Cannon Artillery and Mortar Precision Effects

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“The presentation to the effect that disclosure of information does not imply any specific intent or commitment on the part of the U.S. to provide further information on the topic.”
Cannon Artillery and Mortar Precision Effects Capabilities

- All weather 24/7 continuously “loitering” precision capability
  - Responsively and precisely attack targets…can precisely “mass” fires
  - Minimizes collateral damage…“discretion” & “close” engagements
  - Inherent scalability with multiple shooters and multi-round missions
  - Dramatically reduced logistics burdens (less qtys and transport/storage)

- Employed with current cannon artillery & mortar systems and structure…& accurate targeting systems (FS3, LLDR, PSS-SOF)
  - Easily additive to current systems and capabilities…“compatibility” is key
  - Maintains current smoke & Illum capabilities…“precision” smoke w/PGK?
  - Maintains area fire & suppressive fires capabilities…“precise” area fires?

- PM CAS Indirect Fire Precision Efforts
  - Excalibur provides 155mm artillery <10m CEP capability out to 40 kms
  - Precision Guidance Kit (PGK) for 155mm & 105mm artillery projectiles
  - Exploring 105mm artillery & 120mm mortar precision with ARDEC / ARL
System Characteristics/Description:

- Precision Guided 155mm Cannon Ammunition (CEP < 10m)
- Fin Stabilized, Gliding Air Frame
- All Weather, Day/Night, Fire & Forget, Urban/Complex Terrain
- Compatible with NLOS-C, Paladin and LW155 Howitzer Platforms
- One Meter Length / 106 lb
Excalibur Concept of Operations

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

Mission Planning

- Precision Delivery Regardless of Range
- Limits Collateral Damage
- Increases Range to 40 kms
- Decreases Volume of Fire Per Engagement
- Enhances Soldier Survivability

System Initialization

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)

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

Latitude / Longitude / Altitude
Excalibur Program Status

- Excalibur Block Ia-1
  - Operational use in theater
  - Block Ia-1 production deliveries ongoing

- Excalibur Block Ia-2 (longer range version)
  - Block Ia-2 operational test planned for Jun 09

- Excalibur Block Ib
  - Increased reliability and significantly reduced unit costs
  - Competitive Source Selection ongoing
Precision Guidance Kit (PGK) 155mm Projectile Accuracy

- Increased effectiveness (kills targets quicker)
- Increased stowed kills per platform
- Reduced collateral damage
- Reduced logistics burden
- Closer support of friendly troops

PGK Increment 1 Provides CEP Accuracy of < 50 Meters
Operational Benefits

Today’s Capability: 183m CEP*

- Village Destroyed
- Refinery Destroyed
- Target May Have Been Hit

PGK: ≤50m CEP

- Target Destroyed
- Minimal Collateral Damage

* M109A6 (Paladin) at 27km: 155mm (HE) M549A1

- Improves Accuracy – Significantly Reduces Ballistic Dispersion
- Significantly Decreases the Time Needed to Achieve Desired effects
- Minimizes Collateral Damage
- Increases Number of Kills per Basic Load of Ammunition
- Greatly Reduces Logistics Burdens
• Fits in standard 155mm High Explosive artillery projectile fuze wells (deep intrusion)

• GPS guidance (incorporates SAASM)

• 20 Year Storage Life (no battery)

• Proximity & Point Detonating Fuzing

2007 Tech Demo Firing
PGK Video

PGK

Precision Guidance Kit
### PGK Incremental Schedule

**Date:** 17 Oct 07

#### PGK Increment 1
- ≤ 50m CEP
- 155mm HE only
- Paladin & M777A2

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**Production & Deployment**

- TD
- SD&D
- MS B
- IPR
- MS C
- MR/IOC
- MR/IOC
- End to End Demo
- LUT
- FAT

#### PGK Increment 2
- ≤ 30m CEP.
- Adds 105mm (HE)*
- NLOS-C (O)

*Requires Digitized M119A2

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**Production & Deployment**

- SD&D
- MS B
- DR
- MS C
- MR/IOC
- MR/IOC
- End to End Demo
- LUT
- FAT

#### PGK Increment 3
- ≤ 30m CEP
- Adds 105mm & 155mm Cargo
- NLOS C (T)

**Production & Deployment**

- SD&D
- MS B
- MS C
- MR/IOC
- MR/IOC
- FAT
- LUT

**Fielding Inc. 1 in FY10**
Emerging Needs/ Future Requirements

IBCT Organic Precision Requirements

- 40 Plus IBCTs within Army structure...have mortars & 105mm
- PGK-2 is funded...implemented with 105mm digitization
- Need for organic very responsive precision with <10m CEP

“Cheap” or “Very Affordable” Precision is “coming soon”

- Key technologies...IMUs, GPS, S&As, Power, AJ, & SALs
- ARDEC/ARL VAPP effort to mature components and integrated concepts...applicable to artillery and mortars
- Several Industry efforts ongoing...will enable competition
- Wider use in training...confidence, proficiency, and quantities