

XM982 Excalibur Precision Engagement Projectiles

Executive Summary

- The Army approved the Spiral Ia-1 Milestone C in April 2005. This decision also approved the early fielding of Spiral Ia-1 to coalition forces in FY06 in response to an urgent needs statement from the Multi-National Corps - Iraq.
- DOT&E approved the Excalibur Test and Evaluation Master Plan (TEMP) on May 27, 2005.
- Initial tests indicate the required accuracy and adequate lethality will be met.
- Excalibur must still overcome technical challenges before it can demonstrate operational effectiveness and suitability.

System

- Excalibur is a family of precision-guided, 155 mm artillery projectiles.
- The Army is developing three variants:
 - High explosive, unitary (Block I)
 - Smart (Block II)
 - Discriminating (Block III)
- The Army will develop the high explosive, unitary projectile in three spirals of increasing capability (Ia-1, Ia-2, and Ib).
- All variants use inertial guidance and Global Positioning System (GPS) technology to achieve enhanced accuracy and impact less than 10 meters from an aim point.
- The projectiles are fin-stabilized and will glide to ranges beyond 30 kilometers (km).

Mission

- Artillery units will use Excalibur to provide fire support to combat maneuver units in all weather and terrain including



urban areas.

- The high explosive, unitary projectile will be used to attack stationary targets in complex and urban terrain, while minimizing collateral damage.
- The Smart projectile will engage moving and time sensitive targets.
- The Discriminating projectile will search, detect, and selectively engage individual vehicles by distinguishing specific target characteristics.

Activity

- The contractor fired three projectiles during the Guided-Gunfire A tests in 1QFY05. Two projectiles impacted less than seven meters from the target. The other projectile failed to acquire the GPS signal and flew a ballistic trajectory to a pre-determined fail-safe impact area.
- Arena testing demonstrated lethality at least as effective as the current 155 mm, high explosive projectile.
- The Army approved the Spiral Ia-1 Milestone C in April 2005. This decision also approved the early fielding of Spiral Ia-1 to coalition forces in FY06 in response to an urgent needs statement from the Multi-National Corps - Iraq.
- DOT&E approved the Excalibur TEMP on May 27, 2005. The TEMP outlines an adequate test and evaluation strategy to support a Spiral Ia-2 Milestone C decision in 1QFY07 and a Spiral Ib Milestone C decision in 4QFY09.
- The Army conducted a Front End Demonstration in June 2005 to confirm and refine tactics, techniques, and procedures for Excalibur missions.
- The contractor conducted a flight test with two projectiles on September 1, 2005. Both projectiles successfully acquired GPS signals and navigated pre-programmed maneuver flight patterns.
- The contractor conducted the first flight test with an actual, tactical projectile on September 15, 2005. The projectile flew 15 km and impacted seven meters from the aim point. The contractor intended to fire a second projectile, but postponed that flight test after the projectile failed to initialize.
- The contractor plans to fire 10 projectiles against threat representative targets between December 2005 and January 2006 as part of the Guided-Gunfire B series of tests.

ARMY PROGRAMS

Assessment

- Initial Excalibur testing has demonstrated required accuracy and lethality.
- Excalibur must still overcome many technical challenges. Those challenges include:
 - Reducing initialization time to meet autoloader requirements
 - Achieving reliable fin and canard deployment
 - Improving airframe maneuverability
 - Integrating an inductive fuze setter
 - Hardening the inertial measurement unit
 - Enhancing GPS acquisition
 - Integrating base bleed technologies to achieve extended ranges
- The schedule for the development and testing of Spiral Ia-1 is ambitious, with little time to fix problems.
- Significant effort is required to mitigate GPS jamming.
- The smart and discriminating projectiles, which are scheduled for Milestone C decisions in FY13, incorporate target

discrimination capabilities. Previous efforts to field smart projectiles have been successful against benign targets, but have been less successful against targets that employ active and passive countermeasures.

Recommendations

1. The testing of Spiral Ia-1 should remain event-driven. Failure to meet specific Army entrance and exit criteria specified in the TEMP prior to progressing to the next stage of testing will add program risk.
2. Due to the ambitious schedule for Spiral Ia-1, the Army should incorporate operational realism into the developmental testing whenever possible to reduce program risk. This includes using soldiers as forward observers, fire direction personnel, and gun crews.