

EA-6B Upgrades / Improved Capability (ICAP) III and Low Band Transmitter (LBT)

Executive Summary

ICAP III Block 2

- The Navy demonstrated significant improvement to the EA-6B aircrew's battle-space awareness in the Improved Capability (ICAP) III Block 2 FOT&E. This included assessment of the ICAP III's digital link/Multi-functional Information Distribution System (MIDS).

Low Band Transmitter (LBT)

- DOT&E reported that Low Band Transmitter (LBT) is operationally effective against communications targets. IOT&E data used to assess LBT operational effectiveness against threat representative early warning radars were not adequate due to test range and frequency availability limitations.
- The LBT system is operationally suitable. The Navy augmented the test data collected during IOT&E with data collected during the early operational release of this system. The data indicates that LBT reliability is improving. LBT will provide a more reliable asset to the Navy than the legacy transmitters this system is designed to replace. The LBT underwent system integration testing on the ICAP III Block 3 Prowler Configuration.

System

EA-6B

- The EA-6B aircraft is a four seat, carrier/land-based, tactical jet aircraft with an onboard receiver, external jamming pods, a communication jammer, and a High-Speed Anti-Radiation Missile (HARM).
- The EA-6B is currently the Navy's fielded Airborne Electronic Attack (AEA) platform.

ICAP III Block 1 design improvements provide:

- Enhanced reliability
- A new receiver, processor, and antenna system (ALQ-218)
- New tactical displays/interfaces
- Baseline new joint mission planner
- Better external communications

ICAP III Block 2 adds the following to Block 1:

- Improved battle space management capabilities with the MIDS/digital link
- Improved joint mission planner

ICAP III Block 3 adds the following to Block 2:

- Upgraded messaging capability for MIDS/digital link
- Capability to employ LBT
- Upgraded end-to-end automatic reactive jamming capability
- Improved joint mission planner
- Improved software to introduce corrections and enhancements previously integrated in older EA-6B systems



ICAP III Block 4 adds the following to Block 3:

- An upgraded Digital Flight Control System and new Power Trim Indicators
- Control Display Navigation Unit-900A
- Digital G Meter
- Dual frequency USQ113 (V) 4 communications jammer
- ALE-47 countermeasures dispensing system
- A Phase 1 Litening Pod for Marine Corps Prowlers only

Low Band Transmitter (LBT)

- LBT improvements over legacy low-band pods are designed to:
 - Expand frequency coverage
 - Provide better reliability as the simplified design replaces three low-reliability transmitters

USQ-113

- The intent of the USQ-113 (V) 4 design is to provide more capability against emerging threats and to improve operator utility compared to the fielded USQ-113 system.

Mission

EA-6B

- Combatant commanders use the EA-6B to support friendly air, ground, and sea operations by suppressing enemy radars and communications.
- Commanders use the EA-6B capabilities to suppress enemy radar-guided threats with HARM and to jam integrated air defenses, in addition to supporting emerging asymmetric missions.

ICAP III

- Units equipped with EA-6B ICAP III use its improvements to provide:
 - Counters to emerging threats
 - More flexible and effective protection of strike aircraft
 - More accurate HARM targeting
 - Enhanced situational awareness via MIDS for improved battle management plus enhanced connectivity to national, theater, and tactical strike assets
 - Selective reactive jamming capability to allow automatic detection and jamming of threats as they become active
 - Streamlined mission planning and post flight analysis

LBT

- Commanders use LBT and other EA-6B assets to jam radars and communications.

Prime Contractor

- Northrop Grumman

Activity

EA-6B

- Commander, Operational Test and Evaluation Force (COTF) conducted EA-6B ICAP III testing in FY08 in accordance with the DOT&E-approved Test Evaluation and Master Plan (TEMP) (FY06 Revision B) and test plans.

ICAP III Block 3

- The Navy initiated TEMP Revision C to support planned FY08 ICAP III Block 3 operational testing that COTF completed in August 2008.

ICAP III Block 4

- The program submitted TEMP Revision D for ICAP III Block 4 for coordination in early 2008.
- In order to arrive at a common fleet-wide configuration, the program plans to incorporate Operational Flight Program improvements currently embodied in ICAP II into Block 4. Block 4 will also incorporate the USQ 113 (V) 4 dual-frequency communications jammer, and provide further improved crew vehicle interface performance.

LBT

- COTF completed their assessment of the LBT IOT&E and issued their final report in 2QFY08. The COTF report stated that LBT was operationally effective and suitable. The Navy awarded a full-rate production decision for LBT in 3QFY08.
- DOT&E issued a Beyond Low-Rate Initial Production (BLRIP) report for LBT in 3QFY08.
- The Service conducted ICAP III Block 3 LBT system integration testing in FY08 in accordance with DOT&E-approved TEMP and test plans.

USQ-113

- To support a Rapid Deployment Capability, the Navy began a Quick Reaction Assessment of the USQ-113 (V) 4 communications jammer in FY07 and completed it in FY08.
- The Navy began operational test planning for the EA-6B's upgrades to the USQ-113 (V) 4 communications jammer in FY07, in preparation for system integration testing on ICAP III Block 4 aircraft.

Assessment

ICAP III Block 3

- Navy test planners applied ICAP III Block 2/MIDs operational experience to improve testing of new battle space management capabilities for ICAP III Block 3. ICAP III Block 3 testing was a total system evaluation in mission-oriented scenarios, as opposed to a test of discrete subsystems on the first two increments of ICAP III. Problems with LBT integration and testing hindered ICAP III Block 3 operational testing as well as lack of stable Operational Flight Program performance prior to completing development testing. Aircraft availability before and during operational testing caused testing delays.
- Although the Navy's dedicated testing of Joint Mission Planning System (JMPS) in FY07 indicated JMPS functionality on the ICAP III was adequate, ICAP III Block 3 testing revealed additional deficiencies related to the complex ICAP III mission planning environment as compared to the simpler mission planning environment for older EA-6B systems
- The Service will not be able to provide ICAP III Block 3 Operational Test results before 1QFY09.

LBT

- There is a lack of modeling and simulation capability against threat types not available at open-air test ranges. This lack of capability severely hampers realistic operational testing to fully evaluate LBT and other AEA platforms in their operational environment.
- The BLRIP report stated that LBT is operationally effective against communications targets, but that data for fully assessing LBT operational effectiveness against threat-representative early warning radars were not adequate due to lack of available threat radars to test against. The report also stated that LBT was operationally suitable, with substantially improved reliability over the system it replaces.
- The open-air low band jamming test resource limitations and non-availability of specific threat radars severely limited the ability to completely evaluate LBT during IOT&E.

NAVY PROGRAMS

- The Navy augmented data collected during IOT&E with over 8,000 hours of data provided by deployed squadrons using the Quick Reaction Capability version of the LBT for the reliability assessment.
- Emerging results of the IOT&E for LBT indicate that this new jamming pod will provide improved flexibility and reliability, while providing comparable operational effectiveness to the multiple legacy low band pods it replaces.
- The lack of open-air threat resources to support testing of the full end-to-end mission capabilities of LBT and AEA platforms and subsystems limited the Navy's ability to fully evaluate LBT. The Navy relied heavily on subjective side-by-side comparisons of LBT to legacy jamming pods.
- Federal constraints on jamming frequencies and the lack of specific threat systems drove the LBT open-air low band jamming test resource limitations.

USQ-113

- The USQ113 (V)4 tested during 2007 and 2008 on an ICAP II Prowler revealed sporadic performance in its dual jam mode associated with updated "E" model radios. The program reports a fix for this and other anomalous performance is available. The Operational Test Agency will need to conduct operational testing to confirm better performance.

Recommendations

ICAP III

- Status of Previous Recommendations. Two of the six issues from previous DOT&E recommendations remain unresolved.
- FY08 Recommendations.
 1. The Navy should complete the analysis of, and provide recommendations on, ICAP III Block 3 testing in the

1QFY09 as a total system evaluation in a mission environment. Deficiencies revealed during Block 3 testing need to be corrected under Block 4 tests during FY09.

Additional Block 4 capabilities such as the Litening Pod and USQ 113 (V) 4 communications jammer need to be integrated with crew vehicle interfaces.

2. The Navy should complete an operational test of the dual jam USQ113 (V) 4 system integrated with the ICAP III Block 4 Prowler during FY09. An updated requirements document is needed to form the basis of this test phase.

LBT

- Status of Previous Recommendations. The recommendation about providing adequate test resources remains unresolved. The Services addressed the other three previous recommendations.
- FY08 Recommendations.
 1. The Navy should investigate means by which the aircrew receives positive in-flight indication that the LBT is actually radiating energy.
 2. In order to mitigate the limitations observed during IOT&E, the Navy should invest in early warning radar threats to fully assess LBT capabilities against realistic threats and operationally-representative scenarios.
 3. The Navy should re-evaluate LBT effectiveness testing against early warning radars. Once complete, they should ensure that lessons learned are integrated into the EA-6B ICAP III FOT&E and EA-18G developmental and operational testing.
 4. The Navy should continue to track and use LBT suitability metrics using data from deployed squadrons to inform the reliability growth program.

NAVY PROGRAMS