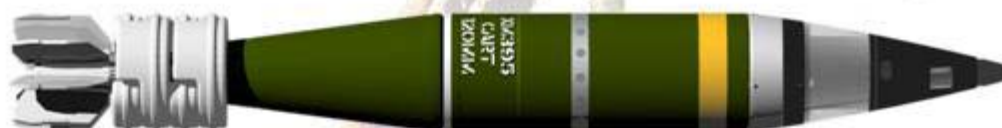




# **XM395 Precision Guided Mortar Munition (120mm PGMM)**

**Responsive, Standoff Precision Lethality  
for Highly Deployable and Mobile Forces**



**“Translating Lessons Learned into Systems Requirements”  
40<sup>th</sup> Annual Armament Systems: Guns-Ammunition-Rockets-Missiles  
Conference & Exhibition  
April 25-28 , 2005**

**Presented By: James Terhune and Anthony Pezzano  
OPEO Ammunition/OPM CAS/ OPM Mortars**

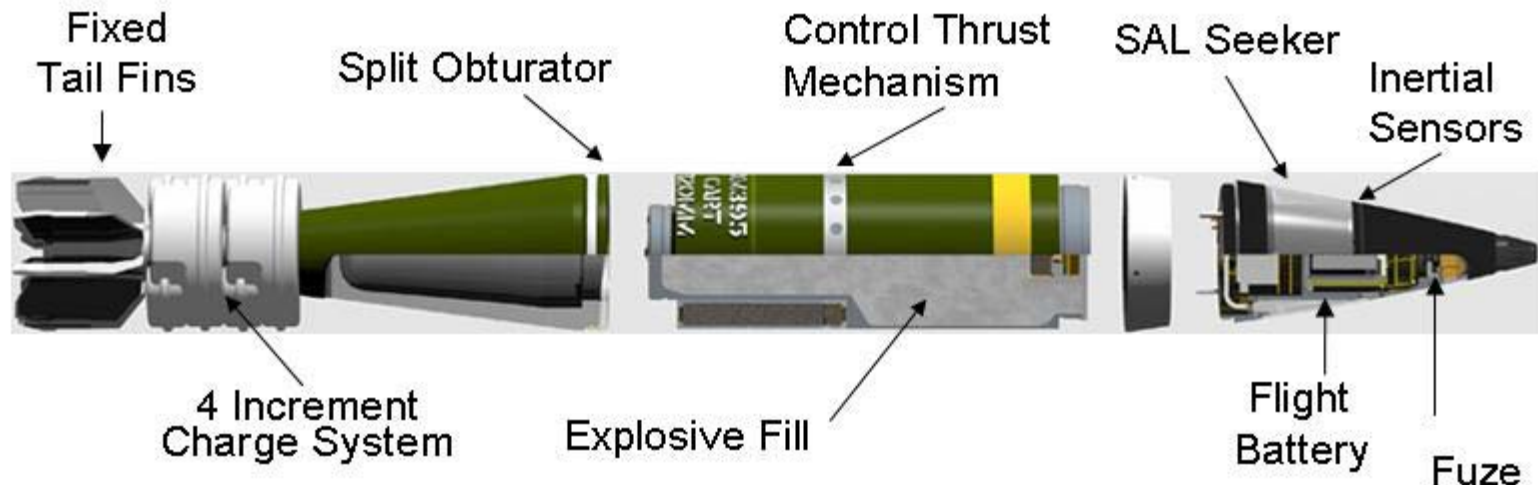
## **Task**

**Present a Summary of the Product Manager's  
Approach to PGMM Training**

## **Purpose**

**Develop Systems Approach for PGMM Training  
Concept Utilizing Six Sigma Principles and  
Processes**

# PGMM Description



## System Requirements (Key Performance Parameters):

### Increment I

**Lethality:** Incapacitate protected personnel, in two rounds or less, within:

- Earth and timber bunkers
- Brick over block masonry structures
- Stationary lightly armored vehicles

### Maximum Range:

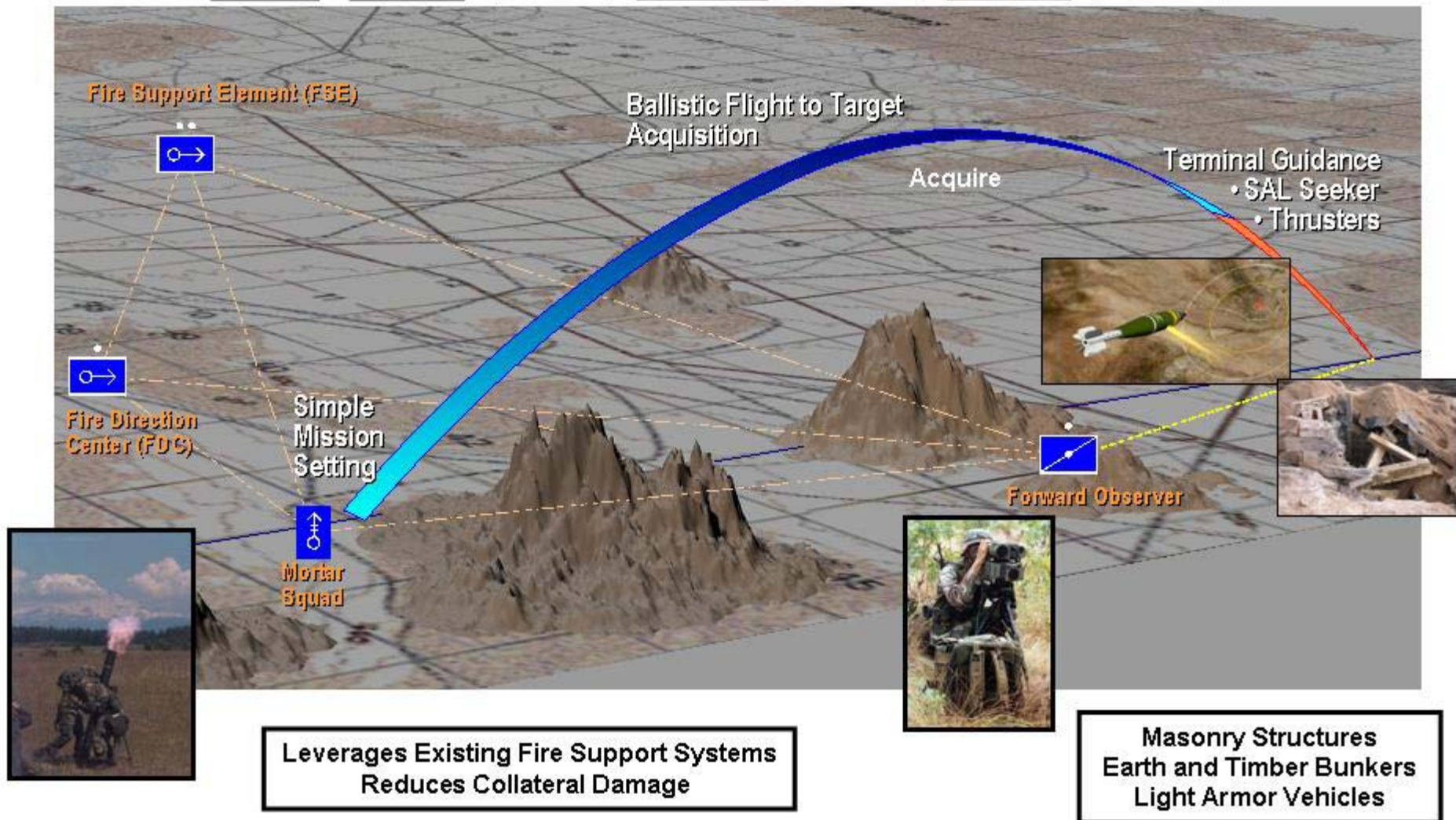
- Current Force: 7.2km (Threshold), 10km (Objective)
- Future Combat System (FCS) Mortar: 8km (T), 10km (O)

### Compatibility:

- 120mm Battalion Mortar System
- Stryker - Mortar Carrier
- FCS Non-Line of Sight (NLOS) Mortar
- Current / Future Laser Designators & Fire Control Systems



# PGMM Operations



**Precision Munitions Increase Warfighter Effectiveness**

# Mortar Infrastructure In Place



Joint Service Forward Observers & Designators



Mortar Fire Control System



Towed 120mm  
(Ground Mounted)



M1064



Vehicle Mounted 120mm  
Stryker MC



NLOS-Mortar (future)

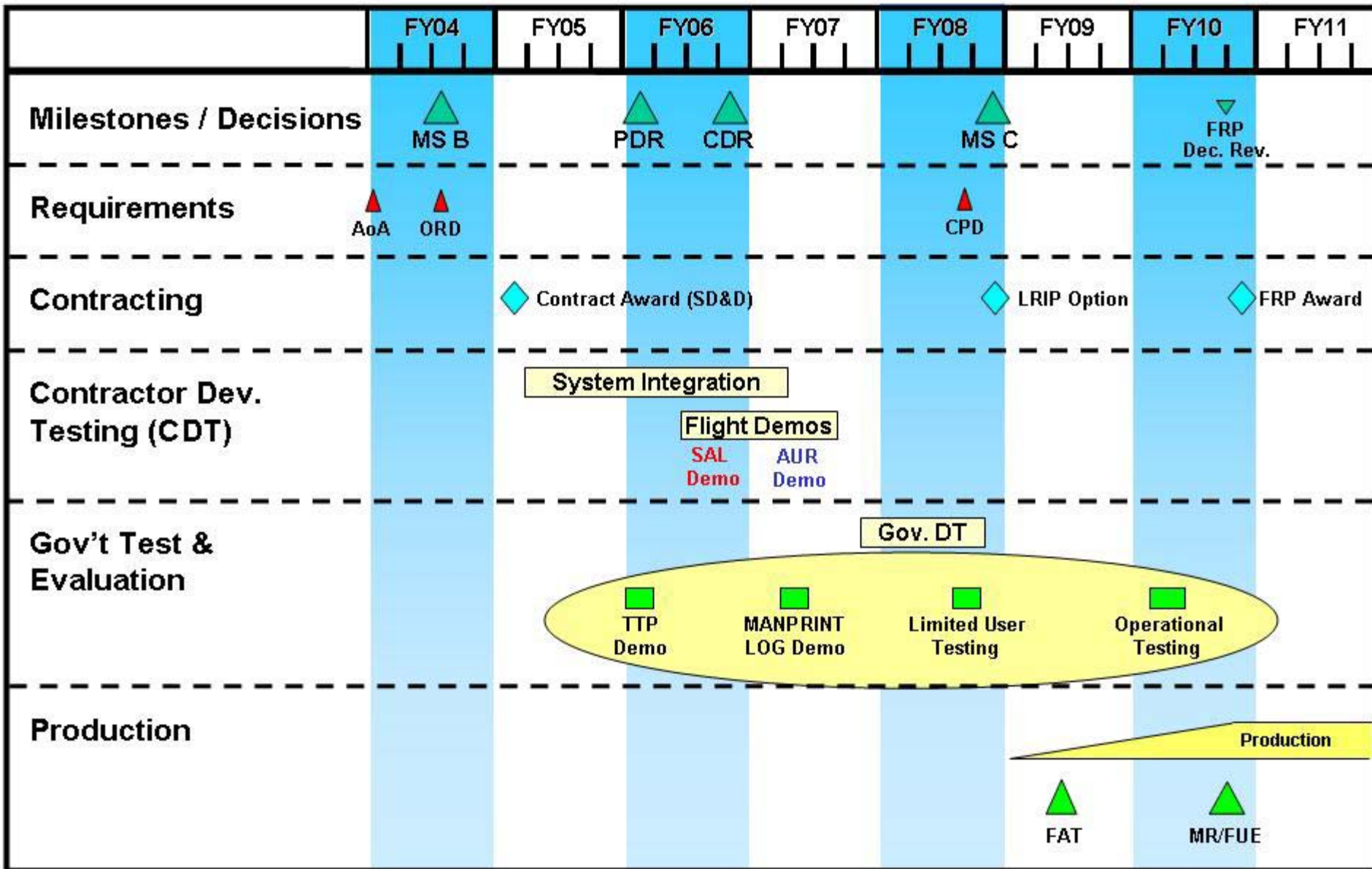
- 120mm Mortars in current infrastructure
  - 120mm Mortar Platforms: M121 (carrier-mounted), M120 (towed), Stryker - Mortar Carrier
  - 120mm Mortar Munitions: HE, Smoke, Illumination (Visible & Infrared)
- Light-weight Laser Designator Range Finder (LLDR)
- Fire Control / Command & Control Links
  - Mortar Fire Control System (MFCS)
  - Advanced Field Artillery Tactical Data System (AFATDS)

**PGMM**

**An Integral Part of Modern and Future Battalion Indirect Fire**



# Baseline PGMM (Increment I) Program Schedule



AoA: Analysis of Alternatives  
FRP: Full Rate Production

TTP: Tactics Techniques Proc.  
AUR: All Up Round

Gov. DT: Government Development Testing  
FAT: First Article Test

MR: Material Release  
FUE: First Unit Equipped

# Problem Statement

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- **Reduced Combat Effectiveness without Adequate Training Program**
- **No Affordable or Practical PGMM Training System is Available**
  - **Current Options**
    - Firing Tactical Laser Guided PGMM (Hundreds of Rounds/Year x \$10K/Round)
    - No Training (Not an Option)
    - Manual Process @ Training Center (not representative of Tactical)

# Project Goals

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- **Develop an integrated plan for PGMM Training Concepts that can:**
  - **Effectively Train the Mortar Crew**
    - Preparation, drop firing, and misfiring procedures
  - **Training of Forward Observer to Adequately Designate Targets within the PGMM Firing Mission Timelines**
  - **Communication Links between FO, Battalion FSE, FDC and Mortar Crew**
  - **Achieve a 50% minimum overall Cost Avoidance through Reduced Tactical PGMM Firing**
    - Cost effective training concept alternatives.



# PGMM Training Q\$SR

|                            |   |             |
|----------------------------|---|-------------|
| <b>T<br/>y<br/>p<br/>e</b> |   | Engineering |
|                            |   | Production  |
|                            |   | Business    |
|                            | x | Management  |

## Project Summary:

Develop an integrated plan for PGMM Training Concepts that can:

- Effectively Train the Mortar Crew
  - Preparation, drop firing, and misfiring procedures
- Train Forward Observer to Adequately Designate Targets within the PGMM Firing Mission Timelines
- Identify Communication Links
- Achieve a 50% minimum overall Cost Avoidance through Reduced Tactical PGMM Firing.

|  |   |
|--|---|
| <i>Quality or Customer Satisfaction</i>  | <i>Co\$</i>   |
| <b>Provide the Warfighter with a viable low cost training solution to achieve indirect fire precision strike capability.</b>                           | <b>Potential savings \$10.24M/year of Training (10 year product life cycle can save over \$100M in training costs)</b>  |
| <b>Project Successfully laid out Approach, Methodology and Plan.</b><br>(Follow-on Project recommended to Implement Training Concept into Program SDD) | <b>FMEA evidenced medium risk areas.<br/>FO Trainer; Virtual Simulator<br/>QFD identified Training Concept leverage points to maintain affordable approach.</b> |
| <i>Schedule</i>  | <i>Risk</i>   |

# **PGMM Training Implementation**

# Implementing PGMM Training

- **New Equipment Training (NET)**
  - Update documents to include PGMM and operating Tactics, Techniques and Procedures.
  - Develop physical mock up of PGMM for handling, programming, and visual reference.
  - Text / Video Course instruction training material.
- **Institutional Training**
  - Develop classroom training.
  - Integrate CFFT / Mortars / MFCS / PGMM / Laser Designation for classroom training.
- **Virtual Training**
  - Understand / Develop Tactics, Techniques & Procedures (TTPs).
  - Integrate CFFT / Mortars / MFCS / PGMM / Laser Designation for virtual training.
  - Integrate PGMM Trainer with MFCS Gun & FDC training aids and devices.
  - Develop Models and Simulations as part of Virtual Training resources to support Live Training.
  - Virtually train Gunner, FDC, and Forward Observer in a closed loop system, for collective unit training.
- **Collective (Live and Combined Arms)**
  - Develop Embedded Training Instrumentation (MFCS).
  - Provide a PGMM training capability at the Combat Training Center (CTC) .

## **Who We Will Be Training**

- Fire Direction Specialist (MOS 13F)
- Indirect Fire Infantryman (MOS 11C)
- Ammunition Specialist (MOS 55B)
- Fire Direction Center (FDC) Personnel
- EOD

## **Mortar Mission Training Requirements**

- Operate in Centralized or Decentralized C3 Modes
- Centralized: Through Battalion Fire Support Element
- Decentralized: Sensor to FDC and/or Gun



# PGMM Call for Fire

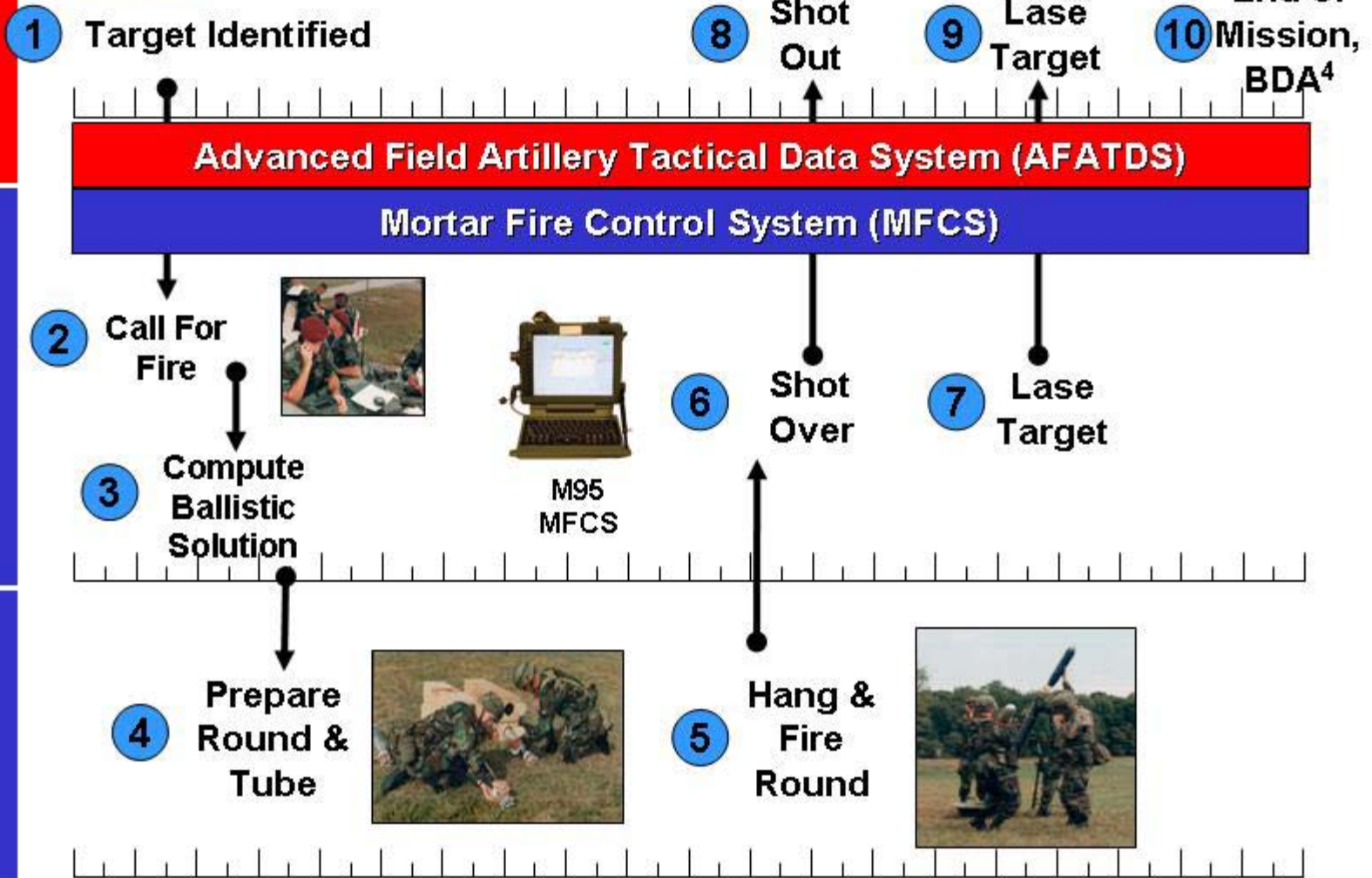
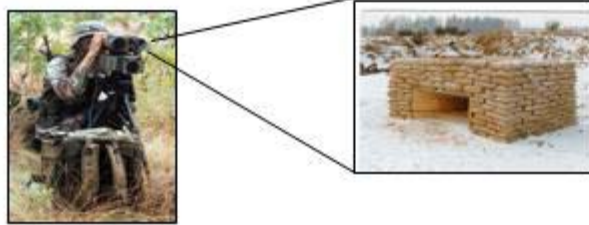
Forward Observer

Company FIST<sup>1</sup>

Battalion FSO<sup>2</sup>

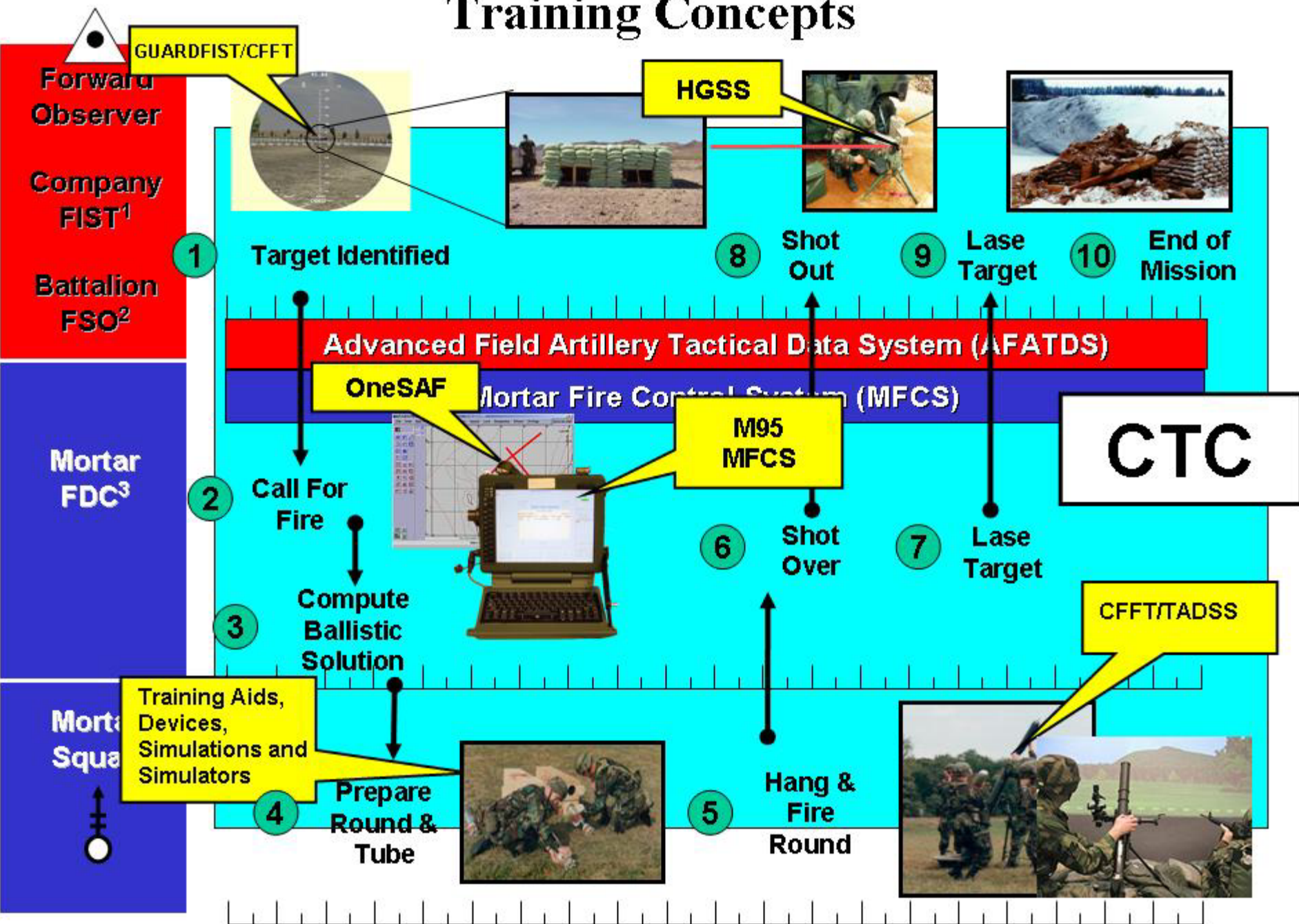
Mortar FDC<sup>3</sup>

Mortar Squad



NOTES: 1. Fire Support Team 2. Fire Support Officer 3. Fire Direction Center 4. Battle Damage Assessment

# Training Concepts



NOTES: 1. Fire Support Team 2. Fire Support Officer 3. Fire Direction Center 4. Battle Damage Assessment



# Summary

- US Army investing in Precision Munitions for Close Combat (Mortar Systems)
  - Requirements are Approved
  - Program is Fully Funded, PGMM SDD Awarded 01Dec04
- Result will be Leap Ahead Precision Effects Capabilities for the Maneuver Commander
- Training is key to PGMM Affordability and Performance
- Collective/Combined Arms Training Requirements are being defined

*6<sup>th</sup> Annual Mortars Conference October 19-21, 2005  
Headquarters Plaza Hotel, Morristown NJ*

