

B-1B Conventional Mission Upgrade Program (CMUP)

The B-1B Lancer is a variable-geometry heavy bomber. The aircraft has four afterburning turbofan engines and its maximum takeoff weight is 477,000 pounds. With air refueling, the B-1B's four-man crew can deliver approximately 50,000 pounds of conventional bombs or precision-guided weapons to targets anywhere in the world at penetration speeds up to Mach 1.2.

Initial Operational Test and Evaluation (IOT&E) of the B-1B was conducted from 1984 through 1989. The B-1B achieved Initial Operating Capability as a nuclear bomber in FY87. Starting in 1993, the Conventional Mission Upgrade Program (CMUP) marked the aircraft's transition from a nuclear to a conventional role. Initial conventional load was limited to 84 MK-82 500-pound general-purpose bombs. To date, block changes carried out under the CMUP have upgraded the aircraft's capabilities as follows:

- Software upgrades to offensive and defensive systems (Block B).
- Capability to deliver CBU-87/89/97 cluster bombs (Block C).
- Communications system upgrades, addition of Global Positioning System navigation, and capability to deliver GBU-31 Joint Direct Attack Munition (JDAM) (Block D).

The following remaining blocks of CMUP are intended to enhance conventional weapons delivery capabilities and improve supportability:

- Upgrade computers for increased weapon flexibility and better supportability and integrate Wind Corrected Munition Dispenser (WCMD) capability (Block E).
- Add Joint Stand-Off Weapon and Joint Air-to-Surface Standoff Missile (JASSM) weapon capability.
- Upgrade the defensive avionics suite by removing most of the existing AN/ALQ-161 and replacing it with an AN/ALR-56M radar warning receiver and portions of the Navy's AN/ALQ-214 Integrated Defensive Electronic Countermeasures (IDECM) system, including a fiber-optic towed decoy (Block F).

TEST & EVALUATION ACTIVITY

Developmental Test and Evaluation (DT&E) of Block E began in December 2000 and concluded in August 2002 at Edwards Air Force Base. A total of 124 Developmental Tests (DTs) and DT/Operational Test sorties were flown, accumulating more than 482 flight hours and approximately 1,234 planned test points. Tests were conducted by a Combined Test Force and included participation of the SEEK EAGLE office for stores certification. Two Operational Test certification flights were conducted at the end of the DT/Operational Test program.

DT&E testing of the Block F defensive system has included hardware-in-the-loop testing at the Nevada Test and Training Range, system integration laboratory testing at the Integrated Facility for Avionics Systems Testing, and aircraft installed-systems testing at the Benefield Anechoic Facility at Edwards Air Force Base, California. Block F DT&E flight-testing began in August 2001. Early testing evaluated aerodynamic aspects of deploying the IDECM towed decoy from the aircraft.

Block E began IOT&E in September 2002. Testing is scheduled to conclude in December 2002. A full-rate production decision is scheduled for FY03.



The primary Block E objectives of increased weapons flexibility and additional capability to deliver WCMD weapons were demonstrated. The military utility of these enhanced capabilities were also demonstrated.

AIR FORCE PROGRAMS

Aeronautical Systems Center (ASC) at Wright-Patterson Air Force Base, Ohio, conducted Live Fire Test & Evaluation (LFT&E) of Block D using large assemblies cut from production aircraft #1. ASC is leveraging on the previously conducted Block D LFT&E to support LFT&E of Block E. All ballistics testing was completed to support Block D Milestone III. An LFT&E report was submitted to Congress in January 1999. LFT&E will be evaluated by analysis for Block E. ASC is currently updating the Air Force Block D LFT&E report to reflect Block E configuration changes and analysis methodology improvements.

TEST & EVALUATION ASSESSMENT

Block E

Block E flight tests of computers and software for all flight conditions and weapon employment functions revealed relatively few anomalies, and the software is stable. The primary Block E objectives of increased weapons flexibility and additional capability to deliver WCMD weapons were demonstrated. The military utility of these enhanced capabilities were also demonstrated.

WCMDs released from all bays experienced pitch downs and inconsistent tail fin deployments. Test results indicate that there will be restrictions on the WCMD delivery envelope and quantities that can be carried as compared to Operational Requirements Document (ORD) objectives. However, ORD threshold requirements will be met. These factors cause the Launch Acceptability Regions (LARs) for B-1B releases of WCMDs to be smaller than for those of other aircraft types.

Additionally, as reported last year, there is a problem with planned Block E design of cockpit controls and displays to support weapon delivery from the aircraft. Concerns about the Block E design are based on crew assessments in simulations and have been verified in flight test. Simulator study results and crew subjective opinions indicate that the planned display of LAR may not provide adequate steering cues to enable flying the aircraft to the correct weapon release zone when the aircraft is not on the planned route or when operators experience heavy workload. The System Program Office and Air Combat Command are currently working short- and long-term situational awareness upgrades to address this problem.

Reliability and maintainability of Block E upgrades were marginal during DT as mean time between maintenance and mean time between failures did not meet requirements. However, a positive growth trend was observed and requirements in this area may eventually be met. Aircraft systems diagnostics were also marginal because of poor fault isolation and high false alarm rates.

During DT&E, several additional issues were identified that may affect the success of Block E in IOT&E. These include:

- Poor accuracy of the radar's ground moving target tracking mode resulting in target coordinate generation errors. To mitigate these errors, a significant increase in the number of WCMDs employed per target may be required to achieve the desired probability of kill.
- Mk-82 weapons released with Air Inflatable Retarders may not achieve the accuracy seen by earlier B-1B blocks without further modifications to ballistic tables.

IOT&E results through November 2002 confirm that problems discovered in DT&E continue to hinder performance in Operational Test and Evaluation.

Block F

The Block F development schedule encountered delays in FY02, primarily due to poor performance of the IDECM towed decoy during DT&E. Setbacks were also caused by delays in Block E avionics software development and problems in the Navy's IDECM program, the latter resulting in late delivery of IDECM hardware and software to the B-1B program.

Although risks were diminishing as DT&E progressed, continued management attention was necessary to solve technical problems, correct deficiencies, and conduct thorough testing of CMUP functions. Current Block F deficiencies could prevent or delay meeting operational effectiveness and suitability requirements. As a result, the Air Force recently cancelled Block F and intends to invest funds to sustain the current defensive suite, exploit stand-off capability by integrating JASSM-ER, and restore B-1 sustainment engineering levels to the command standard. An operational evaluation of this new integrated approach is necessary to adequately assess the viability of the B-1B under this envisioned role.