

## EA-6B UPGRADES



### **Navy ACAT II Program**

#### ***ICAP-III:***

Total Number of Systems:	123
Total Program Cost (TY\$):	\$1.195B
Average Unit Cost (TY\$):	\$5.06M
Full-rate production:	3QFY03

#### ***BLOCK 89A:***

Total Number of Systems:	119
Total Program Cost (TY\$):	\$518.2M
Average Unit Cost (TY\$):	
BLK 82 (46 kits)	\$3.3M
BLK 89 (39 kits)	\$1.3M
Full-rate production:	4QFY99

#### ***BAND 9/10 TRANSMITTER:***

Total Number of Systems:	209
Total Program Cost (TY\$):	\$109.4M
Average Unit Cost (TY\$):	\$524K
Full-rate production:	1QFY97

#### ***LOW BAND TRANSMITTER (LBT):***

Total Number of Systems:	180
Total Program Cost (TY\$):	\$189.6M
Average Unit Cost (TY\$):	\$900K
Full-rate production:	1QFY04

### **Prime Contractor**

Northrop Grumman

Government

Major subcontractor: Northrop Grumman

BAE Systems

BAE Systems

## **USQ-113 (V3) COMMUNICATIONS**

### **JAMMER:**

Lockheed Martin - Sanders

Total Number of Systems:	119
Total Program Cost (TY\$):	\$30.2M
Average Unit Cost (TY\$):	\$253.7K
Full-rate production:	FY96

## **SYSTEM DESCRIPTION & CONTRIBUTION TO JOINT VISION 2020**

The EA-6B "Prowler" aircraft contributes to the *Joint Vision 2020* concept of *full-dimensional protection* and *precision engagement* by improving supported aircraft probability of survival through its contribution to the Suppression of Enemy Air Defenses (SEAD) Electronic Attack (EA) mission. Planned improvements also contribute to *focused logistics* by providing improved built-in-test capabilities to allow confidence in system readiness by maintenance personnel and system health by the aircrew.

The EA-6B is a four-seat, all weather, twin turbojet powered, tactical EA aircraft designed to operate from aircraft carriers and airfields ashore. Its primary mission is the interception, analysis, identification, and jamming of enemy weapons control and communications systems in support of joint offensive and defensive operations. High priority EA missions include SEAD by denying, delaying, degrading, or destroying the enemy's ability to detect and target friendly forces. The crew includes one pilot and three electronic countermeasures officers. The EA-6B carries the AN/ALQ-99 Tactical Jamming System (TJS). The TJS on-board system (OBS) includes the receiver, processor, and aircrew interfaces. The TJS also includes a selection of mission-configured jammer pods carried as external stores. Each jammer pod contains a ram air turbine generator, two selectable transmitter modules with associated antennas, and a universal exciter that is interfaced with and controlled by the OBS and aircrew. The modular open architecture of the jammer system optimizes transmitters and antennas for a given frequency range and tailors mission configurations. The EA-6B also has the USQ-113 Communications Jammer and may be armed with high-speed radiation missiles (HARM) for enemy surface-to-air radar destruction and suppression.

## **BACKGROUND INFORMATION**

Operational since 1972, the EA-6B has undergone a number of upgrades: Expanded Capability, Improved Capability (ICAP), and Improved Capability II (ICAP II). ICAP II, including major upgrades to HARM employment and updated communications, was installed on operational aircraft in Operation Desert Storm. Another significant upgrade, Advanced Capability (ADVCAP), reached Full Scale Development in FY93 but was dropped from the FY95 Navy budget submission and subsequently cancelled. IOT&E of ADVCAP was completed in 1QFY94. This program provided the technical basis for much of the current upgrade program. ADVCAP included a new receiver-processor system, a new communications jammer, a new band 2/3 transmitter, an upgrade to the universal exciter function of the radar jamming system, avionics upgrades, airframe and engine improvements. EA-6B improvements that are currently in development, test, or production are:

- a) Block-89A. Block 89A is a common configuration baseline for the EA-6B fleet. It includes structural, safety of flight, computer, navigation system, and communications upgrades. This upgrade reached IOC in 4QFY00 and seven of ninety-nine aircraft are complete as of the

beginning of FY00. Block-89A configuration is a pre-requisite for the Improved Capability-III (ICAP-III) upgrade discussed below.

- b) Various warfighting enhancements. Improvements to the AN/ALQ-99 jamming pod capability include Universal Exciter Upgrade (FRP 4QFY96), Band 9/10 transmitter (IOC 1QFY00), a prototype Band 7/8 jamming capability (derived from the in-production Band 9/10 transmitter), and the EMD development phase Low Band Transmitter (LBT) upgrades. The USQ-113 (Version 3) Connectivity Upgrade (awaiting OT&E) improves the capability to jam enemy communications. Addition of the Multi-Mission Advanced Tactical Terminal and the Improved Data Modem capability improves battlefield situational awareness for the crew. The program is also integrating Aircrew Night Vision Devices (NVD) to enhance night capabilities.
- c) ICAP III. ICAP III develops and procures a new tactical receiver that provides a reactive jamming capability and replaces the current 1960s era receivers. Additionally, ICAP III systems integrates many of the above mentioned warfighting enhancements with the addition of new controls and displays, allowing improved crew operation. ICAP-III includes provisions for Link-16, via the Multi-Functional Information Distribution System. ICAP-III builds upon the Block-89A improvements to achieve integrated receiver connectivity and reactive jamming/targeting capability through accurate geolocation of active emitters. The procurement plan is to transition all EA-6B aircraft to the ICAP-III configuration by 2010. Of the EA-6B upgrade programs, the ICAP-III program is the only ACAT II program.

## **TEST & EVALUATION ACTIVITY**

**Block 89-A.** Suitability deficiencies (incomplete NATOPS manual documentation) identified in this upgrade program's OPEVAL were resolved and the system reached IOC in 4QFY00.

**USQ-113 Version 3.** DT was completed in April 2000. However, as a result of an Operational Test Readiness Review (OTRR) in May of 2000, OPEVAL is was held until the program office addressed certain safety of flight issues involving the use of a laptop computer in the rear cockpit as an interface to the communications receiver/jammer capabilities. In October 2000, a second OTRR resulted in a successful certification for OPEVAL to begin. USQ-113 was already declared EOC in May 1999 and deployed to two fleet EA-6B squadrons in support of air operations over Serbia.

**Low Band Transmitter (LBT).** The Navy re-baselined the LBT upgrade to the AN/ALQ-99 jammer in September 2000, slipping the program IOC from 3QFY04-2QFY05. The resultant TEMP revision is in progress. During the program restructure, the PEO directed anechoic chamber tests of the transmitter/antennas. These tests took place in August 2000 with favorable results: no catastrophic failures and an assessment by the program office that the problems encountered can be resolved within program cost and schedule constraints. EMD and DT&E activities continue to progress.

**NVD.** NVD integration DT was conducted in August and a Quick Reaction Assessment (QRA) was conducted in September 2000. No major deficiencies were noted prior to the QRA other than insufficient NATOPS documentation. The QRA found the upgrade effective, and recommended that operational testing be done to substantiate the opinions in the QRA.

**ICAP-III.** The Navy re-baselined the ICAP-III upgrade in May 2000 as a result of cost growth due to underestimating the complexity of the LR-700 receiver design, software, and development requirements. IOC slipped from 3QFY04 to 2QFY05. A TEMP revision is in progress. A significant feature of the restructure is that the new acquisition strategy eliminated an LRIP decision, and the concomitant operational test, originally planned in FY02. The key feature of ICAP-III, the LR-700 receiver, prepares for integration into test aircraft and the beginning of DT in FY01.

## **TEST & EVALUATION ASSESSMENT**

DOT&E oversight focuses on ICAP-III, LBT, and USQ-113 Version 3 upgrades; Block-89A and NVD upgrades are essentially complete. USQ-113 Version 3 will eventually complete OPEVAL and provide an improved, safer capability for communications jamming. Recent technical progress and successful anechoic chamber tests have buoyed the LBT upgrade, which now has an executable schedule.

Of the EA-6B upgrades, the ICAP-III program has both the most risk and the promise of greatest reward. Program risk is centered on development of the LR-700 receiver; without it, ICAP-III does not offer much in overall combat capability enhancements beyond new displays. However, if the program office is successful in shepherding an adequate receiver design and software development profile, ICAP-III can provide a much needed reactive jamming and accurate emitter geolocation capability in full azimuth coverage. In restructuring the program, however, an OA and LRIP assessment were eliminated, which inherently increases program risk. To compensate, the program office should imbed an OA early enough in TECHEVAL (DT) so that OT events take place early enough for the OTA to prepare for OPEVAL and for the program to correct deficiencies prior to the subsequent Operational Test Readiness Review. Since ICAP-III integrates new and old avionics supporting all mission roles of the weapons system, the final OPEVAL should be a robust, comprehensive, and challenging flight test of the improved EA-6B's ability to jam and launch HARMs in a composite force, multi-ship environment.