



Precision Universal Mortar Attack (PUMA)

NDIA 46th Annual Armament Systems:
Gun & Missile Systems Conference & Exhibition

29 Aug – 1 Sep 2011



What is PUMA?

Precision Universal Mortar Attack (PUMA) – 46th Annual NDIA Armament Systems – 29 Aug-1 Sep 2011

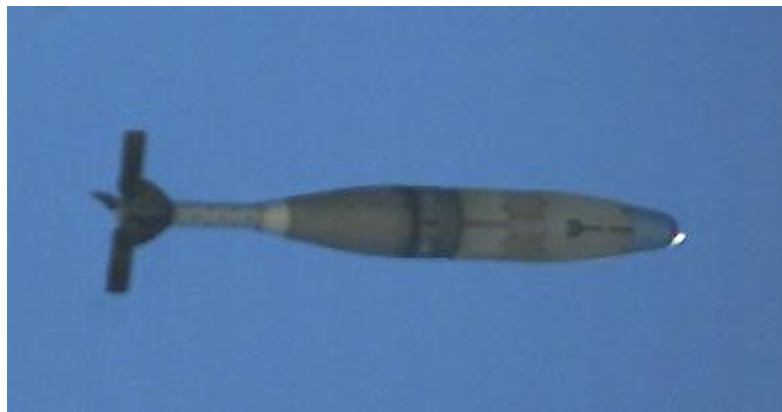
- ONR Future Naval Capabilities (FNC) Program
 - Demonstrate critical technologies to support a system capability for enhanced mortar engagements
 - Precision Guidance
 - Trajectory Shaping
 - Range Extension
 - Lighten the Load for the Warfighter
 - More Stowed Kills
 - Lighter/Smaller Support Equipment
 - Cost Effective Solution
 - Utilization of Novel technologies & COTS products
 - Joint Services, Gov't Lab Partnership Development Team

TRL 6 Demonstrations & Transition to Acquisition Program in FY14

Guided Flight Testing

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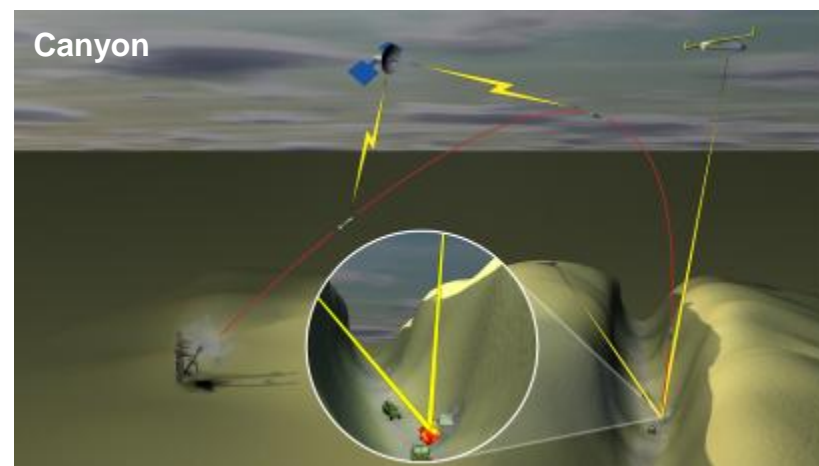
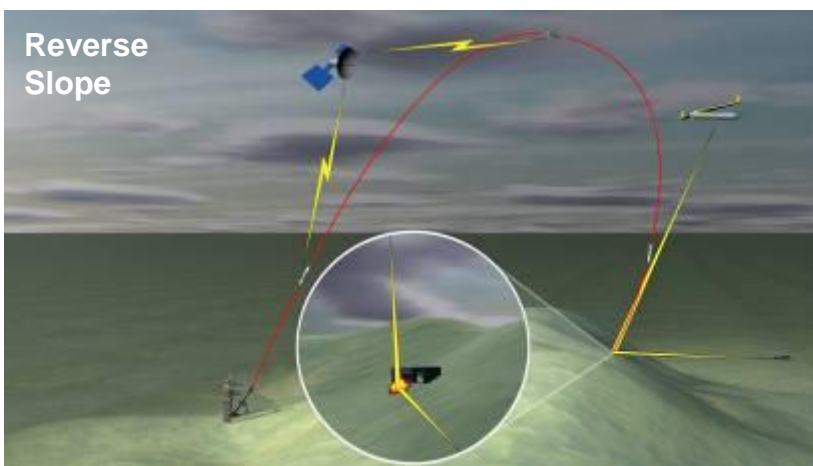
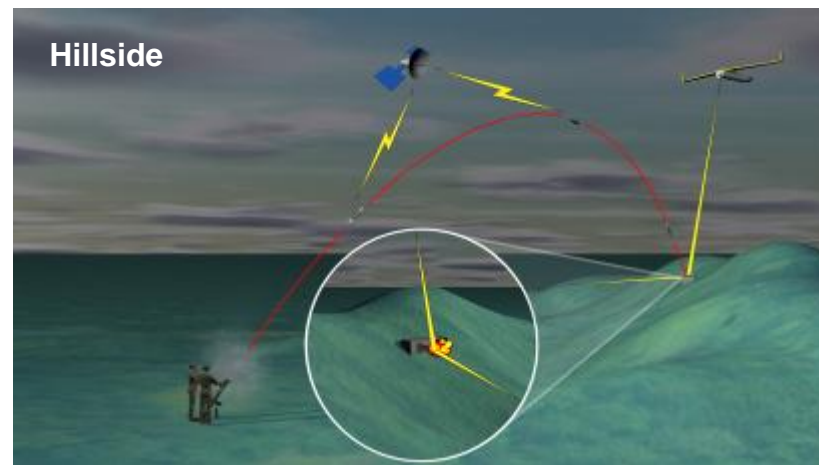
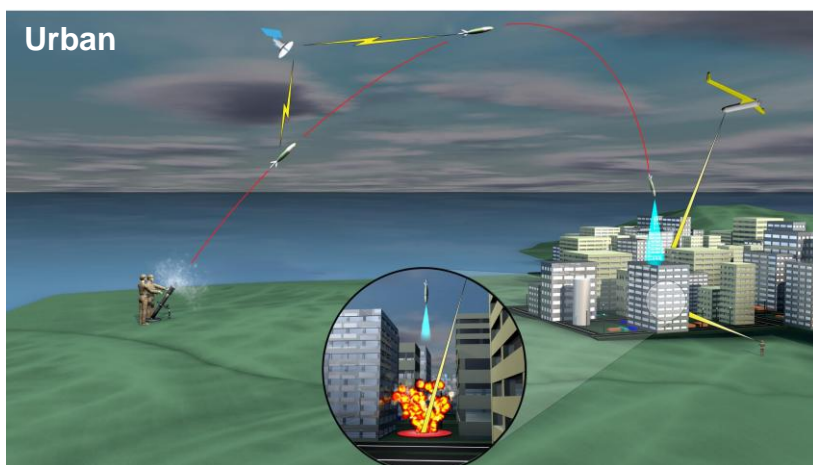
- Successful Demonstration of Guided 81mm Mortar Airframes
 - 22 Jun 2011 @ YPG, AZ
 - 6 Test Rounds: 2 Ballistic, 4 Guided
 - Pre-Programmed Maneuvers
 - Divert authority well in excess of ballistic delivery accuracy



GPS Guide-to-Hit Demonstration in FY12

81mm Future Engagement Capability

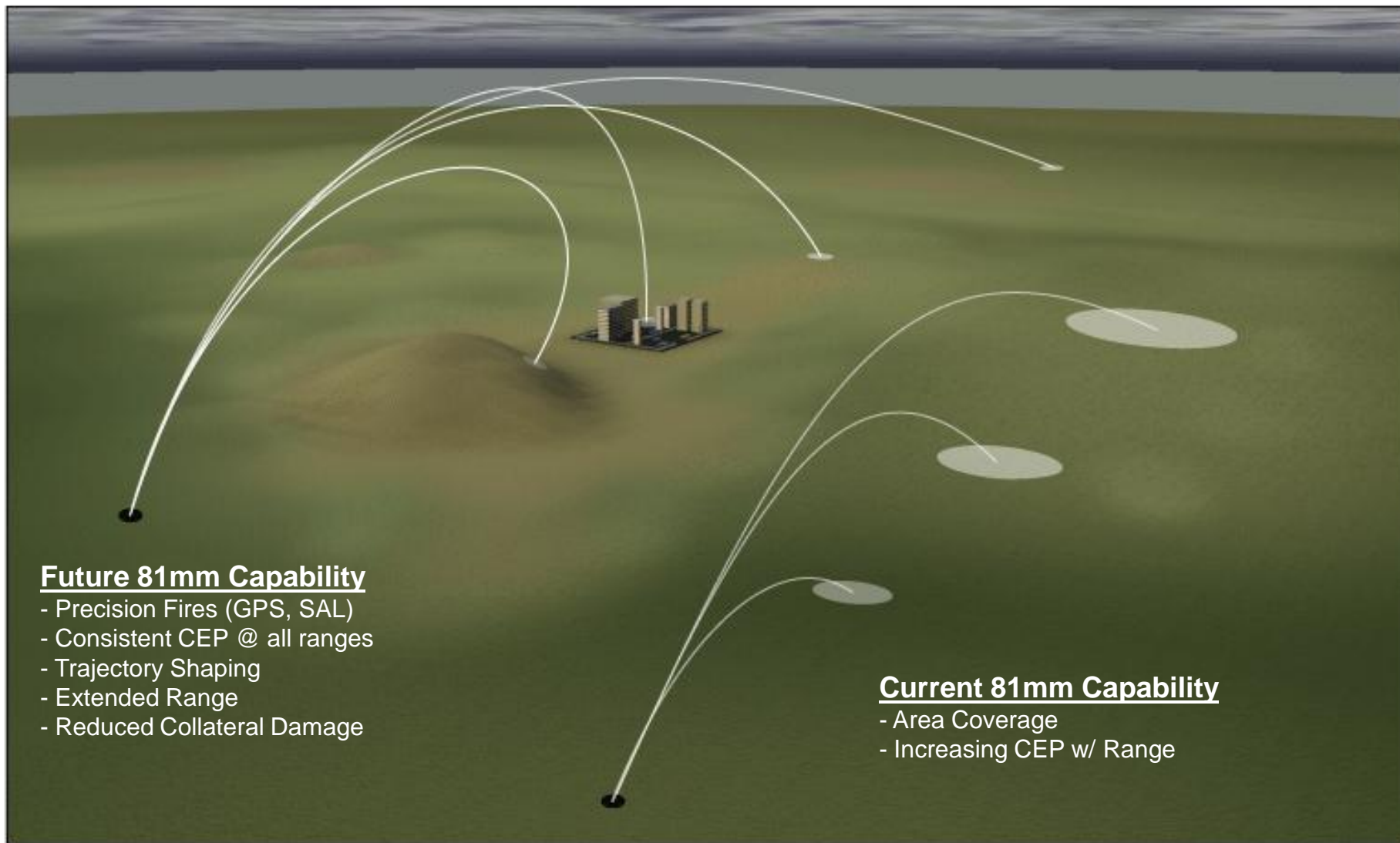
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Ability to Address Targets Masked by Terrain Topology

Current vs. Future 81mm Mortar

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Future 81mm Capability

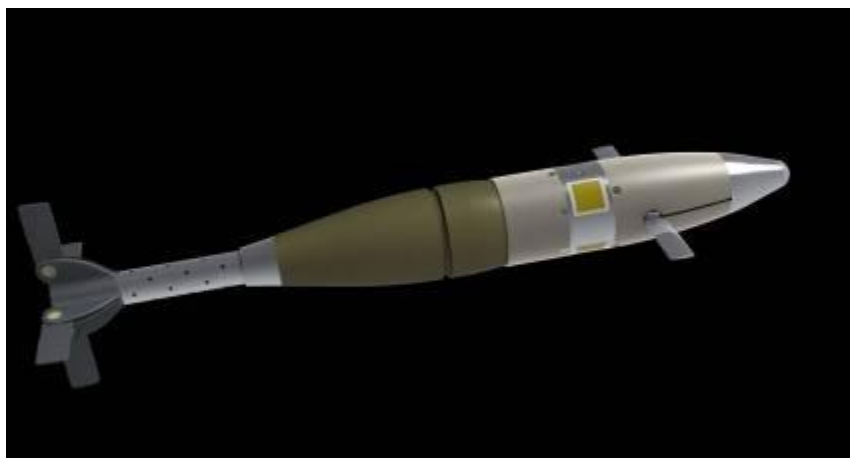
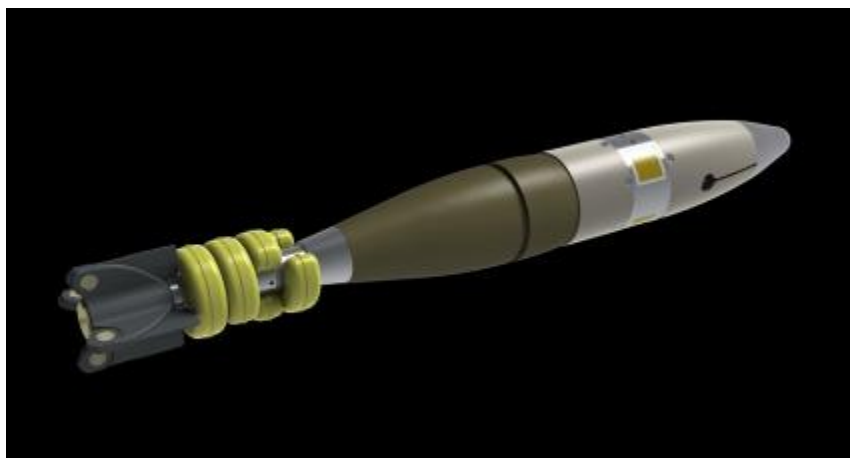
- Precision Fires (GPS, SAL)
- Consistent CEP @ all ranges
- Trajectory Shaping
- Extended Range
- Reduced Collateral Damage

Current 81mm Capability

- Area Coverage
- Increasing CEP w/ Range

Enabling Products

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Flight Controlled Mortar (FCMortar) – (NSWCDD, ARL)

- Guidance Kit for Mortar Ammunition
 - Depot/Factory level conversion kit for HE projectiles
 - Reuses existing Primer/Igniter assembly
- Global Positioning System (GPS) Guidance
 - Fire & Forget Precision
- Semi-Active Laser (SAL) Guidance
 - TLE Elimination
 - GPS, Setter denied operations
- Non-ballistic flight path capable Airframe & GNC
 - Vectored approach guidance
 - Range extension
 - Proven pedigree (VAPP)
- Modular Design
 - “Plug & Play” modules allow for easy upgrade to alternate configurations
 - Sub-systems portable to other systems

Precision Compliment to Existing HE Inventory

Enabling Products

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Miniaturized SAL Seeker – (NSWCDD)

- Strap-Down, Body Fixed Architecture
 - No mirrors, gimbals, or gyros
- STANAG 3733 compliant
 - Compatible with all fielded designators
 - Works with proposed lower pulse energy (20-30 mJ) designators
- Form factor units ready for flight testing in FY 12

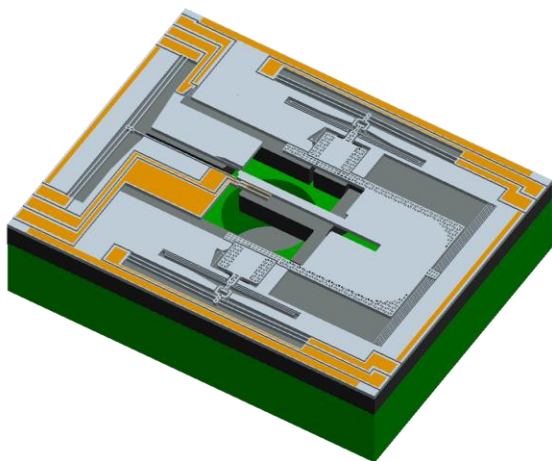
Extended Range Mortar Ammunition (ERMA) Propellant (NSWCIHD)

- Advanced artillery propellant adapted for mortar use
- Increased muzzle velocity
 - Extends FCMortar operational range
- Improved cook-off & IM performance
- Lower barrel erosion & fouling
- Already demonstrated on ballistic mortar ammo



Enabling Products

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MEMS S&A Based Fuze (NSWCIHD)

- Reduces size of PD/PDD Fuze to that of conventional mortar Fuze S&A device
- Based on silicon MEMS chip with integrated micro-detonator
- Connector for external HOB sensor
- Successful fabrication of first S&A chips complete

Mission Setter (NSWCDD, ARDEC)

- Small Form Factor precision weapon pre-flight initialization device (hand-held)
- Provides trajectory, guidance, and fuze mode data prior to launch
- Miniaturization of EPIAFS system starting FY12
 - New Non-Inductive link to be developed
- Backwards compatible w/ current EPAIFS interface (inductive & direct connect) based systems through add-on kit





Conclusions

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- Guidance Capability Demonstrated on 81mm
 - Successful controlled divert testing in July '11
 - GPS Guide to Hit Demonstration in FY12
- Modular Guidance Kit Solution
 - Easily upgraded
 - Enabling technologies portable to other systems
- Government Lab Partnership developed/owned design
 - Maximum flexibility in meeting acquisition sponsor requirements
- TRL 6 Solution Demonstration in FY14 to support transition to USMC Acquisition POR