Precision Guided Mortar Munition

XM395 PGMM

International Armaments Technology Symposium
16 June 2004

Pete Burke
Office of the Product Manager for Mortar Systems
Agenda

• Organization
• Requirements
• Compatibility (Interoperability)
• Training
PEO Ammunition

Mission:
Deliver Conventional and Leap-Ahead Munitions Combat Power to Warfighters
PM Combat Ammunition Systems

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PM CAS Goals
Get Smart and Precision-Guided Munitions to the Warfighter
Improve and Sustain Conventional Munitions
Satisfy Customers and Achieve Excellence
Grow World-Class People and Teams
PM Mortars

Mission

Life Cycle Manager for the full range of mortar systems to include weapons, fire control, and advanced ammunition integrated across Current and Objective Forces.

Vision

To Be the Mortar Systems Expert who provides the Close Combat Warfighter with the World’s Best Integrated Mortar Systems
Systems Approach
Mortars: Responsive Indirect Fire for Close Combat

That was then ...
Mortars: Responsive Indirect Fire for Close Combat

This is now!
Transforming Army Indirect Fires

Networked through Battle Command
Fully Interoperable with Joint systems
Mobile (Strategic and Tactical)
Responsive & Integrated with Maneuver
Lethal (through precision and volume)
Precise Effects with Area Options
Reduced Sustainment
Ability to Mass Effects
24/7, All-Weather, All-Terrain

Challenges
Strategic Deployability
Networked Capability (C4)
Tactical Mobility
Target Location (ISR)
Accuracy / Rate of Fire
Precision Munitions

To achieve **Destructive, Suppressive** and **Protective** effects
while **minimizing collateral damage**
taking advantage of **emerging technology**
Trends in Rules of Engagement (ROE)

• Minimize Collateral Damage to Protect . .
  – Non-combatants
  – Religious and Cultural Landmarks
  – Socio-Economic Infrastructure (METT-TC Context)

• Minimize Unexploded Ordnance
Threat Trends

- **Asymmetric/Paramilitary**
- Use **Nonrestrictive** Rules of Engagement
- Seeks Cover in Reinforced Structures, Bunkers, and Vehicles near politically sensitive targets
- Execute **widely dispersed**, often well equipped, small unit operations
  - **Non-linear** battlefield
- Interspersed with **Noncombatants**
- Seeks Sanctuary in Urban and **Complex Terrain**
- Exploits Terrain and Geography
- Possesses **Electronic Countermeasures**
- Intentionally use **civilians** as obstacles
- Capitalize on **media**’s response to U.S. military power
Mortar Ammunition Growth Plan

- 3 families of Ammunition (120mm, 81mm, 60mm)
- Highly Flexible
  - Suppression, Obscuration, Illumination
- Area Weapon – Large CEP
- Drop Fired
- Multi-Option, Hand Settable Fuzing
- Max Range 7,200 Meters (120mm)

- Adds Precision
  - High Priority Targets
  - Most Dangerous Targets
  - Low Collateral Damage
- Improved Conventional Effects
- Breech Loaded
- Automated Loading/Handling
- Extended ranges (12-15 km)
- Non-Lethal Effects

Roles for Mortars are Expanding in Range & Capabilities
**Precision Guided Mortar Munition**

**High Explosive**
- Area Effects
- High Volume Fire
- Defeat Targets in the Open
- Suppress Personnel Under Cover

**Precision Guided**
- Precision Effects
- 1-2 Rounds to Effect Target
- Incapacitate Personnel Under Cover
- Low Collateral Damage

PGMM gives Battalion Commanders Organic Precision Strike, Destructive Capability
## Incremental Development

<table>
<thead>
<tr>
<th>Accuracy</th>
<th>2004</th>
<th>2010</th>
<th>TBD**</th>
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<tbody>
<tr>
<td><strong>M934A1</strong>&lt;br&gt;High Explosive</td>
<td><strong>XM395</strong>&lt;br&gt;PGMM</td>
<td><strong>XM395A1</strong>&lt;br&gt;PGMM</td>
<td><strong>XM395A2</strong>&lt;br&gt;PGMM</td>
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<tr>
<td><strong>Increment 1</strong></td>
<td><strong>Increment 2</strong></td>
<td><strong>Increment 3</strong></td>
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<tr>
<td><strong>Area Fire</strong>*</td>
<td>&lt; 2 rounds</td>
<td>&lt; 2 rounds</td>
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<tr>
<td><strong>Range</strong></td>
<td>7.2 km</td>
<td>7.2 km</td>
<td>12 km</td>
<td>15 km</td>
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<td><strong>Lethality</strong></td>
<td>High</td>
<td>High</td>
<td>High</td>
<td>High +</td>
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<tr>
<td><strong>Cost</strong></td>
<td>Affordable&lt;br&gt;&lt;$1K</td>
<td>Affordable&lt;br&gt;$5 – 15 K</td>
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<td>Affordable</td>
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* Suppression of Enemy Troops
** Dependent on availability of funding and subject to further requirements analysis and approval

Incremental Development will Build on each Version’s Successful Fielding and Employment
PGMM Requirements  
Increment 1

• **PGMM Requirements are Final**, Approved by the Joint Requirements Oversight Council (JROC) on 27 April 04.

• **Key Performance Parameters:**
  
  – Incapacitate Personnel protected by Earth & Timber Bunkers, Masonry Structures, or Lightly Armored Vehicles **in 2 Rounds or Less**
  
  – Range: Match current maximum range (Threshold), 10km (Objective)

  – **Compatibility (Interoperability):** Work within current / future 120mm weapons, fire support system
PGMM Operational Concept

Leverages Existing Fire Support Systems (G/VLLD, LLDR, AFATDS) Reduces Collateral Damage

PGMM Adds Destructive Capability to Mortars for High Value Targets
Compatibility (Interoperability) Challenge

Joint Service Forward Observers, Designators

Mortar Fire Control System

TRAINING

Weapons, Carriers, Crews

PGMM Must Communicate with MFCS, Operate within Mortar Environment (transportation, handling, firing), and Guide to Designator’s Spot on the Target
Conventional Mortar Training
Live Firing

Live Firing Offers Best Training Value for Conventional Ammunition, *but* Precision Munitions can’t Afford this…
Precision Guided Mortar Munition

XM395 PGMM

Mortar Firing.avi
PGMM Mission Thread

1. Target Identified
2. Call for Fire
3. Compute Ballistic Solution
4. Prepare, Hang, Fire
5. Shot Over
6. Lase Target
7. Shot Out
8. Lase Target
9. End of Mission

Digital & Voice Fire Support Systems

Mortar Fire Control System (MFCS)

Realistic, Affordable Training System required at Each Step in the Process
New Equipment Training (NET) / Institutional Training Requirements

- **Purpose:** Provide an initial transfer of knowledge on the employment and maintenance of PGMM to instructors and Key personnel. New Equipment familiarization Training (NET), Unit, Classroom, Individual and sustainment training.

- **Tasks:**
  - Text / Video Course instruction training material.
  - Update document to include PGMM and operating Tactics, Techniques and Procedures.
  - Develop physical mock up of PGMM for handling, programming, and visual reference.
  - Develop classroom training.
  - Virtual training resources to allowing more complete, effective, and interactive Institutional and sustainment training.
Virtual Training Requirements

• **Purpose:** Use M&S to support and supplement New Equipment Training (NET), Institutional, and Live Collective Training. Early introduction of Training will help Understand Tactics, Techniques & Procedures as well as help shake out design decisions.

• **Tasks:**
  – Virtually train Gunner, FDC, and Forward Observer in a closed loop system, for collective unit training.
  – Integrate PGMM Trainer with MFCS Gun & FDC training aids and devices.
  – Leverage GUARDFIST /Call For Fire Trainer (CFFT) to virtually train FO
    • Existing, Fielded PC based virtual trainer
    • Enhancement to add Laser Designation hardware/software now underway at PEO STRI
Collective / Institutional Training Requirements

• **Purpose:** Provide a Live / Collective and Combined Arms Training capability at the Combat Training Center (CTC)

• **Tasks:**
  – Modify Legacy/Current Training system software
  – Develop interface hardware.
  – Develop Embedded Training Instrumentation (MFCS).
  – Develop Models and Simulations as part of Virtual Training resources to support Live Training.
PGMM Schedule

**PHASES / USFY**

<table>
<thead>
<tr>
<th>Concept &amp; Tech Development</th>
<th>01</th>
<th>02</th>
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<tr>
<td>System Development &amp; Demonstration</td>
<td>ATD</td>
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<td>Production &amp; Deployment</td>
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<td>MFCS Software Integration</td>
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- Low Rate
- Full Rate
- Decision Review
- Type Classification
- Material Release
- Fielding
- Fire Control System Compatibility

**PGMM Delivered to the Field in US Fiscal Year 2010**
Summary

• US Army investing in Precision Munitions for Close Combat (Mortar Systems)
  – Requirements are Approved
  – Program is Fully Funded, Ready to Start

• Result will be Leap Ahead Precision Effects Capabilities for the Maneuver Commander
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