

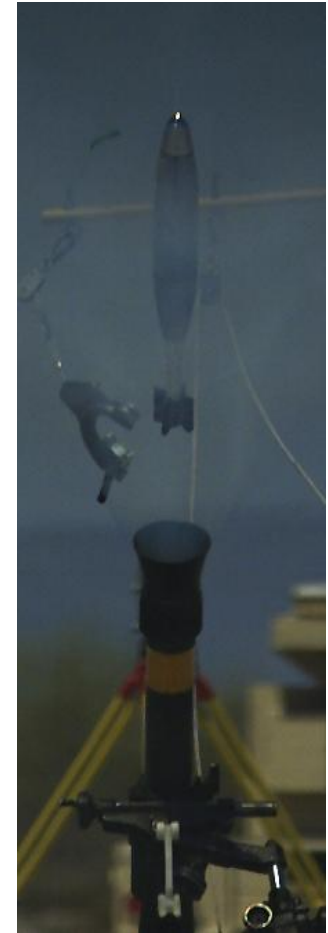


PRECISION UNIVERSAL MORTAR ATTACK



NDIA 2012 Joint Armaments Conference
14-17 May 2012

- ONR Future Naval Capabilities (FNC) Program
 - Demonstrate enabling technologies as an **integrated system solution** 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



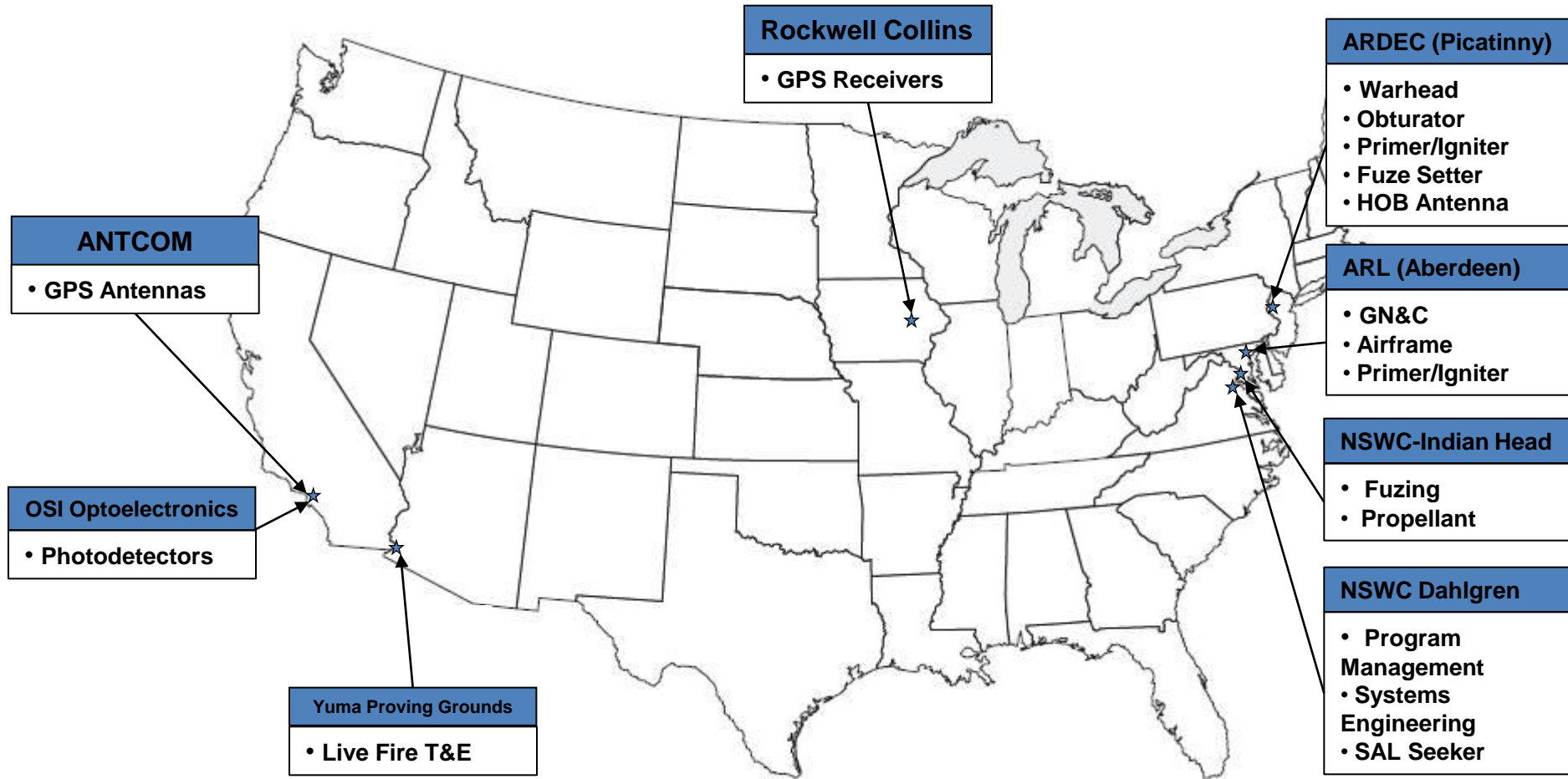
TRL 6 Demonstrations & Transition to Acquisition Program in FY14

PRECISION UNIVERSAL MORTAR ATTACK **PUMA**



Development Partners & Major Suppliers

NDIA Joint Armaments Conference (14-17 May 2012)



PRECISION UNIVERSAL MORTAR ATTACK **PUMA**





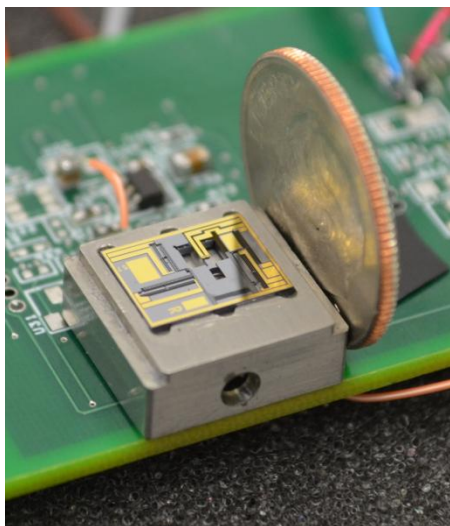
Low Cost SAL Seeker (LCSS)

- 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 unit performance testing complete
 - Flight Testing this Year
- \$1,000/seeker @ 10k production rate

Evolved VAPP Control System

- Very Affordable Precision Projectile
 - ARL cost effective GN&C demonstrator program
 - 105mm/155m Artillery, 120mm Mortar
- COTS drive actuators
- Reduced navigation state estimation
- PUMA evolution includes deployable canards for increased maneuver authority





MEMS S&A Based Fuze

- 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
- Form factor units in testing, live fire in FY13

Extended Range Mortar Ammunition (ERMA)

Propellant

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

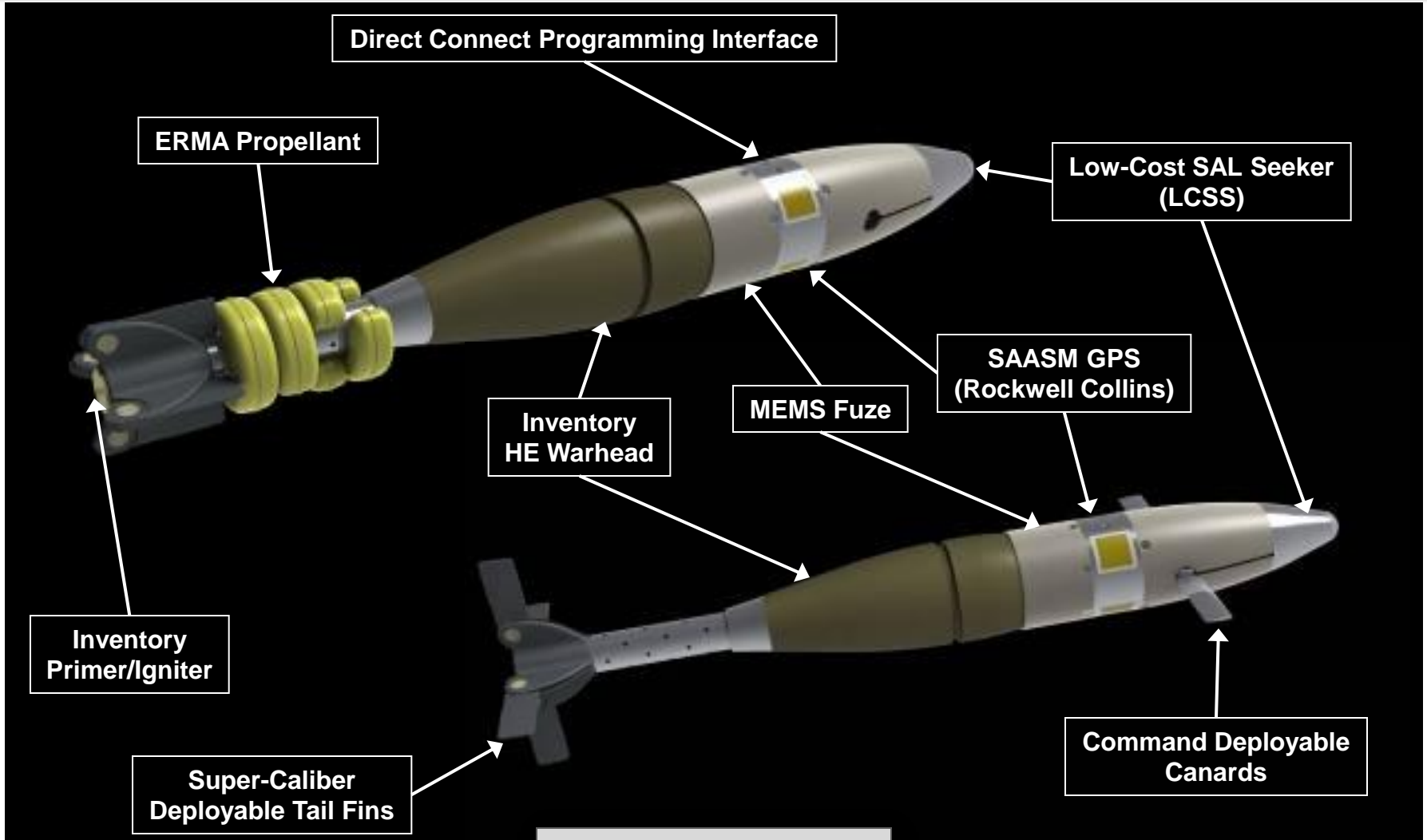


- Guidance Kit Solutions for Mortar Ammo
 - Fuze & Tail replacement kits
 - Modular configurations
- Compatible with existing mortar systems
 - Fire Control
 - Fuze setters
 - Targeting Systems



81mm PUMA^{GL}

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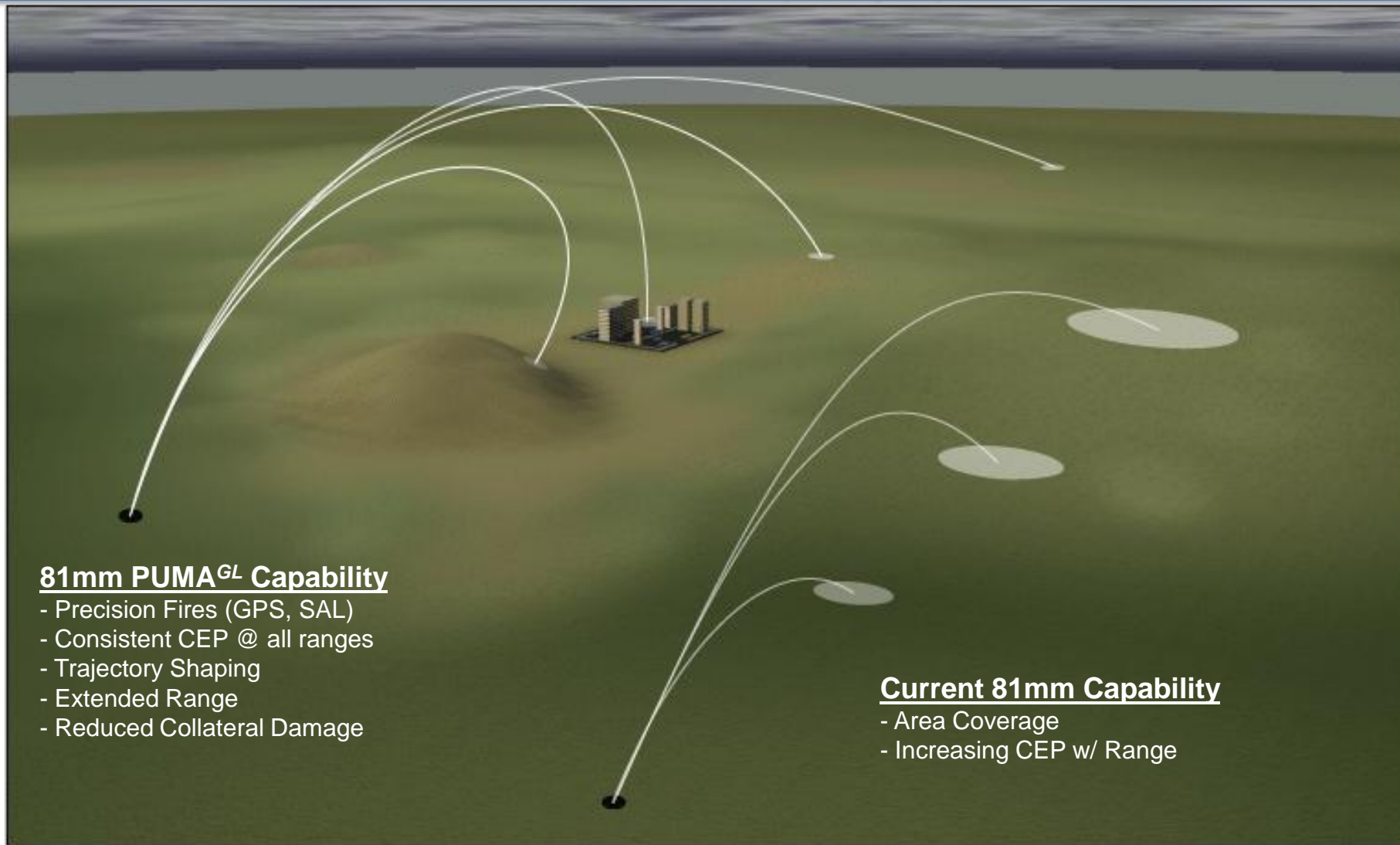


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PRECISION UNIVERSAL MORTAR ATTACK PUMA

Current vs. Future 81mm Mortar

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- Airframe Live Fire Tested
 - Maneuver authority expanded to multiples of ballistic delivery accuracy
 - Range Extension capability
 - GPS Guide-to-Hit  **PENDING**
 - Ballistic & Extended Ranges

- Advanced Configurations Researched
 - Wind Tunnel/CFD/Simulations of alternative designs
 - Additional maneuver authority available (2x+)
 - 81mm Extended Ranges of up to 9km (Guided)
 - Without use of rocket motor or enhanced launcher



DISTRIBUTION STATEMENT A:

Approved for

Public Release

Distribution is unlimited

PRECISION UNIVERSAL MORTAR ATTACK **PUMA** 

Alternative 81mm Configurations

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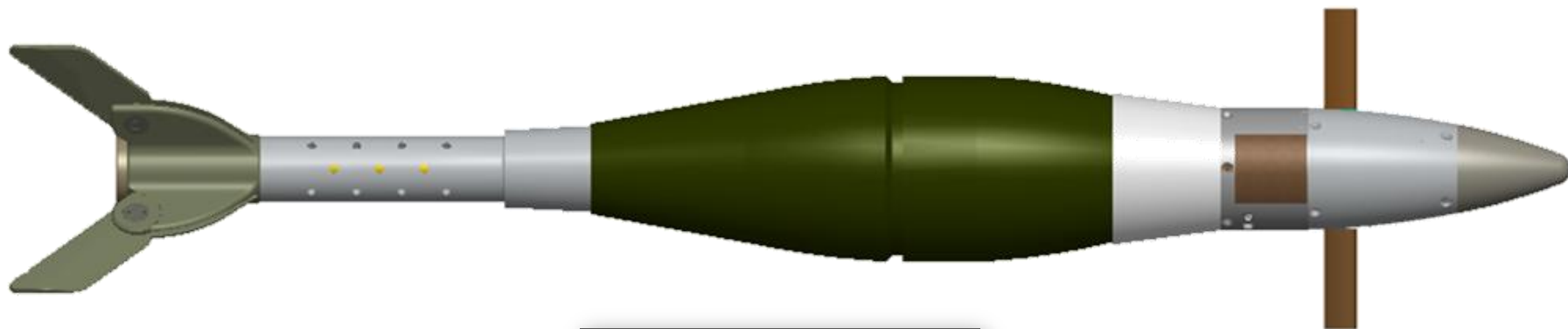
- 81mm **PUMA^G**
 - GPS Only Guidance
 - EPIAFS Inductive Nose Cone
 - No Tear-away Hood Required
 - Lower cost option than **PUMA^{GL}**



- 81mm **PUMA^{AN}**
 - AN = Auto-Navigation
 - SAL Only Guidance
 - Precision Fires under true GPS Denial
 - No Fuze Setter Required
 - Fuze Mode & Laser code selector switches on projectile

PRECISION UNIVERSAL MORTAR ATTACK **PUMA** 

- 120mm **PUMA^G**
 - Mid-Range, Low-Cost Member of EFSS Family of Munitions
 - Different requirements than other cartridges
 - GPS Precision Guidance to 12 km
 - Direct Reuse of 81mm Guidance Kit
 - Replace SAL Seeker w/ EPIAFS Interface
 - Backwards compatible to M120 Smoothbore Cannon
 - 9km Max Range
 - FY14 Final Demonstration Configuration

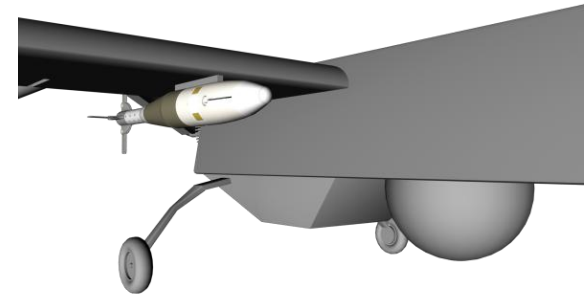


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PRECISION UNIVERSAL MORTAR ATTACK **PUMA**

- UAS Dropped Munitions
 - 81mm Mortars already demonstrated on UAS
 - Precision Air Dropped Guided Mortar (PADGM)
 - 81mm **PUMA^{GL}** or **PUMA^{AN}** can provide self-contained engagement capability at low-cost

- Shoulder Launched Munitions
 - PUMA Guidance Kit designs are comparable in size to existing shoulder launched systems
 - Adds precision delivery, range extension, and additional targeting modes
 - New Dimension of Embedded Infantry Fire Support Capabilities



- Single Guidance Kit for Multiple Applications
 - 81mm Mortar, 120mm Mortar, 120mm EFSS, 81mm UAS Air Drop, Shoulder Launched...
 - Common Control Section Architecture
 - Upgradeable Fuze and Nose Modules
 - Low-Cost SAL Seeker Already Available
 - Additional Capability Upgrades Already researched

- Joint Services, Multi-Platform Economies of Scale
 - Maximize purchase power in leaner environment
 - Production Line/Inventory Flexibility
 - Upgradable to meet Future Requirements

- Integrated System Solution for Precision Mortar Delivery
- Low-Cost, Modular Architecture
- Guidance Capability Demonstrated on 81mm
- Multi-Platform Capable
- TRL 6 Solution Demonstration in FY14 to support transition to USMC Acquisition POR

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