Joint Standoff Weapon (JSOW)

The Joint Standoff Weapon (JSOW), produced by Raytheon, is a family of kinematically efficient (~12:1 glide ratio) 1,000-pound class, air-to-surface glide weapons intended to provide low-observable, 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. The system will allow pilot manual inputs of up to eight targets as well as third party targeting as long as the targeting system can meet JSOW's targeting requirements. The weapon is intended to be used by land- and carrier-based forces.

The air crew accomplishes mission planning using the Navy's Tactical Automated Mission Planning System and the Air Force Mission Support System. Integration of operations with the Joint Mission Planning System is planned. JSOW will be employed on the following aircraft: F/A-18C/D and E/F; F-16C/D; F-15E; F-35; B-1B; B-2A; and B-52H. The weapon comes in three operational variants:

- AGM-154A (JSOW Baseline) – Air Force and Navy: The payload of the AGM-154A consists of 145 BLU-97/B sub-munitions. The BLU-97/B is a combined effects munition. The bomblets consist of a shaped charge for light armor defeat capability, a fragmenting case for material destruction, and a zirconium ring for incendiary effects. The 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) – Navy only (the Air Force withdrew support in FY02): The payload for the AGM-154B is the BLU-108 sub-munition from the Air Force Sensor Fuzed Weapon. JSOW carries six BLU-108s, each of which dispenses four warheads, or skeets. Each skeet carries an infrared or dual-mode sensor, and upon detecting a target, detonates to create an explosively formed penetrator that impacts the target. This system is an interdiction weapon. The target set consists of tanks, infantry fighting vehicles/armored personnel carriers, and trucks in a tactical road-march formation. The President's budget did not include funding for the BLU-108 variant. The Navy no longer intends to continue development of this variant.
- 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 British Aerospace multiple warhead system (Broach). The Broach warhead, consisting of an augmenting charge and a follow-through bomb, can be set to explode both warheads simultaneously or sequentially. The AGM-154C is designed to attack point targets vulnerable to blast and fragmentation effects and point targets vulnerable to penetration, such as industrial facilities, logistical systems, and hardened facilities.

AGM-154A, Baseline Variant
Initial operational testing of the AGM-154A concluded in FY98. DOT&E submitted a combined AGM-154A OT&E and LFT&E report to Congress to support a Milestone III decision in October 1998. The AGM-154A, incorporating a new low cost control section and guidance unit, entered full-rate production in FY99. A deficiency in AGM-154A software's ability to accurately estimate wind effects was later suspected as a result of combat employment of AGM-154A weapons in FY00. The Air Force

AGM-154A follow-on operational tests confirmed the effectiveness and suitability of new hardware and software.

and Navy later confirmed the deficiency during developmental testing in FY01. Operational tests of both new hardware and updated software began in FY02.

AGM-154B, BLU-108 Variant
The Navy approved the low-rate initial production of the AGM-154B in FY99. Continued developmental tests ceased in FY00 during production verification due to numerous system performance shortfalls.

AGM-154C, Unitary Variant
In September 2000, the Under Secretary of Defense (Acquisition, Technology and Logistics) approved incorporation of the developmental Broach warhead. Due to incorporation of the new warhead, LFT&E is required.

TEST & EVALUATION ACTIVITY

AGM-154A, Baseline Variant
Adequate operational test of both new hardware and updated software began in FY02, but was not complete prior to deployment in the Navy in November 2002. Adequate operational testing of this AGM-154A hardware and software configuration was not complete until December 2002. Operational testing in FY03 also included evaluation of the effectiveness and suitability of a further re-design of the AGM-154A control section intended to enable the F-16 to employ the weapon throughout the entire F-16 operational envelope.

AGM-154B, BLU-108 Variant
Although the Navy conducted test planning for operational evaluation (OPEVAL) through mid-FY03, testing is no longer planned.

AGM-154C, Unitary Variant
An operational assessment to support an AGM-154C low-rate initial production decision began in January 2003. Testing concluded in June 2003 and consisted, primarily, of captive carry missions to evaluate seeker performance and concluded with the free flight of an inert AGM-154C. Developmental flight-testing is slated to conclude in FY04. The Navy has initial operational testing planned for FY04.

LFT&E of static warhead arena testing to characterize the Broach warhead's blast and fragmentation performance began in September 2002. Dynamic warhead integration sled testing began in October 2002. Live warhead developmental flight-testing began in August 2003.

TEST & EVALUATION ASSESSMENT

AGM-154A, Baseline Variant
DOT&E's evaluation of the results of Navy operational evaluation and Air Force IOT&E confirmed that the AGM-154A, in the low-rate initial production configuration, is operationally effective and suitable.

Follow-on operational tests concluded in December 2002 and July 2003, were adequate to evaluate the effectiveness and suitability of new software and hardware. Results confirm the hardware deployed to the fleet, the redesigned control section to support F-16 full envelope employment, and updated Baseline software are effective and suitable for combat. Operational testing to evaluate F-16 capability to employ weapons from the BRU-57 smart rack was delayed, awaiting certification of an expanded employment envelope, and will be accomplished under additional follow-on operational testing.

AGM-154C, Unitary Variant
An operational assessment of the unitary variant, concluded in June 2003, was adequate. Initial performance of the system resulted in the seeker tracking well outside requirements. Mission planning was slow and was evaluated as not

suitable. Regression testing with updated seeker software later demonstrated that guidance to the intended point of impact has the potential to meet requirements. However, improvements to mission planning remain undemonstrated.

Sled tests against concrete slabs have not demonstrated follow-through bomb lethality. The results from one of three developmental flight-tests using live warheads against similar targets has resulted in no follow-through bomb detonation. Additional risk-reduction efforts performed by the contractor occurred prior to the last developmental free-flight test event. Although risk reduction efforts and an additional weapon drop have delayed entry into operational testing, additional developmental testing and further risk reduction should increase the probability of weapon system success during OPEVAL.

Four static arena tests occurred in FY03 to characterize the blast and fragmentation performance of the Broach warhead in both simultaneous and sequential detonation modes. Analysis of these results will be available in FY04. Warhead lethality and the intended level of damage against realistic targets will be assessed during the combined OT&E and LFT&E.

To proceed forward with OPEVAL, target materials and construction where lethal warhead effects occur must be realistic for all targets. OPEVAL will test the weapon in a realistic GPS-jamming and camouflaged, concealment, and deception environment, but will simulate surface-to-air threat systems. The Navy will complete an evaluation of weapon survivability against realistic surface-to-air threat systems during follow-on operational testing.