

## Integrated Defensive Electronic Countermeasures (IDECM)

### Executive Summary

- In October 2010, DOT&E approved an updated Integrated Defensive Electronic Countermeasures (IDECM) Block 3 test plan to support correction of deficiencies testing in early FY11.
- In March 2011, the Navy completed testing to confirm the correction of deficiencies in IDECM Block 3 performance discovered during the 2008 IOT&E.
- DOT&E completed its IDECM Block 3 IOT&E Report in June 2011, assessing the system as operationally effective and operationally suitable for combat. The system significantly reduces aircraft susceptibility and provides enhanced self-protection against radio frequency-guided surface-to-air and air-to-air threats. Additionally, IDECM Block 3 provides adequate reliability, availability, and maintainability to support mission accomplishment.
- Although the IDECM Block 3 is suitable, testing confirmed a previously identified compatibility shortfall associated with wingman APG-79 Active Electronically Scanned Array radars. Although some work has occurred to address this problem, the Navy will require a collaborative effort across the F/A-18 program community to identify fixes and/or mitigations to this shortfall.
- The Navy authorized IDECM Block 3 full-rate production in July 2011.
- IDECM Block 4 hardware and software delivery to the government began in 3QFY11. A revised Test and Evaluation Master Plan (TEMP) is scheduled for completion prior to the start of the Navy Operational Assessment in FY12.

### 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.

### Activity

#### IDECM Block 3

- The Navy postponed the IB-3 full-rate production decision to 4QFY11 to allow time to test and evaluate fixes to the suitability and safety deficiencies identified during the 2008 IOT&E.



- IB-1 combined the legacy onboard system (ALQ-165) with the legacy (ALE-50) off-board towed decoy (fielded FY02).
- IB-2 combined the improved onboard system (ALQ 214) with the legacy (ALE-50) off-board towed decoy (fielded FY04).
- IB-3 combines the improved onboard jammer (ALQ-214) with the new (ALE-55) off-board fiber optic towed decoy that is more integrated with the advanced onboard receiver/jammer (ALQ-214).
- IB-4 replaces the onboard jammer (ALQ-214(V)3) with a lightweight, repackaged onboard jammer for the F/A-18 aircraft variants.
- 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 capability 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 and Improved Multi-purpose Launch Controller: Raytheon Electronic Warfare Systems – Goleta, California

- In October 2010, DOT&E approved an updated IDECM Block 3 test plan to support correction of deficiencies testing in early FY11.

- The Navy completed laboratory and developmental flight testing to confirm the correction of deficiencies in the IB-3 performance found during the 2008 IOT&E.
- In March 2011, the Navy completed operational testing to confirm the correction of deficiencies in IDECM Block 3 performance discovered during the 2008 IOT&E.
- DOT&E completed its IDECM Block 3 IOT&E Report in June 2011.
- The Navy authorized the IDECM Block 3 full-rate production in July 2011.
- The Navy conducted testing in accordance with the DOT&E approved TEMP and test plan.

#### **IDECM Block 4**

- The IDECM Block 4 hardware and software delivery to the government began in 3QFY11. Contractor and government laboratory testing is underway.
- The IDECM Block 4 TEMP update is scheduled for completion prior to the start of the Navy Operational Assessment testing in FY12.

#### **Assessment**

##### **IDECM Block 3**

- DOT&E concluded in its IOT&E report that the IDECM Block 3 was adequately tested. Testing followed the DoD electronic warfare test process, including several laboratory hardware and software tests and flight testing. The 139 hours of flight testing, which included 19 decoy deployments, provided high-confidence answers to the suitability assessment.
- The IDECM Block 3 is operationally effective for combat. The system met or exceeded its operational requirement under all test conditions, while significantly reducing aircraft susceptibility and providing enhanced self-protection against radio frequency-guided surface-to-air and air-to-air threats.
- The IDECM Block 3 is operationally suitable for combat. Testing confirmed with high confidence that safety deficiencies observed during the 2008 IOT&E were corrected; the system was reliable and maintainable. There were an excessive number of unscheduled maintenance actions, but most were brief, and often involved simple reseating or cleaning of connections. The built-in test false alarm rate was improved, but was still above the threshold requirement level, which affected unscheduled maintenance.
- Testing did show the importance of aircrew and maintenance personnel proficiency with the system. Thus, the Navy should

establish a training concept that includes the employment of simulated and actual ALE-55 decoys during training exercises. Although the 2011 testing showed no repeat of the safety-related decoy deficiencies, the Navy should develop hardware and/or software changes to provide pilots with correct indications of whether a decoy was completely severed.

- Testing confirmed a previously identified compatibility shortfall associated with wingman APG-79 Active Electronically Scanned Array radars. Although some work has occurred to address this problem, the Navy will require a collaborative effort across the F/A-18 program community to identify fixes and/or mitigations to this shortfall. System effectiveness was not significantly degraded by this problem.

#### **Recommendations**

- **Status of Previous Recommendations.** The Navy addressed the prime recommendations from FY10 by completing testing to confirm IB-3 deficiencies were corrected, and there are ongoing efforts to develop new and improved tactics, training, and countermeasure techniques. One recommendation from FY10 to develop hardware and/or software changes to provide pilots with correct indications of deployed decoy status remains. Of the two FY10 recommendations that were related to Electronic Warfare Warfighting Improvements, one is still outstanding and it is repeated below.
- **FY11 Recommendations.**

##### **IDECM System**

1. The Navy should collaborate across the F/A-18 program community to identify fixes and/or mitigations to the compatibility shortfalls with APG-79 fire control radars.
2. The Navy should continue to improve maintenance procedures and documentation and develop an IDECM Block 3 training concept that includes employment of simulated and actual ALE-55 decoys during training.
3. The Navy should continue to reduce the built-in test false alarm rate, improve the reliability of decoys while they are being deployed, and confirm that each new procurement lot of decoys is reliable through laboratory and flight tests of lot samples.

##### **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.