the number of resolved deficiencies, showing lack of system maturity.
- The Navy has made progress in hardware testing and software development, and is resolving deficiencies at an increasing

rate since IPR #3. However, the Navy continues to discover system deficiencies at a steady rate, and DOT&E anticipates that the program will need additional time to resolve system deficiencies, thus extending the test schedule. This will require the Navy to either postpone conducting the next IPR and lot production decision (currently scheduled for March 2013) or again make a lot production decision with much less information than originally intended.

- DOT&E assessed system maturity at the start of the OA test as less than the program originally planned. No suitability data and limited effectiveness data were available to support the OA test readiness review, and therefore the program assumed increased risk of inadequate system performance during the OA.
- The Navy has significantly reduced the time period between the completion of all testing planned for the OA and FOT&E, thus leaving little time to correct deficiencies found as a result of testing.

Recommendations

- Status of Previous Recommendations. The Navy has adequately addressed three of the nine IDECM-specific recommendations from FY11. The Navy has partially addressed an additional three of the nine recommendations and further activity to resolve them is ongoing. The three recommendations that may require material solutions and/or further Research and Development Test and Evaluation have not yet been addressed and are repeated below. One electronic warfare recommendation that was not program-specific is also repeated below.

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.
- FY12 Recommendations. None.