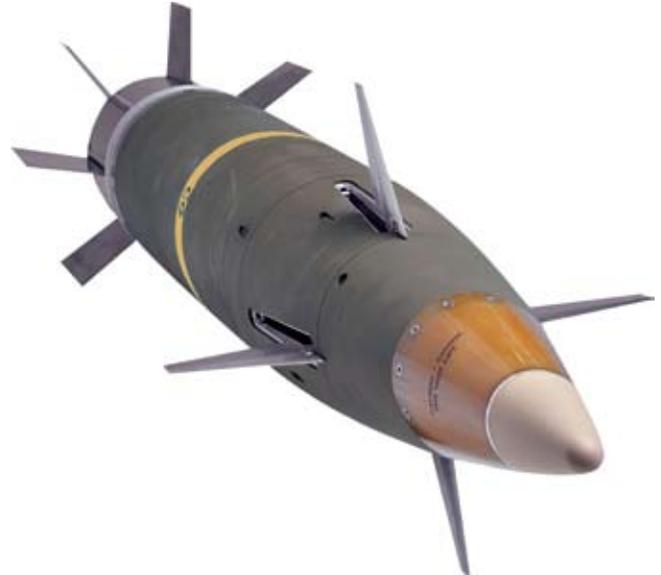


Excalibur XM982 Precision Engagement Projectiles

Executive Summary

- On May 23, 2007, OSD approved the Excalibur Milestone C Test and Evaluation Master Plan (TEMP).
- The Increment Ia-1 projectile completed developmental testing, a Limited User Test with an Army firing battery platoon equipped with Paladin Howitzers, and a Customer Test with a Marine Corps unit using Lightweight 155 mm Towed Howitzers.
- The Army approved an Urgent Material Release for Increment Ia-1 to Iraq in April 2007. DOT&E delivered an Early Fielding Report to Congress, in accordance with Section 231 of the 2007 National Defense Authorization Act, summarizing Excalibur's demonstrated performance.
- Increment Ia-2 projectile development continues. In April 2007, the Increment Ia-2 achieved a range of 40 kilometers (km) during a live fire event.
- In July 2007, the Army approved entry of the Increment Ia-2 projectile into low-rate initial production.



System

- Excalibur is a family of precision-guided, 155 mm artillery projectiles.
- The Army is developing three Excalibur variants:
 - ~ High Explosive, Unitary (Increment I)
 - ~ Smart (Increment II)
 - ~ Discriminating (Increment III)
- The Army will develop the High Explosive, Unitary Projectile (Increment I) in three spirals of increasing capability (Ia-1, Ia-2, and Ib).
- All variants use Global Positioning System (GPS) and an Inertial Measurement Unit to attack point targets with an accuracy of less than 20 meters from the desired aim point.
- The projectiles are fin-stabilized and glide to extended ranges beyond 30 kilometers by using base bleed technology and aerodynamic lift generated by canards in the nose of the projectile.

Mission

Artillery units will use Excalibur to provide fire support to combat maneuver units in all weather and terrain, including urban areas. Artillery units will use:

- The High Explosive, Unitary Projectile (Increment I) to attack stationary targets in complex and urban terrain and minimize collateral damage
- The Smart Projectile (Increment II) to engage moving and time sensitive targets
- The Discriminating Projectile (Increment III) to search, detect, and selectively engage individual vehicles by distinguishing specific target characteristics

Activity

Increment Ia-1

- The Increment Ia-1 projectile completed safety and developmental testing in 1QFY07. This included Production Verification Tests, which verified the contractors could furnish the projectile in accordance with the established technical criteria and contract specifications; and First Article Tests, which verified the capability of the manufacturing process, equipment and procedures, and certified the projectile free from critical safety incidents. Live fire flight testing, conducted against realistic ground targets, used live warheads.
- In February 2007, the Increment Ia-1 projectile completed a Limited User Test (LUT) in which a Paladin Howitzer-equipped artillery platoon fired the projectile. This test cleared the projectile for material release and use by Paladins, which are equipped with the Portable Excalibur Fire Control System.
- In April 2007, the Army approved an Urgent Material Release of the Increment Ia-1 projectile to Operation Iraqi Freedom (OIF). DOT&E delivered an Early Fielding Report

to Congress, in accordance with Section 231 of the 2007 National Defense Authorization Act, summarizing Excalibur's demonstrated performance.

- In June 2007, during a Customer Test with the Marine Corps, Joint Lightweight 155 mm Towed Howitzers fired the Increment Ia-1 projectile. This test cleared the projectile for material release with the M777A2 Howitzers, which are equipped with the Enhanced Portable Inductive Fuze Setter.

Increment Ia-2

- In April 2007, developmental testing of the Increment Ia-2 projectile continued with a "Shooter-to-Effects on Target" live fire demonstration. In this demonstration, the projectile achieved a range of 40 km and demonstrated its initial capability in a limited GPS jammed environment.
- In May 2007, OSD approved the Excalibur Milestone C TEMP for Increment Ia-2.
- In July 2007, the Army Acquisition Executive approved the Milestone C decision for the Increment Ia-2 projectile to enter into low-rate initial production.
- Beginning in August 2007, the Increment Ia-2 projectile will undergo a series of Sequential Environmental Tests for Safety and Performance. These tests are used to evaluate the Increment Ia-2 projectile against all the requirements identified in the Capability Production Document. Live Fire flight tests, conducted against realistic ground and structure targets, will use live warheads.

Assessment

- The Excalibur Increment Ia-1 projectile achieved the desired lethal effects against personnel and structure targets during the February 2007 LUT. The projectile met reliability, safety, and suitability goals for early release to combat forces. Its April 2007 fielding to artillery units in OIF enhanced their ability to precisely strike targets requiring minimal collateral damage.
- The Excalibur Increment Ia-2 projectile demonstrated effectiveness against personnel and structure targets in an unjammed environment. The projectile is expected to meet reliability, survivability, and safety requirements before the full-rate production decision point.
- Excalibur projectiles rely on GPS technology to enhance accuracy, which may make them vulnerable in a GPS

jamming environment. To overcome this, the contractor and program manager have developed a plan to address projectile susceptibility, which will be validated in future operational testing.

- The Smart (Increment II) and Discriminating (Increment III) projectiles Milestone C decisions are expected to be made beginning FY13. These projectiles will incorporate target discrimination capabilities. The previous efforts to field projectiles with target discrimination capabilities were successful against fully exposed benign targets but consistently unsuccessful against targets that employed active and passive countermeasures. It will challenge the program to successfully demonstrate target discrimination capabilities in the next seven years.

Recommendations

- Status of Previous Recommendations. The Army is making progress on DOT&E's previous recommendations. The Army postponed Milestone C so that the program could complete a LUT and focus on event-driven testing instead of schedule-driven testing (FY05). The program used Soldiers in several developmental testing events as permitted by safety releases (FY05). The Army is reviewing Guided Multiple Launch Rocket System fire mission reports from Iraq to assist in the development of Excalibur tactics, techniques, and procedures. The U.S. Army Fires Center of Excellence reviews all new reports concerning Increment Ia-1 employment in Iraq for potential implications to the future variants (FY06).
- FY07 Recommendations. The Army should:
 1. Improve and accelerate the fielding of more precise targeting systems to dismounted forces in order to achieve Excalibur accuracy requirements.
 2. Address the self-jamming problem identified during cold conditions environmental testing in order to reduce incidents of stray rounds.
 3. Implement updated anti-jamming solutions in time for FY08 testing.