Cannon Artillery and Mortar Precision Effects

Presented by: COLONEL Ole Knudson
Project Manager for
Combat Ammunition Systems
973 724-2003, ole.knudson@us.army.mil

“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.”
What Level of Precision is Needed?

- Urban Density Can Vary Widely Over Small Distances Between Terrain Elements
- Munitions with Varying Levels of Precision May Be Most Cost-Effective

Area Munition

- 120m Radius Circle

Open Area

Area Precision Munition

- 50m Radius Circle

Densely-Packed Urban

Precision Guided Munition

- 10m Radius Circle

Sparsely-Packed Urban

Cultural Area
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 force structure… & accurate targeting systems (FS3, LLDR, PSS-SOF, and others)
  - Easily additive to current systems and capabilities… “compatibility” is key
  - No additional manpower or force structure is needed
  - Maintains current Smoke & Illum capabilities
  - Maintains area fire & suppressive fires capabilities… “precise” area fires?
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

- Precision Delivery Regardless of Range
- Limits Collateral Damage
- Increases Range to 40 kms
- 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

Structure Top Attack (Detonation after Penetration)

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

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
Excalibur Video

Excalibur M982
155mm Artillery
Precision Projectile
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 and Enables Closer Support to Friendly Troops
• 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
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
  ✓ ONS for organic very responsive precision with <10m CEP

➢ “Cheap” or “Very Affordable” Precision
  ✓ Key technologies… GPS, Fuzing, Power, AJ, & SALs
  ✓ ARDEC/ARL CRADA efforts to mature components and integrated concepts…applicable to artillery and mortars
  ✓ Several Industry efforts ongoing…should enable competition
  ✓ Wider use in training…confidence, proficiency, and quantities

Is Very Affordable Precision “Coming Soon”?