

## JOINT STANDOFF WEAPON (JSOW)



The Joint Standoff Weapon (JSOW) is a family of kinematically efficient (~12:1 glide ratio) 1,000-lb class, air-to-surface glide weapons that provide for low observability, standoff precision engagement, and launch and leave capability against a wide range of targets during day/night, all weather conditions. All three JSOW variants employ a tightly coupled Global Positioning System/Inertial Navigation System (GPS/INS). JSOW is employed for interdiction of soft/medium fixed, re-locatable and mobile light and heavy armored targets; massed mobile armored targets; anti-personnel; and air-to-surface threats. JSOW primarily functions in a preplanned mission mode where the system can store up to eight targets; however, the system will allow pilot manual inputs as well as third party targeting as long as the targeting system can meet JSOW's targeting requirements. The weapon will be both land and carrier based.

Mission planning will be accomplished using the Navy's Tactical Automated Mission Planning System (TAMPS) and the Air Force Mission Support System (AFMSS). Integration of operations with the Joint Mission Planning System (JMPS) is planned. JSOW will be employed on the following aircraft: F/A-18C/D and E/F; F-16C/D; F-15E; JSF; B-1B; B-2A; and B-52H. The weapon comes in three operational variants.

- AGM-154A (JSOW Baseline) – USAF and Navy: The payload of the AGM-154A consists of 145 BLU-97/B submunitions. The BLU-97/B is a combined effects munition. The bomblets have a shaped charge for an armor defeat capability, a fragmenting case for material destruction, and a zirconium ring for incendiary effects. JSOW Baseline is designed to conduct pre-planned attacks on stationary soft targets such as: air defense sites, parked aircraft, components of airfields and port facilities, command and control antennas, stationary light vehicles, trucks and artillery, and refinery components.
- AGM-154B – (JSOW BLU-108) - USAF and Navy: The payload for the AGM-154B is the BLU-108 submunition from the Air Force Sensor Fuzed Weapon (SFW). JSOW will carry six BLU-108s, each of which dispenses four warheads or skeets. The skeets carry an infrared or dual mode sensor and, upon detecting a target, detonate to create an explosively formed penetrator that impacts the target. This system is an interdiction weapon with a target set of mixed units of tanks, infantry fighting vehicles/armored personnel carriers, and trucks in a tactical road march formation.
- AGM-154C (Unitary Variant) – Navy only: The AGM-154C, in addition to the common GPS/INS guidance, will use an autonomous imaging infrared seeker for target acquisition

and terminal guidance. The AGM-154C will carry the BAE multiple warhead system (Broach), and is designed to attack point targets such as industrial facilities, logistical systems, and shipping locations.

## **BACKGROUND INFORMATION**

The JSOW program is incorporating a new Low Cost Control Section (LCCS) and Low Cost Guidance Electronics Unit (LCGEU) into all variants. This change is planned prior to final operational test and full-rate production decisions of AGM-154B and AGM-154C variants, but will be cut into the full-rate production of AGM-154A. In addition, JSOW will be integrating the new GPS Selective Availability Anti-Spoofing Module (SAASM) security architecture into the LCGEU for delivery in fielded units in late FY07.

### **AGM-154A, BASELINE VARIANT**

In support of the October 1998 Milestone III decision, DOT&E submitted a combined AGM-154A Operational and Live Fire Test and Evaluation Report to Congress.

In April 2000, material defects were discovered in the payload rails and were identified as safety of flight critical to the BLU-97 payload assembly of the AGM-154A (baseline) variant. The corrective action was implemented and retrofit AGM-154As were released for combat operations.

### **AGM-154B, BLU-108 VARIANT**

Although low rate initial production for the AGM-154B was granted 1QFY99, problems encountered with the LCCS delayed the Multi-Service Operational Test and Evaluation, Milestone III, and Initial Operational Capability. The AGM-154B Milestone III decision is currently planned for 4QFY03.

AGM-154B LFT&E is based upon live fire testing conducted for the SFW program. AGM-154Bs will incorporate the Insensitive Munition (IM) fill with the SFW Preplanned Product Improvement (P<sup>3</sup>I) BLU-108.

### **AGM-154C, UNITARY VARIANT**

The AGM-154C LRIP first delivery is scheduled for 1QFY03. The Milestone III decision is currently planned for 1QFY03. In September 2000, USD(AT&L) approved incorporation of the developmental Broach warhead. Due to incorporation of the new warhead, LFT&E (including system-level realistic lethality testing of the AGM-154C against threat representative targets) is required.

## **TEST & EVALUATION ACTIVITY**

### **AGM-154A, BASELINE VARIANT**

Problems were encountered during developmental testing of full-rate production weapons incorporating the LCCS and LCGEU. An F-18C/D launch attempt in June 2001 had failure indications in the control section similar to the F-16 launch of an AGM-154B in September 2000 in which all control section moveable fins fully deflected just prior to release. The weapon hung on the F-18C/D, due to a

software change designed to prevent release in this situation, unlike the F-16 release in which the weapon went out of control and crashed. Investigation of the cause of fin deflection is now complete. The cause appeared to be the LCCS timing oscillator that would crack during the JSOW launch sequence. Combined DT/OT began in November 2001 and FOT&E is planned following DT/OT to evaluate the proposed solution. The problems delayed integration testing on all platforms.

LCCS Fin Motor BIT fail indications and control fin pin lock and insert wear were observed during F-16 captive carriage. In addition, tracking of GPS satellites was inhibited and resulted in navigation anomalies. A separate investigation into the aerodynamic effects on the LCCS hardware and the GPS tracking algorithms in a low altitude, high Mach environment on weapons carried on the F-16 is underway. Environmental loads and vibration data collection is complete on the F-16, F-18C/D, F/A-18E/F, and the F-15E. Environmental data analysis and navigation anomaly resolution efforts are ongoing in support of the All Up Round (AUR) redesign Engineering Change Proposal (ECP).

#### **AGM-154B, BLU-108 VARIANT**

MOT&E has been delayed due to JSOW common technical issues outlined above. MOT&E will begin after the AUR redesign ECP is incorporated. Current MOT&E planned start is 1QFY03. LFT&E and validation testing for the complete P<sup>3</sup>I BLU-108 submunition is covered in the Sensor Fuzed Weapon section.

#### **AGM-154C, UNITARY VARIANT**

AGM-154C developmental flight testing has begun. An operational assessment is planned for 3QFY02, with initial operational testing starting in 2QFY03.

### **TEST & EVALUATION ASSESSMENT**

#### **AGM-154A, BASELINE VARIANT**

The results of Navy OPEVAL and Air Force IOT&E confirmed that JSOW Baseline, AGM-154A, in the LRIP configuration, is operationally effective and suitable. Initial results of testing of the FRP configuration with the LCCS and LCGEU (reported last year), including side-by-side launch of a AGM-154A with the older control section and an AGM-154A with the LCCS and LCGEU, showed no discernable difference in performance including terminal end-game maneuvering, performance within GPS jamming environments, or weapon accuracy between the two configurations. Further testing uncovered the problems outlined above.

An anomaly in the wind estimator was discovered during operational employment of LRIP weapons. A software change to enhance wind estimator effectiveness is being incorporated and will be evaluated during FOT&E of the full-rate production AGM-154As. The F-16 is currently unable to employ JSOW throughout the entire flight envelope. An AUR engineering change to the weapon is underway and is anticipated to be an 18-month effort. A limited F-16 employment envelope is currently under evaluation. The problems encountered during employment and testing this year raised significant operational concerns that must be resolved and tested.

### **AGM-154B, BLU-108 VARIANT**

Since the AGM-154B uses the same air vehicle as the AGM-154A, some test data will be applicable to both variants. However, dedicated MOT&E of the AGM-154B will not begin until after the AUR engineering change is incorporated. MOT&E weapons will have the BLU-108 P3I warhead with IM fill.

### **AGM-154C, UNITARY VARIANT**

Developmental testing has begun. No operational assessment has been accomplished. Static testing of the Broach warhead and captive carry tests of the seeker have been conducted. The first free flight occurred in December 2001.