ARDEC Fuze Overview
48th Annual Fuze Conference
27 April 2004

COL John Merkwan
Commander, USA Armament Research, Development and Engineering Center
Picatinny is home to….

- Armament Research, Development and Engineering Center (ARDEC)

- Program Executive Office for Ammunition (PEO AMMO)
  - PM CCS (Close Combat Systems)
  - PM CAS (Combat Ammunition Systems)
  - PM MAS (Maneuver Ammunition Systems)
  - PM Joint Services

- Project Manager Soldier Weapons
  - Product Manager Crew Served Weapons
  - Product Manager Individual Weapons

- Project Manager Unit of Action – Lethality Systems Integration

- Project Manager Joint lightweight Howitzer (JLWH) 155 MM
ARDEC Overview – Providing America Advanced Armaments for Peace and War

Artillery & Mortar Systems

Advanced Fuze Technologies

R&D

Special Operations Weapons & Demolitions

DEMIL

TOTAL LIFE CYCLE

Advanced Explosives & Warhead Development

PROD

FIELD SUPPORT

Logistics R&D

Non-Lethal Technologies

Future Small Arms

Providing over 90% of the Army’s lethality...
The Organization is Designed around Five Key Areas

Financial Management (FM)
Armaments Engineering & Technology Center (AETC)
Tech Base/ MANTECH
Enterprise Management (EM)
Armament Systems Integration Center (ASIC)
Quality Engineering & System Assurance (QESA)

Financial Support
Technology Innovation & Competency Development
Strategic Planning & Business Development
Cost, Schedule, & Performance Adherence & Systems Engineering
Product & Process Verification & Validation

Technology Push
Technology Pull

Empowered Teams Support Customer Needs throughout the Lifecycle
Armament Engineering Technology Center (AETC) Purpose and Intent

- Maintain and grow robust core competencies
- The ideal state is to have a balance of technology investments
- Create, find, leverage and accelerate technology
- Technology investment must be virtually continuous - weeding and feeding
Armament Systems Integration Center (ASIC)

Purpose and Intent

• Instill systems engineering discipline, processes, and focus across all ARDEC programs

• Ensure cost, schedule, performance adherence across ARDEC through implementation of standardized processes and metrics based reviews

• Production problems and field problems resolved
Fuze Division

- Fuze RD&E Life Cycle
  - Fuzes all types (prox, time, mechanical)
  - Safety &Arming Devices (Mechanical and Electronic)
  - Related Technologies
    - Advanced Sensors
    - Low Cost, Small, Gun Rugged Electronic and Micro-mechanical Devices (MEMS)
    - Demolition devices

- Concurrent Engineering for Producibility
- National and International Fuze Related Committees
- Army Fuze Safety Review Board
- DoD Fuze Committees
- Electromagnetic Environmental Effects Munition Evaluation

RECENT SIGNIFICANT ACCOMPLISHMENTS AND TRANSITIONS:

MEMS team wins Army R&D Achievement Award, Dec 2003

Materiel release of M1155 Portable Inductive Artillery Fuze Setter, Jan 2004

M762A1/M767A1 ET fuze Materiel Release Aug 03 99.6% Time mode reliability

Marines fire ARDEC designed mortar ammunition at Umm Qasr, Iraq, 23 Mar 2003
Enabling Fuze Components for Advanced Munitions

Purpose:
Develop enabling fuze components that provide the multipurpose & multimode capability, scaleable lethality, increased safety, and affordability required by advanced munitions. Supports NLOS FOC for Reduced Weight Munitions and Scaleable Focused Effects

Product:
- Ballistic firing of MEMS S&A in an artillery fuze fired from 155mm gun launched environment
- Ballistic firing of a Multipoint ESAD in missile/rocket environment and 120mm gun launched environment
- Ballistic firing of proximity sensor in a 155mm and 120mm gun launched environment. Demonstrate safety sensor in missile/rocket environment and 120mm gun launched environment

Payoff:
- Multipoint ESADs enables the use of multipurpose and multimode warheads in a single munition, leading to increased or scaleable lethality, and reduced logistic burden
- Reduced volume of MEMS S&As allows room for added capabilities such as guidance (increased precision) and increased warhead size (increased lethality)
- New and more accurate HOB and direct-fire/stand-off sensors increase lethality and precision. Environmental sensors provides increased safety to the soldier
- Transitions Plans:
  ✓ MAST Ammo Suite upgrades (LOS MP, Enhanced MRM, Advanced Anti-armor) FY08
  ✓ NLOS-LS Block II FY08 (lethality), Increment III FY08 (multi-mode), Joint Common Missile Spiral Spiral 2 FY07/08
  ✓ CCF Spiral II FY08

Schedule and Cost

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<tr>
<th>Tasks</th>
<th>FY05</th>
<th>FY06</th>
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<td>• Multi-point ESAD</td>
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<td>Proximity (RADAR and LADAR)</td>
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Current Fuze Technology Programs

- Fuze Technology Integration (FTI) Program
  - ~ $2M/year
  - FY02-FY18

- OICW Systems Enhancements Science & Technology Objective (STO) III.WP.2000.01
  - ~ $13M
  - FY00-FY04

- MEMS Safe & Arm Device (S&A) Manufacturing Technology Objective (MTO)
  - ~ $18M
  - FY04-FY08

- Power Sources Science and Technology Objective (STO) IV.WP.2004.03
  - ~$8M
  - FY04-FY08
  - Joint ARL/ARDEC Managed Effort
Development Programs

• XM784/785 ET Mortar Fuze
• XM395 PGMM Fuzing
• Course Correcting Fuze (CCF)
• EPIAIFS
• XM 982 EXCALIBUR (integral Fuze)
• Medium Caliber Bursting Munitions
  • M549A1 E1 (SDF function) - 40mm
  • XM 25 - 25mm airburst
  • XM307- Advanced Crew served Weapon
• Navalized MOFA
• Self Destruct Fuze for M864 RECAP
  • XM236
  • XM223E1
  • IMI SD Fuze – CL3677
• Networked munitions, Countermines, Demolitions
  • APLA Track 1 Spider – network munition (Electronic S&A device -ESAD)
  • Mongoose –countermine (ESAD)
  • M1 RAMS & SYDET – demolition (ESAD)
• XM 235 submunition MLRS Rocket
• APKWS Block II
• M84 A3 – MAAWS
Production Programs

**Artillery Fuzes**
- M782 Multi Option Fuze for Artillery
- M762A1 / 767A1 Artillery Electronic Time (ET) Fuze
- Mk432 (Navalized ET Fuze)
- FMU-153/B PD/Delay for 105mm (AC-130 Gunship)
- FMU 160/B Prox Fuze for High Frag 105mm (AC130 Gunship)
- M234 Self destruct Fuze

**Mortar Fuzes**
- M734A1 Multi Option Fuze for Mortars
- M783 Point Detonating Fuze for Mortars
- M772/M776 Mechanical Time Fuzes
- Mortar practice fuzes

**Grenade Fuzing**
- M213 for M67 grenade
- M228 practice
- M201A1 smoke pot
- M201A1 MOD2 stun grenade

**Med Caliber Fuzes**
- M549/M549A1 (40 mm)
- M550 (40 mm)
- M759 (30 mm)
- M505 A3 (20 mm)

**Rocket/missile Fuzing**
- M423, M439, M442 – 2.75 inch rocket.
- MK 420-BDM
- FFV447-1, FFV-501 MAAWS
- M934E6 Stinger

**Tank Fuzes**
- M774 Point Initiating Base Detonating (M830A1)
- M74 Proximity Switch (M830A1)

**Countermines/Demolitions/AT munitions**
- APOBS fuzing
- M1134A3 for MICLIC
- M1147 TDFD
- M87A1 Volcano
In Summary ARDEC Supports the Warfighter

Fielded Systems

Artillery

Mortar

Demolitions

Special Operations

Medium Caliber

2.75” Rocket