Precision Strike Association

Excalibur Overview

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PEO Ammunition
Picatinny Arsenal, New Jersey
Deliver Leap-Ahead Munitions to War Fighters

Revolutionary Capability for Cannon Artillery

Excalibur Can Now Quickly Engage Targets Previously Unreachable with Cannon Artillery

Your Target

- Makes Cannon Artillery Relevant in Today’s Conflicts
- Precision Accuracy Provides Single Round Effects
- Low Collateral Damage
- Not just for urban environment
**Mission Statement:**
Provides improved fire support through a Precision Guided Extended Range family of 155mm projectiles with greatly increased accuracy and reduced collateral damage.

**Characteristics / Description:**
- Precision Guided, Extended Range Carrier for a Family of 155mm Cannon Ammunition
- Optimal Terminal Trajectory for Urban/Complex Terrain (Near Vertical Angle of Fall)
- Fin Stabilized Glide Air Frame
- All Weather, Day/Night, Fire & Forget
- 4-Axis Canard Actuation System for Maneuverability
- One Meter Length / 106 pounds
- Objective Maximum Range: 40km (39cal), 50km (50cal)

**Special Features:**
- GPS - Inertial Navigation System (INS) Guidance
- Conducts In-Flight Guidance and Trajectory Correction for Precision Attack
- Tri-mode fuze capable of penetrating urban structures
- Automated - inductive fuze setting

**Capability / Improvements:**
- Increased Accuracy, Less Than 4 meter CEP at all Ranges
- Precision Delivery Decreases Collateral Damage
- Expands the Missions and Capabilities of Cannon Artillery
  - Urban and other Complex Terrain
- Decreases Volume of Fire Per Engagement
- Evolutionary Acquisition / Block Development Enables
  - Technology Refresh, Improved Reliability
  - A "Precision Bus" for Future Payloads (Smart, Discriminating, Non-Lethal, etc.)

**Contractors**
- Ia-1, Ia-2, lb Prime-Raytheon Missile Systems
Excalibur
Concept of Operations

- Precision Delivery Regardless of Range
- Limits Collateral Damage
- Decreases Volume of Fire Per Engagement
- Enhances Soldier Survivability

Deploy Canards prior to Apogee (Ballistic prior to Apogee)

GPS Acquisition and Track

Impact Near Vertical for Max Lethality

Fragmenting Warhead

Structure Top Attack (Detonation after Penetration)

- Gun Target Location
- Trajectory Information
- GPS Crypto Keys
- Precise Time
- Fuze Setting
- Power

Mission Planning

Latitude / Longitude / Altitude

Top Attack, 3 Fuzing Modes:
- Height of Burst
- Point Detonating
- Delay/Penetration

Sensors:
- M707 Knight w/FS3
- Stryker FSV w/FS3
- M7 & M2A3 BFIST
- Shadow PIP TUAV
Product Overview

Increment Ia-1: **Urgent, Early Fielding (XM982)**
- Fielded Now
- Production Complete
- Precision Capability to Theater
- Met Urgent Need/Lessened Requirements

Increment Ia-2: **Baseline Program (M982)**
- Fielding Now
- Full Rate Production
- Extended Range (added base bleed)
  - Beyond 37.5 km (Ia-1 = 24km)
- Improved Reliability (>85%)
- Improved Countermeasures

Increment Ib: **Affordability (M982E1/A1)**
- In EMD MS C – FY13
- Reduced Cost of Proc Rd by 50%
- Increased Reliability (>90%)
- Begins production 2QFY13

Current CEP 3.8 Meters
Elements of Predicted Fire with Excalibur

Target Location - Essential
Observer Location - Less Critical
Gun Location - Less Critical
Muzzle Velocity - Less Critical
Weather - Less Critical

Excalibur Compensates for Four of the Five Critical Elements

Circular Error Probable (CEP) - The Radius of a Circle Within Which 50% of the Projectiles Fired Will Impact
Miss Distances and CDE

10M Excalibur Radial Miss Distance (CEP90)

Collateral Damage of a 50M CEP

Collateral Damage Reduced

– Highly Accurate
– Top Down Attack
– Optimized Height of Burst
– 22kg (50 lb) warhead
**39 Caliber 155mm Artillery**

**Excalibur 1a-2 Proj**
- MACS Charge-3H (21km Optimal) 24km
- MACS Charge-4H (29.1km Optimal) 33km
- MACS Charge-5H (37.5km Optimal) 40km

**Excalibur 1a-1 Proj**
- MACS Charge-3H (16.5km Optimal) 22km
- MACS Charge-4H (25.2km Optimal) 28km

**M549A1 Proj**
- MACS Charge-3H 20.3km
- MACS Charge-4H 24.6km
- MACS Charge-5H 30.4km

**M795 Proj**
- MACS Charge-3H 15.1km
- MACS Charge-4H 18.5km
- MACS Charge-5H 22.3km

- Increases the range by 20%
- Increases area coverage by 35%

*Optimal* 40+km

*Degraded* (16.5km Optimal) (20km Optimal) (21km Optimal) (25.2km Optimal) (37.5km Optimal) 40+km
**Logistics and Effectiveness**

### Infantry Platoon
- M107: 43 Rounds
- M549: 25 Rounds
- Excalibur: 3 Rounds

### Command Post
- M107: 78 Rounds
- M549: 54 Rounds
- Excalibur: 6 Rounds

### Radar
- M107: 11 Rounds
- M549: 10 Rounds
- Excalibur: 1 Round

### Structures
- M107: 147 Rounds
- M549: 110 Rounds
- Excalibur: 3 Rounds

**Effects Comparison:**
- M107 at 15Km
- M549 at 20Km
- Excalibur at any Range

**Reduced Demand for Shells, Fuzes, Charges by ~90%**