GO Jets!!
Thought for the Day …

We cannot solve our problems …

...with the same thinking we used when we created them.
Agenda

- PEO Ammo Vision and Mission
- Management Philosophy
  - Changing the Way We Do Business
- Products and Services in Support of the Future Force
Where PEO Ammo Programs Came From

PEO GCS $ 375.911M
- PM ARMS
- PM TMAS
- PM Crusader (MACS)

# Programs 23

DSA-TACOM $ 439.476M
- PM Mines
- PM Mortars
- PM Small Arms

# Programs 74

AMC/DCS Ammo $ 708.263M
- Training Ammo
- Industrial Base
- Demil
- ARDEC (Fuze Programs)

# Programs 94

PEO Ammo
- PM MAS
- PM CAS
- PM CCS
- PM Joint Services

Total RDA Programs
191 programs
$ 1,523.650 M
PEO Ammo

VISION

Deliver Conventional and Leap-Ahead Munitions Combat Power to Warfighters

GOALS

- Get PGM’s & Smart Weapons to Warfighters
- Improve and Sustain the Conventional Stockpile
- Satisfy the Customer, Achieve Excellence
- Grow World-Class People and Teams
About Experience, .... and Execution

- You've carefully thought out all the angles.
- You've done it a thousand times.
- It comes naturally to you.
- You know what you're doing, it's what you've been trained to do your whole life.
- Nothing could possibly go wrong .....
Think Again!
Management Philosophy

- Promote Competition via Best Value Acquisitions
- Reinforce Success
- Utilize Disciplined Processes
- Promote Six Sigma and Lean Design/Production
- Promote Commonality and Interoperability
- Spiral or Evolutionary System Development

*Put Eyeballs On – “Trust, but Verify”*
Change Acquisition Mentality

- Systems Engineering From The “Systems of Systems” Perspective
- New Approach To Ammo Development
  - Commonality
  - Spiral/Block Development
  - Continuous R&D/Block upgrade
  - Life Cycle Management
- Ultra-reliability
- Logistics Upfront
- Industrial Base Transformation

Think Differently!
The “System of Systems” Perspective

- Newer ammunition will be smarter, smaller, more lethal, more accurate, automation friendly and cost effective
  - Vehicles will be smaller, less storage
  - Logistics is key
  - Insensitivity is critical
- Must think of ammunition as a family of munitions with maximum commonality.
  - Anticipate limited quantity of “smart” ammo supported by quantity of “competent” ammo

Army Cannot Afford All Smart Ammo

Smart Ammo Core

Supporting “Competent” Conventional Ammo
Commonality

CURRENT MUNITIONS

Small/med cal
25mm
Javelin
TOW
Tank
2.75” Rocket
Mortars
Howitzers
Hellfire
MLRS
ATACMS

COMMONALITY PLAN

Near Term
Mid Term
Far Term

Common Propellants
Common Sub-munitions
Common Guidance
Common Warheads
Munitions with Common Sub-Components

ENDSTATE

Common Short-Range Munitions
Common Mid-Range Munitions
Common Deep Range Munitions
Current Approach

- R&D
- Production
- Fielding

10 Years

Modular Approach

- Tech & Common Components Insertion
- R&D
- Base
- Up-Grade 1
- Up-Grade 2

War Reserve Stocks

Spiral / Block Development

MODULAR PARADIGM
Life Cycle Management

- Manage Ammunition as a Family, by Families (Artillery, Mortars, Tanks, etc.)
  - Optimize Acquisition Strategy
  - Optimize Technology across Family can save $$ in schedule
  - Opportunity for Continuous Improvement thru Recurring Buys and Long Term Strategies
  - Shape the Product Base through acquisition (modernize base through long term strategies)

Authority and Accountability...
For Meeting Full Military Requirement For all Ammo Families
Ultra - reliability

Achievable and Deliverable to the Objective Force

Understanding of the manufacturing, operational, storage & user environment

Knowing / documenting / challenging "how and why" an item performs successfully

Logistically aligning ultra-reliability materiel assets with deliveries to the battlefield

Robust design that accommodates spiral development

Controlling, assuring, and assessing those "key characteristics / weak links" in the production and post-production
Logistics Upfront

- Strategic configured loads / mission configured loads
- Insensitive munitions
- Remote readiness asset prognostics/diagnostics system (RRAPDS)
- FCS modular rearm
- Smart distribution
Industrial Base Transformation

Sizing Up the Problem …

- Munitions Production Base Capacity
  - Down 68% Last 10 Years
  - Currently Underutilized

- Single Sources
  - 71 of 302 Critical Components

- Minimal Incentives for Contractor Capital Investment

- Manufacturing Capability
  - Currently Focused on Legacy Systems
  - Marginal Future Munitions Capacity

- Surge Capability Virtually Non-Existent
Evolution

Quantities

Technology

Balance Affordability & Preparedness

Time
Emerging FCS Concept
LSI’s Family of Combat Systems

120mm BLOS / LOS
- Combat Wt: 20.8 tons
- Airlift Wt: 18.0 tons
- Crew size: 2
- Remote Wpn Station
- 42 stowed rounds

120mm Mortar
- Combat Wt: 18.5 tons
- Airlift Wt: 16.5 tons
- Crew size: 2
- Robotic follower P3I
- 100 stowed rounds

155mm NLOS
- Combat Wt: 21.4 tons
- Airlift Wt: 18.0 tons
- Crew size: 2
- Remote Wpn Station
- 35 stowed rounds

SUAV
- Combat command asset
  - Reconnaissance
  - Surveillance
  - Target acquisition
- 75lb payload

Infantry Carrier Vehicle
- CH130 transportable
- Carry Infantry squad with Individual equip
- Crew size: 2
- Remote Weapon Station
Government’s Efforts Are Aligned With LSI’s Family of Combat Systems

120mm BLOS / LOS
- MRM
  - Advanced KE
  - Advanced Multi-Purpose Anti-Tank (MPAT)
  - Lt Wt 120mm Cannon

120mm Mortar
- Precision Guided Mortar Munition (PGMM)
  - Mortar Fire Control
  - Advanced Mortar System (AMOS)

155mm NLOS
- XM982 Excalibur
  - Low Cost Course Correction
  - Next Generation Scatterable Mines (NGSM)

SUAV
- Intelligent Munitions System (IMS)
  - Quicklook
  - Air Standoff Mine Detection System (ASTAMIDS)

Infantry Carrier Vehicle
- Bursting Munitions
  - Medium Caliber Program
  - Ground Standoff Mine Detection System
Mid Range Munition (MRM)  
Block I FCS Lethality

- LOS & BLOS 105mm / 120mm Precision Munition for Blk 1 FCS that can destroy heavy armor and other targets
XM395 Precision Guided Mortar Munition

Description:

- Precision Engagement of Point Targets
- Incapacitate Personnel protected within:
  - Earth and timber bunkers
  - Masonry walls
  - Lightly armored vehicles
- Engage targets at Extended Ranges – Block Upgrades to 12 km Threshold, 15 km Objective
- Compatible with existing and future weapon platforms
PGMM Operations

Precision Munitions Increase Warfighter Effectiveness

Glide

Acquire

Destroy Target

Precision Range Lethality Compatibility

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

Masonry Structures Earth and Timber Bunkers Light Armor Vehicles

Precision Munitions Increase Warfighter Effectiveness
Excalibur

Current: System Development & Demonstration
FY06: Unitary Milestone C
FY08: Unitary IOC

- Canard Actuation Sys - CAS
- Fuze Safe & Arm PD Sensor
- Unitary Payload
- Airframe
- GPS Receiver
- Inertial Measurement Unit – IMU
- GPS SAASM
- GPS Antennas
- System Battery
- Data Hold Batteries
- Base

Unitary

- Smart
- Discriminating

- Fin Stabilized Glide Air Frame
- Inductive Set Integral Fuze with Enhanced Setter
- GPS - Inertial Navigation System (INS) Guidance
- All Weather, Day and Night
- Compatible with JLW155 & FCS Digitized 155mm Platforms
- One Meter Length / 106 lb
Concept of Operations

System Initialization

GPS Acquisition and Track

Deploy Canards

Mission Planning

Latitude / Longitude / Altitude

Targeting

Midcourse Trajectory Corrections

Structure Top Attack (Detonation after Penetration)

Fragmenting Warhead

• Gun Target Location
• Trajectory Information
• GPS Crypto Keys
• Precise Time
• Fuze Setting
• Data Download

• Precision Delivery Regardless of Range
• Limits Collateral Damage
• Decreases Volume of Fire Per Engagement
• Enhances Soldier Survivability

Unitary Warhead XM982 Is Designed To Meet User Needs
IMS – Intelligent Munitions System

- Integrated system of sensors, lethal and non-lethal munitions, software and communications
- Emplaced by multiple means and capable of autonomous, unattended employment
- Detects, classifies, identifies, tracks and engages selected targets IAW commander’s intent
Key Aspects of IMS

- **Physical**
  - Small and lightweight
  - Remotely delivered by mortars, cannons, missiles, air & ground vehicles

- **Tunable**
  - On-Off-On

- **Commander’s Intent**
  - Detect and attack
  - Selectively attack
  - Detect and report
  - Pass and then attack

- **Self-Destruct**
  - Selectable times
  - On command
  - Anti-tamper
  - Anti-jam

- **Discriminating**

- **Autonomous or “Man-in-the-Loop”**

- **Reconfigurable**
  - Self-organizing
  - Respond to gaps
  - Munitions move/adjust

- **Self-Marking**
  - Physical
  - Electronic

- **Recoverable**
  - Self-organizing
  - Respond to gaps
  - Munitions move/adjust

- **Scaleable**
  - Lethal and non-lethal munitions
  - Variable lethal effects

- **COP**

- **MS-B in FY05, FUE in FY08**
**40mm Airburst Munitions**

**Description:**
- Air Burst Munitions employ programmable fuzes which are set in the gun by the fire control system.
- Provide large increase in lethality.
- Air burst ammunition can be programmed to burst over tops of prone and prone protected troops.
- Multi round bursts can be programmed to burst at different points downrange (string-of-pearls) increasing lethal area.
Transformation – Artillery and Mortars

Current Force
- 155mm M795 HE Projectile
- 155mm M107 HE
- M720A1 HE
- M769 FRPC
- M1155 PIAFS

Interim Force
- 105mm M915 DPICM
- 155mm M231/ M232 Prop
- 60mm M769 FRPC
- 81mm M853A1 Illum

Objective Force
- 155mm M864 Recap
- MFCS
- CCF
- Excalibur Discriminating
- 120mm XM984 DPICM
- ACAAP
- Excalibur Unitary

Additional:
- 155mm M782 MOFA
- 60mm M720A1 HE
- 155mm M782 MOFA
- 81mm M821A1/ M889A1 HE
Our Munitions Goals

AFFORDABLE & EXECUTABLE

Reliable
Accurate
Lethal
Cost Effective
Commonality
Upgradeable

Realistic Training
Maintainable
Reduced Log Footprint

Responsive
Industrial Base
Planned
Demil/Recapture Environment Friendly
Back-ups
Advanced Munitions

Advanced Kinetic Energy Munition

- LOS 120 mm or 105 mm Munition capable of defeating advanced Heavy Armor threats
- Follow-On Improvement to 120mm M829E3 with Addition of Novel Penetrator Technologies and Advanced Propulsion Systems
- Addresses Advanced ERA

- Included Advanced Warhead to Defeat
  - Concrete Walls
  - Building & Bunkers
  - Light Armored Vehicles
  - Helicopters
Lightweight 120mm Gun

- Breech Ring
- Breech Block
- Breech Mechanism
- Two Recoil Brakes
- Two Recuperators
- Gun Mount
- Cannon Rails
- Tube Yoke/Adapter

Description:
- Lightweight 120mm LOS Gun
  - 4400 lbs maximum weight
  - 85000 lbs maximum tunnion force
  - 22 inch recoil stroke
  - Integral muzzle brake (efficiency TBD)
- FCS MCS must have a field of regard (FOR) of 360° azimuth and –10 to +30° elevation (threshold), -15 to +50° (objective) [ORD 2168]
Today

- Labor Intensive
- Crew Exposed During Missions
- Flexible, Responsive
- High Volume Fire

Interim

IAV Mortar Carrier

Tomorrow

- Semi-Automation
- Reduced Crew Size w/Protection
- Direct Fire and Extended Range
- Increased Mobility & Responsiveness

M1064A3

NLOS Mortar
Mortar Fire Control System (MFCS)

Legacy
- MFCS (H) Heavy
  - Gunner’s Display
  - PDA
  - SINCGARS Radio
  - Commanders Interface
  - Pointing Devices
  - V1 Software

Interim
- MFCS BCT
  - Gunner’s Display
  - PDA
  - SINCGARS Radio
  - Commanders Interface
  - Driver’s Display
  - V2 Software
  - Pointing Devices

Objective
- Future Combat System - Dismounted
  - MFCS (L) Light
    - MECS Software
    - MPCS Software

Future Combat System

MFCS is Key to Legacy, interim and Objective Mortar Platforms
Advanced Medium Caliber Fire Control

Bradley A3--MK 44 30/40mm
Firing Demo, Camp Roberts, Sept. ‘02

5-rnd Burst Fire
S-O-P Air-Burst