

Fuizing

The background of the slide is a collage of military-related images. At the top, the word 'Fuizing' is written in large, 3D, orange-gold letters. Below it, the text 'ARDEC Fuze Overview' and '48th Annual Fuze Conference' is displayed in bold black font. The date '27 April 2004' is also in bold black font. The background features a large, central image of a fuze component, which is a conical, metallic object with a blue base. Surrounding this are various military scenes: soldiers in camouflage gear, tanks, and a soldier operating a fuze. The overall theme is military technology and fuze development.

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



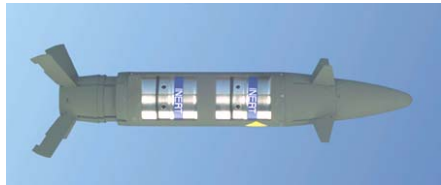
Artillery & Mortar Systems



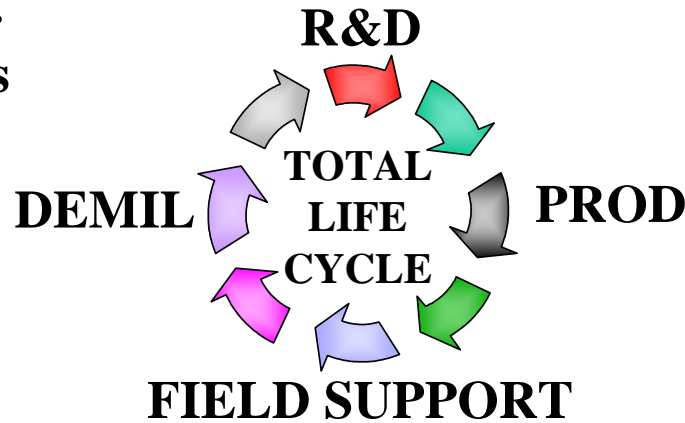
Advanced Fuze Technologies



Special Operations Weapons & Demolitions



Smart Munitions



Advanced Explosives & Warhead Development



Combat Vehicle Armaments & Fire Control



Logistics R&D



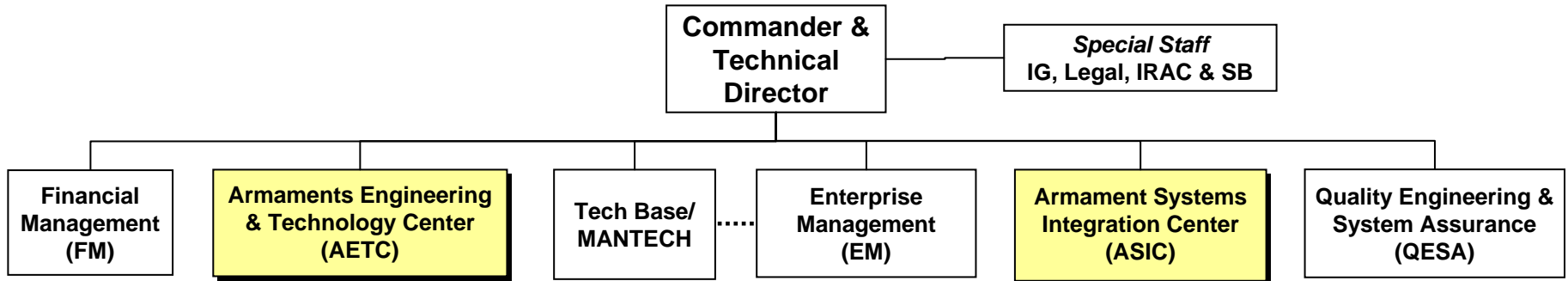
Non-Lethal Technologies



Future Small Arms

PROVIDING OVER 90% OF THE ARMY'S LETHALITY...

The Organization is Designed around Five Key Areas



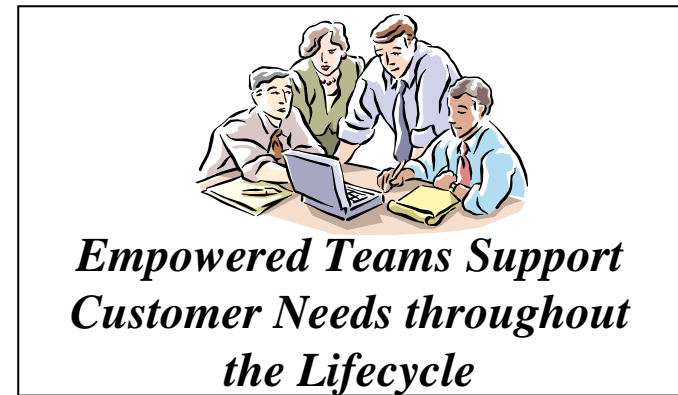
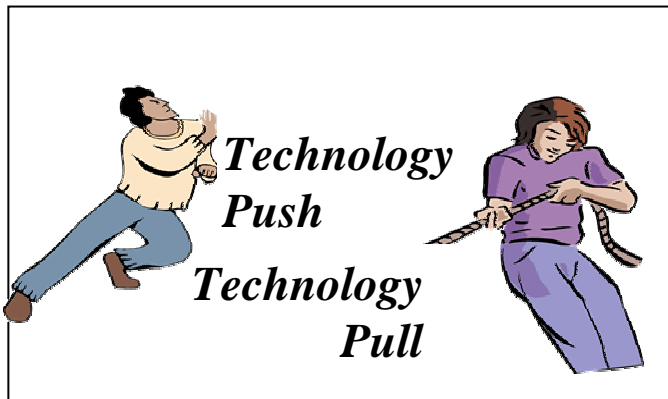
Financial Support

Technology Innovation & Competency Development

Strategic Planning & Business Development

Cost, Schedule, & Performance Adherence & Systems Engineering

Product & Process Verification & Validation



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**

**GENERATE TECHNOLOGY AND PROVIDE ENGINEERING
SUPPORT/SERVICES TO CUSTOMERS**

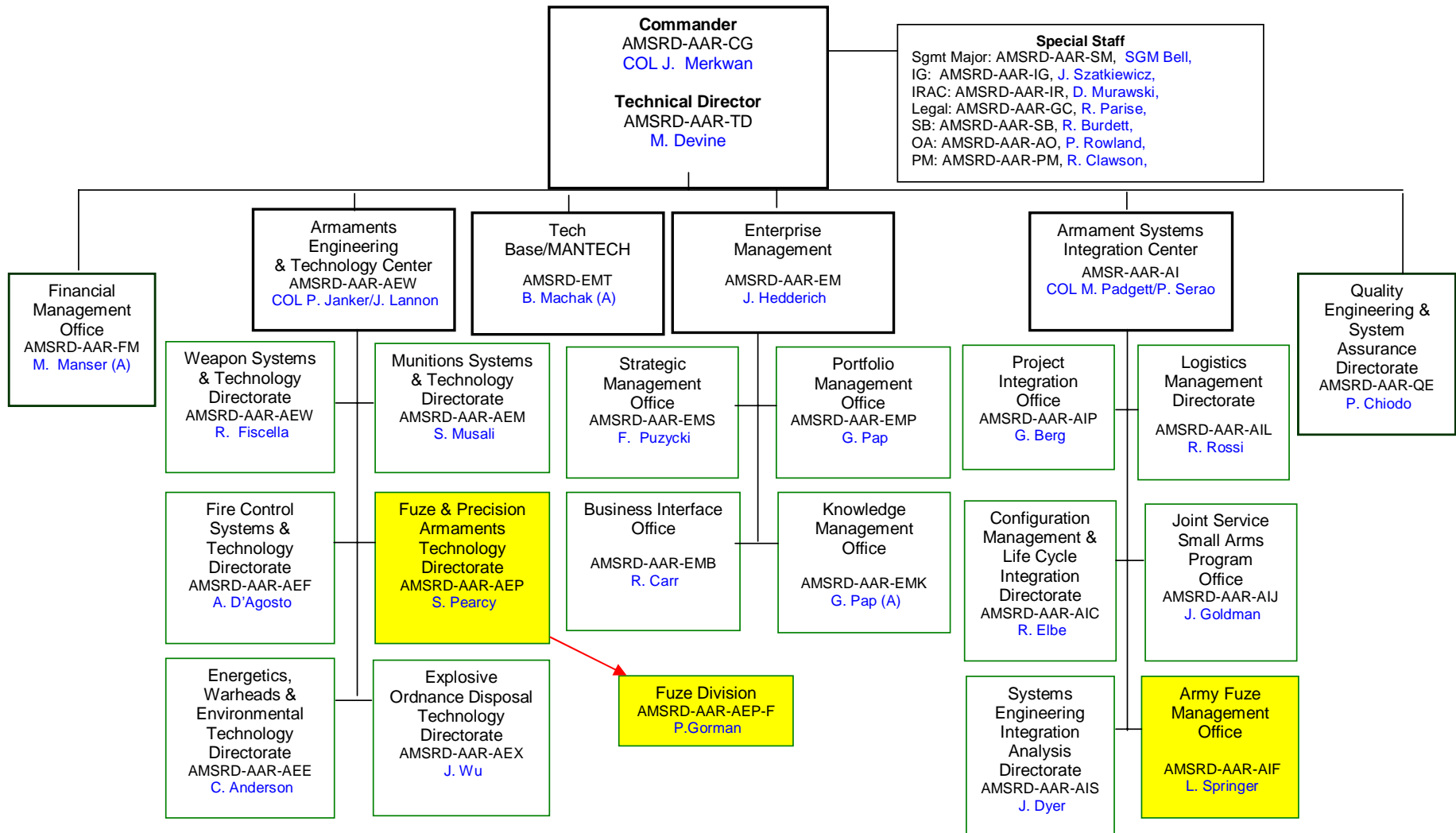
Armament Systems Integration Center (ASIC)

Purpose and Intent

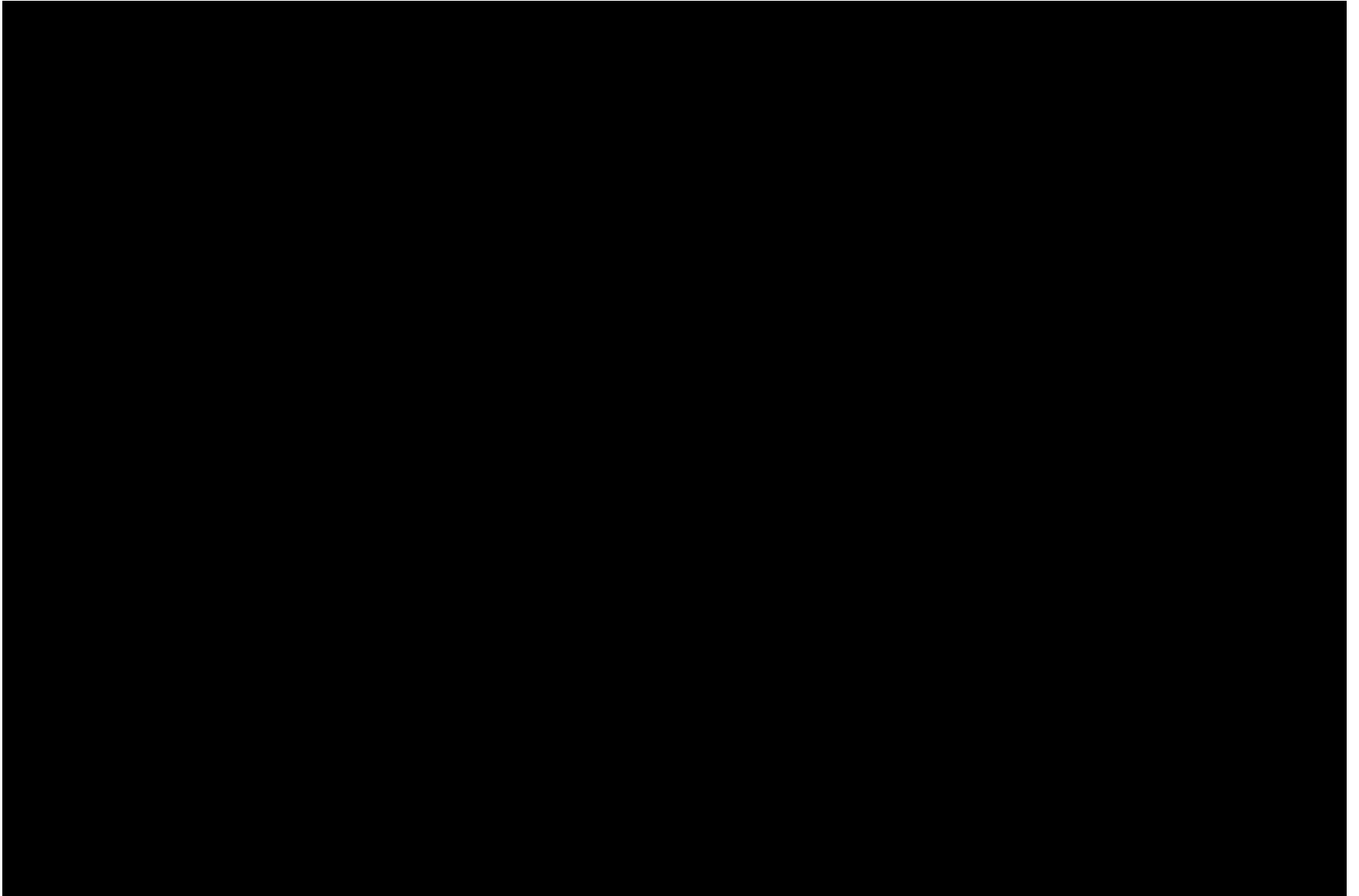
- **Instill systems engineering discipline, processes, and focus across all ARDEC programs**
- **Ensure cost, schedule, performance adherence across ARDEC through implementation of standardized processes and metrics based reviews**
- **Production problems and field problems resolved**

RAPID TECHNOLOGY TRANSITION OR END-CAPABILITIES FIELDDED

ARDEC Organization



ARDEC VIDEO



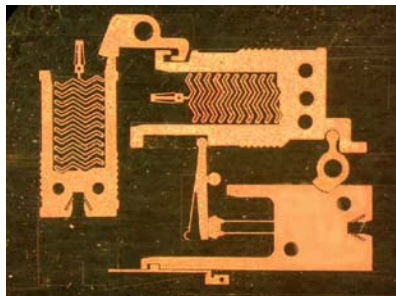


Fuze Division



- **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



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



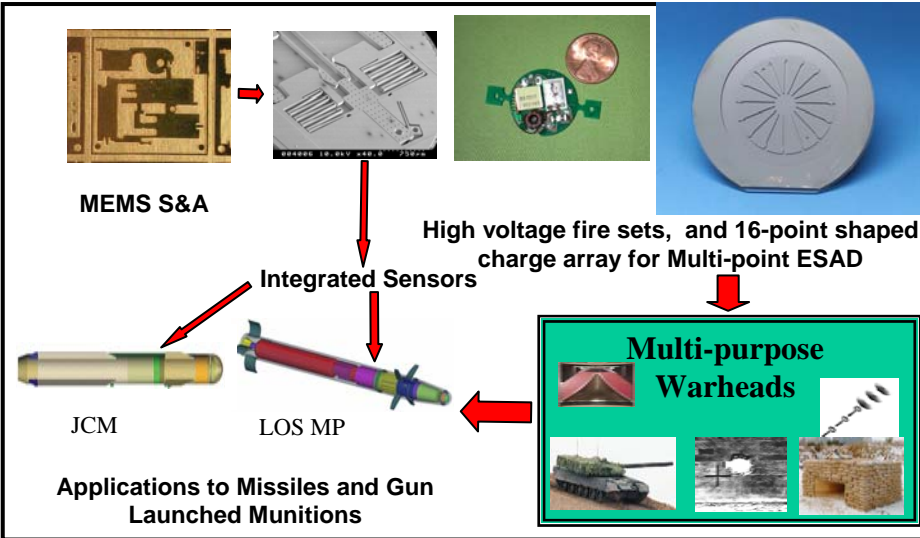
M762A1/M767A1 ET fuze Matériel Release Aug 03 99.6% Time mode reliability



Marines fire ARDEC designed mortar ammunition at Umm Qasr, Iraq, 23 Mar 2003



Enabling Fuze Components for Advanced Munitions



Schedule and Cost

Tasks	FY05	FY06	FY07	FY08
<ul style="list-style-type: none"> Multi-point ESAD <ul style="list-style-type: none"> EFI Array & fire set design ESAD integration and lab/flight test 		3	4	
<ul style="list-style-type: none"> Sensors <ul style="list-style-type: none"> MEMS Based flight safety/impact Proximity (RADAR and LADAR) 	3	4	5	6
<ul style="list-style-type: none"> MEMS S&A/Micro-firetrain <ul style="list-style-type: none"> Design components Component build and lab test MEMS S&A lab and flight test 		3	4	5

Purpose:

Develop enabling fuze components that provide the multipurpose & multimode capability, scalable 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 scalable 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

Technology Thrusts

Gun Hardened In Line ESAs

**Scaleable Lethality
Advanced Warheads**

MEMS S&As

**Affordability
Common Process**

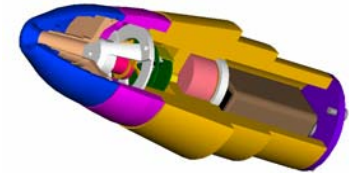
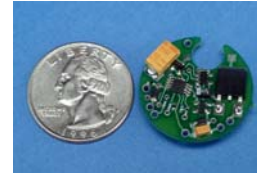
Safety and Standoff Sensors

**Enhanced Lethality
2nd Environment
Direct Fire standoff**

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



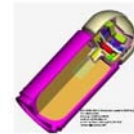
➤ Power Sources Science and Technology Objective (STO) IV.WP.2004.03

- ~\$8M
- FY04-FY08
- Joint ARL/ARDEC Managed Effort



Development Programs

- XM784/785 ET Mortar Fuze
- XM395 PGMM Fuzing
- Course Correcting Fuze (CCF)
- EPIAFS
- 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

Tank Fuzes

M774 Point Initiating Base Detonating (M830A1)
M74 Proximity Switch (M830A1)

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

Countermines/Demolitions/AT munitions

APOBS fuzing
M1134A3 for MICLIC
M1147 TDFD
M87A1 Volcano

In Summary ARDEC Supports the Warfighter

Fielded Systems



Artillery



Medium Caliber



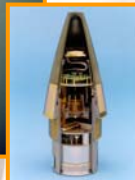
Mortar



Demolitions



Special Operations



2.75" Rocket

