Precision Strike Association
(Affordable Precision Munitions)

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Project Manager

9 June 2009
Agenda

Small Caliber
- EXACTO

Medium Caliber
- Programmable Airburst Munition (PABM)
- 40mm Efforts

Large Caliber
- Advanced Kinetic Energy (AKE)
- Advanced Multi-Purpose (AMP)
- Mid-Range Munition (MRM)
Deadly Accuracy at Extreme Range

EXACTO
(EXTreme ACCuracy Tasked Ordnance)
EXACTO is a system composed of:

- An optical guidance system that provides information to direct the projectile to the target regardless of environmental or target perturbations
- An actively-controlled 50-caliber projectile that uses this information for real-time directional flight control

EXACTO delivers high accuracy against moving targets under environmental conditions
Acquisition Strategy

- Three phase program:
  
  Phase I: Component Development, Preliminary Design and Performance Validation

  Phase II: System Integration and Prototype Demonstration

  Phase III: Operational Assessment/Transition

- Progression to subsequent program phases contingent on meeting end of phase go/no go criteria and availability of funds
Medium Caliber Precision Munitions: Areas of Focus

- Current Effort: FCS 30mm Programmable Airburst Munition

- Potential Future Efforts: 40mm Suite of Munitions
  - Increased Yield
  - Precision, Steerable Munitions
Current Efforts: FCS 30mm Programmable Airburst Munition

- **Warhead**
  - High Explosive Air Burst with Base Mounted Fuze
  - Hardened Nose for Performance Against Materiel Targets
  - PBXN-5 Explosive
  - Zirconium Incendiary

- **Cartridge**
  - Aluminum Case
  - Single Base Propellant
  - M36A2 Percussion Primer

- **Fuze Operating Modes**
  - Point Detonate
  - Point Detonate Delay (up to 1 ms)
  - **Air Burst**
  - Self-Destruct: Detonates at Maximum Mission Time

- **Status:**
  - PABM-T Fuze Design accepted by Army, Navy working mods
  - Joint Qualification Test to Date Resulted in 43% Functional Failures
  - Approximately $1.5M additional required to Achieve >85% Reliability
  - FCS program cuts may end this program
Future Efforts: 40mm Suite of Munitions

- **BLUF:** There are currently NO requirements for 40mm accuracy / lethality improvements…but:
  - Increased explosive yield has been mentioned by soldiers in the field
  - Future Requirements may call for steerable/ guided munitions and associated sighting systems:
    - 40mm rounds have room for micro-electronics
    - New platforms (i.e. M320 GLM) allow for longer rounds
Description & Requirement
- The M829E4 is the 5th Generation 120mm Kinetic Energy Cartridge Developed to Provide the Abrams M1A2 SEP with Heavy Armor Defeat Capabilities
- M829E4 Provides M1A2 the Capability to Engage and Destroy Main Battle Tanks with Advanced ERA at extended ranges

Status/Key Accomplishments
- EMD/ Production Acquisition Prepared
- Draft RFP Released
- Industry Day Complete
- Milestone B Documentation Being Prepared

Top Level Schedule

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Acquisition Plan:
- Full & Open Competition to Select Two Phase I EMD Competitors
- Contract is for EMD Phase I (FY10) With Options For EMD Phase II, LRIP, FRP I, FRP II
- Down select Based Upon Shoot-Off & Updated Proposals
- Restrict To Depleted Uranium (AEROJET)
Description

- Incorporate the Performance of M908 (Obstacle Reduction), M830 (HEAT), M830A1 (MPAT), and M1028 (Canister) within a Single Cartridge
- Multi-Mode Programmable Fuze
- Reduced Logistic Footprint
- Adds Capability of Engaging Infantry in Open at Significantly Increased Range
- Breach Rebar (Concrete Reinforced Wall)
- Airburst Technology
- Program Start planned for FY14

Requirements

- Defeat ATGM Team
- 30” x50” Hole in Wall
- Bunker Defeat
- Defeat Light Armor BMP with ERA
- Infantry / Anti-Personnel
AMP Summary

Bunker Defeated 1 Shot

Double Reinforced Concrete Defeated 2 Shots

Simulated ATGM Defeat

T-55 Defeated 1 Shot

30 Man Platoon Defeated

AMP Video
Mid Range Munition

Description & Requirement

- Mid Range Munition (MRM) Round is First Generation Fire and Forget Gun-launched Precision-guided Munition
- Materiel Solution For Beyond Line Of Sight (BLOS) Capability Gap
- Originally Developed to Provide Future Combat System (FCS) Mounted Combat System (MCS)
- Current Design Is Interoperable With Abrams
- Provides Capability to Engage & Destroy High Value Moving and Stationary Enemy Targets Throughout Area Of Operations up to 12km
- Dual Mode Gun Launched Precision Munition
  - Semi Active Laser (SAL)
  - Imaging Infra-red (IIR)
- Target set Includes:
  - Main Battle Tanks
  - Light Armor
  - Self-propelled Artillery
  - Air Defense Artillery
  - Earth and Timber Bunkers

Key Accomplishments

- Successful Cartridge Integration Test Dec 08:
  - Fired From Abrams M1A2 SEP
  - Autonomous Shot Using IIR Hit T-72 at 5.2km
  - IIR seeker searched, acquired & tracked
  - No external queuing
- SAL Shot Successful Against Moving T-72 at 8.7km
- Dual Mode Shot (SAL and IIR) Successful Against Stationary T-72 At 5.2km
- Airframe and Propulsion Test Sequences Underway
- Warhead Down-Select Completed
Modes of Operation

Three Modes of Operation (Video)

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MRM (Mid Range Munition)
December 2008

Autonomous Engagement
5.2km Stationary Target
Affordability

Cost Drivers of the System

- **Design Cost Contributors**
  - 42%
  - Innovation Workshops
  - Yield Material
  - Attrition
  - Test Capability
  - Assembly Time
  - Inspection Time

- **Test Cost Contributors**
  - 40%
  - Test Time
  - TE Reliability
  - ODC/Transport
  - Burden Rates
  - Labor Rates
  - Index Support

- **Manufacturing Cost Contributors**
  - 10%
  - SEPM Business Models

- **Programmatic Cost Contributors**
  - 8%
  - System Definition
  - That Supports
  - Cost Requirement

Emphasis On System Performance
Does Not Support Cost Requirement

Requirement Trades Guide Costs

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Refining Cost Reduction Opportunities

1. Innovation Workshops
   Definition of Trade Space & Cost Drivers
   1 – 2 Day Focused Idea Generation
   Cross Functional With Outside Thinking

2. Refinement Project
   Opportunity Worksheet
   Cost Model & Performance Model Analysis
   IPT Schedule Insertion Roadmap

3. Exploration Project
   Targeted Workshop
   Prototype Validation
   Update Drawing Package
   Cost Model Update

Chaos

~ 200 Ideas
Innovation Workshops

~ 20 Ideas
Refinement

~ 2 Ideas
Exploration

ORDER
Enabling An Affordable Solution

- Know your cost targets
- Document and understand your entire value stream
- Aggressively identify cost reduction opportunities and submit them to the opportunity register
  - Eliminate waste in EMD and LRIP
- Identify requirements that drive cost and flow it back to systems
- Design to eliminate current production rework drivers
- Incorporate Critical Parameter Management to ensure your design is within manufacturing process capability
- Make affordability part of your performance development goals
MRM Current Situation

- MRM Program was Initially Funded to Support the Future Combat System (FCS) Mounted Combat System (MCS)

- MRM is Required to be Fully Compatible with the Abrams Cannon

- An Abrams Capabilities Development Document (CDD) is Currently in Staff which Contains a Key Performance Parameter (KPP) for the Beyond Line of Sight (BLOS) Mission that only MRM can Fulfill

- FY10 President’s Budget Indicated Zero Funding for MRM

- Government Direction Provided to the System Contractor regarding the following:
  - Reduction of Program Scope
  - Utilize Existing Funding to Work Critical EMD Efforts and Close-Out Activities

- The Revised Plan will Continue at a Reduced Level at which point the Program will either be Restructured or Terminated
Summary

- Advancing “Precision” Munitions Across Calibers
  - Providing Improved Capabilities

- Pursuing Cost Reduction and Affordability
  - Lean Innovation

- Committed to Providing the Warfighter with the most Reliable, Lethal and Affordable Ammunition Available