NDIA 52nd Annual Fuze Conference

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ARDEC Overview

ARMAMENT RESEARCH, DEVELOPMENT AND ENGINEERING CENTER
PICATINNY ARSENAL, NJ

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

Presented by:

COL Scott Flynn
Director, Enterprise & Systems Integration Center (ESIC)
14 May 2008

ARDEC Video

Team Picatinny

Assigned/Direct Support ——
Coordination .....

ASA, AL&T

AMC

IMA

JM&L LCMC

RDECOM

Garrison Commander

PEO Ammo/CG

ARDEC

PM CAS

PM CCS

PM JS

PM MAS

- Population 4,237
- 6,493 Acres
- 804 Buildings
- 64 Laboratories

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Other Tenants

PEO Soldier
PM Soldier Weapons

PM FCS BCT
PM Lethality

PEO GCS
PM JLW155

DCMA
DCMA NE

CPAC

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Armament, Research Development & Engineering Center - Executive Team

Director/Deputy Director
Dr. Joseph A. Lannon/COL Russell Hrdy
6000/7000

Tech Base/MANTECH
Ms. Barbara Machak
X7019

Senior Research Scientist for Warhead Technologies
Mr. Richard Fong
X2516

Munitions Engineering Technology Ctr.
John Hedderich III
x6173

Enterprise & System Integration Ctr.
COL Scott Flynn/Patrick Serao
X6006/7912

Weapons & Software Engineering Center
Mr. David Castellano
X6444

Fuze & Precision Armaments Technology Directorate
William Smith
X7258

Financial Management Office
Ms. Mary Manser
X8625

Army Fuze Management Office
Chris Janow
X5438

Quality Engineering & System Assurance Directorate
Mr. Dominick Carra
X3918/4738

Fuze Division
Phil Gorman
X7307

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Phone Numbers: COMM: (973) 724-XXXX
DSN 880-XXXX

Research

Development

Production

Field Support

Demilitarization

Vision:

Innovative Armaments Solutions for Today and Tomorrow

Mission:

To develop and maintain a world-class workforce to execute and manage integrated life-cycle engineering processes required for the research, development, production, field support and demilitarization of munitions, weapons, fire control and associated items

Advanced Weapons – line of sight/beyond line of sight fire; non line of sight fire; scalable effects; non-lethal; directed energy; autonomous weapons

Ammunition – small, medium, large caliber; propellants; explosives; pyrotechnics; warheads; insensitive munitions; logistics; packaging; fuzes; environmental technologies and explosive ordnance disposal

Fire Control – battlefield digitization; embedded system software; aero ballistics and telemetry

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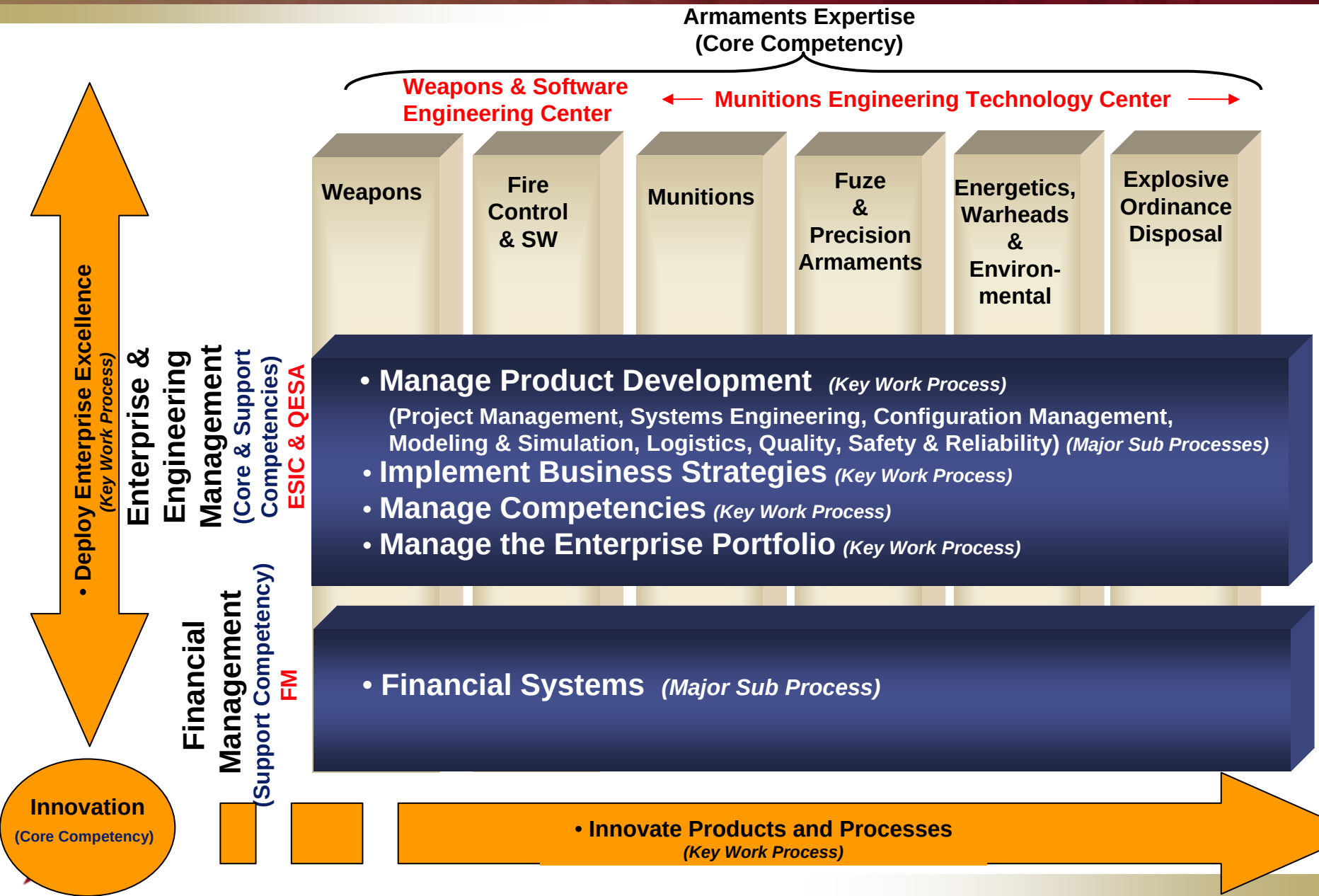
ARDEC Provides the Technology for Over 90% of the Army's Lethality; Significant support to other Services Lethality

ARDEC Core Competency & Key Work Process Relationship



ARDEC at a Glance

- Established "Center of Mass" for Armament Systems and Munitions for Joint Services
- ARDEC is the largest tenant at Picatinny Arsenal
  - Over 800 Buildings/64 Laboratories
- ARDEC Gov't Personnel ~ 3067; 1000 new hires since FY99
- >$100M invested in "World Class" experimental R&D facilities since mid-90's; Additional $75M planned
- Strong partnerships with Industry, Academia, and other Government agencies - Growth and Success through Cooperative Research and Development Agreements (CRADAs) = 159
- Intellectual Property (FY07):
  - Invention Disclosures – 49
  - Patent Applications – 30
  - Patents Issued – 13
- Patent License Agreements = 13
- In-house rapid prototyping initiatives demonstrating new desired capabilities, supporting production prove-out and initial fielding demands
- >$125M Tech Base portfolio addressing Joint needs

AFSRB Approvals
7 Interim Certs (TC)
5 Final Certs (MR)
10 UMR

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Proven Track Record – ARDEC Field Transitions
46 MR (23 UMR): FY07 & 08

Picatinny's Mission: Life Cycle Engineering & Support

Electro Magnetic Gun

CROWS Lightning

Excalibur

Plasma Arc Furnace

Cryofracture

Research & Development

Production

Demilitarization

Field Support

SUPPORT TOTAL LIFE CYCLE

Lake City Army Ammunition Plant

M777A2 Lightweight 155mm Howitzer

M110 Semi-Automatic Sniper System

M240B 7.62MM Machine Gun

40mm Multi-Shot Launcher

Abrams Main Battle Tank

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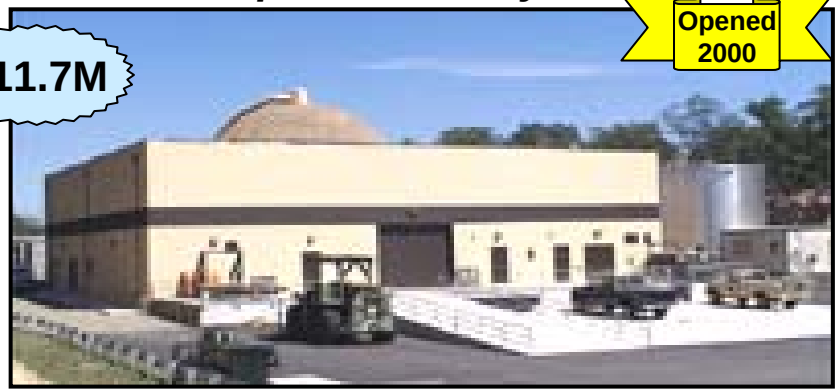
TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

R&D and Experimentation Facilities
Major Examples

Davidson Advanced Warhead Development Facility

$11.7M

Opened 2000



- Maximum 50 TNT equivalent capability
- 100m indoor warhead test range

Precision Armaments Lab

Opened 2003

$8.8M

- 2 Lab grade elevators for sensor dev
- 3 Target locations; 150m, 400m, & 1500m

Armament Technology Facility

$8.4M

Opened 1996

- 100 & 300m indoor ranges
- Environmental chambers

Armament Software Engineering Cntr

$15.5M

Opened 2005

- Integrated S/W & H/W development/integration
- Multi-platform SOSI highbay capability

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TECHNOLOGY DRIVEN. ***WARFIGHTER FOCUSED.***

New Facilities Under Construction
Breaking "Old" Grounds

Soft Recovery System (SRS)

Opening FY08

- High-g test Munition/Components to 20K g's
- 155mm capability (current); Only one in existence
- Navy 5", 120mm mortar, and EM Gun planned

High Energy Propellant Formulation Facility

Opening FY08

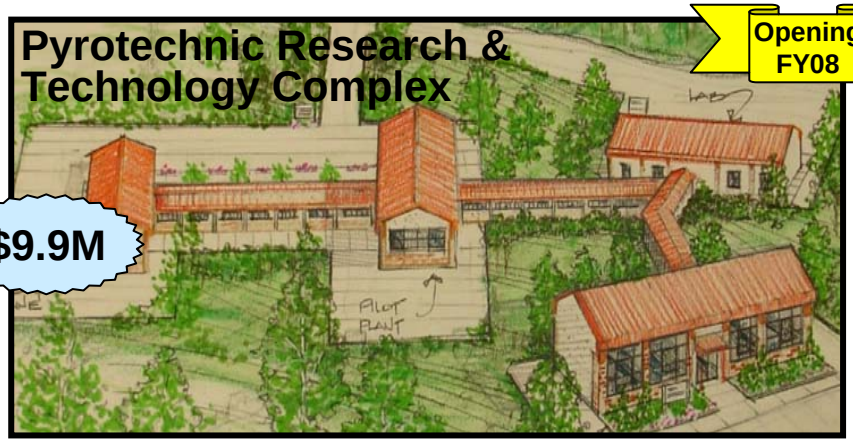
$17.7M

- 45,000 ft2 Propellant Pilot Plant
- Characterization Laboratories
- Magazine Storage / Offices

Pyrotechnic Research & Technology Complex

Opening FY08

$9.9M



- 33,000 ft2 Engineering Offices & Laboratories
- Pilot manufacturing facility
- Energetic stowage

Explosives R&D Loading Facility

Opening FY09

$8.0M

- 28,000 ft2 Melt Pour Operations & Engineering
- Climate Controlling Machining
- Explosive Pressing, Cast Cure, & X-Ray

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TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.

ARDEC In-House Capabilities

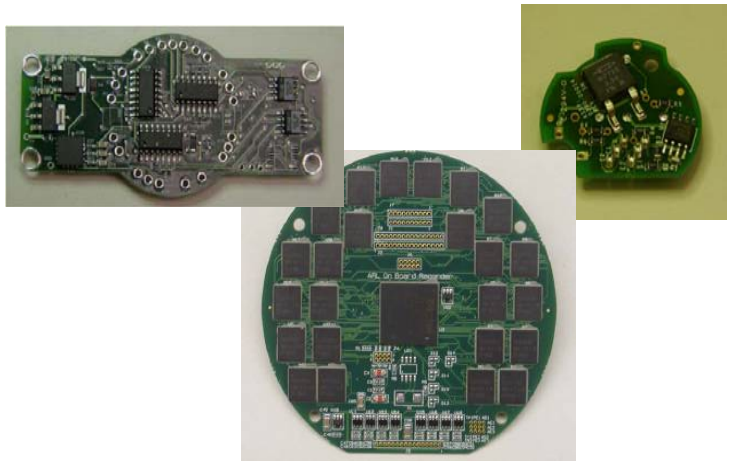
- Engineering Modeling and Simulation
- Electromagnetic Environmental Effects (E^3)
- Armament Technology Facility
- Centrifuge Capabilities
- Air Gun / Rail Gun
- Environmental Conditioning
- ARDEC Soft Recovery System (SRS) Facility
  - 155 mm Soft Catch (Scat) Gun
    - 39 – 62 Cal Capability
- Fuze Development Center

Armament Technology Facility

Soft Recovery System Facility

Fuze Development Center

Mission: To Accelerate New Technology To The Field



Capabilities for Rapid Prototyping:

- Custom Circuit Card Design and Fabrication
- Automated Surface Mount Assembly
- Real-Time X-Ray Inspection
- Environmental Test
- Optical Strain and Stress Measurement
- Stereo lithography
- High Speed Spin Stand
- Machine Shop

Current Projects Supported:

- M208 Smoke Pot Fuze
- 40 mm ANLM
- Rattlesnake
- PGK
- Excalibur

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Army Fuze Management Office (AFMO)

- Centralized Fuzing Life Cycle Oversight Management
  - All Non-Nuclear Army Fuzes
- Collocated With PEO Ammunition
- Army Fuze Safety Review Board (AFSRB)
  - Army Review Authority for Fuze Safety
  - Chaired & Managed By The AFMO

The AFMO Is The Army Focal Point for Fuzing

AFMO/AFSRB GWOT Support

- Fuze Safety Certification supports TC and Materiel Release
  - AT4 CS (Anti-Tank/Confined Space)
  - GMLRS (Guided Multiple Launch Rocket System)
  - LAW (Light Anti-Armor Weapon) -UMR
  - Grenade Rifle Entry Munition (GREM)
  - Spider Munition – First certification of fuzing system with Software control of safety critical functions
  - Excalibur
  - 60mm MAPAM (Mortar Anti-Personnel Anti-Material)
  - FOG (Fast Obscuration Grenade) – UMR
  - ASM (Anti-Structural Munition) Grenade
  - 40mm XM1060 Thermobaric Cartridge
  - TOW Bunker Buster
  - XM104 Non-Lethal Rubber Ball Grenade

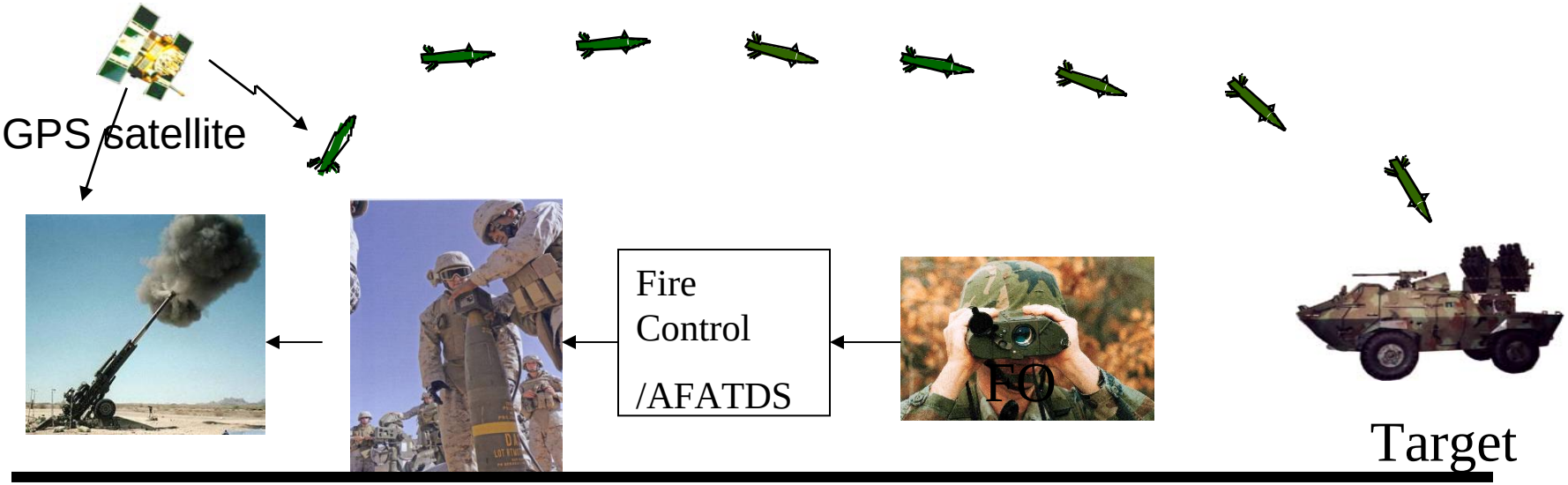
ARDEC FOCUS:

Deliver Safest & Most Capable Fuze Solutions To The Warfighter

ENHANCED PORTABLE ARTILLERY FUZE SETTER (EPIAFS) M1151A1

- **Sends Initialization Data To Excalibur (& PGK)**
- **Retains Form, & Functionality of PIAFS (Standard Artillery Fuzes)**
- **Interfaces:**
  - **PEFCS & DFCS Digital Fire Control Systems**
  - **Key Loader (Including The New SKL)**
  - **DAGR GPS receiver**
- **Fully Field Upgradable**
  - **Via SPORT or MSD**
- **In-House Gov't EPIAFS Team (Fuze Division)**
  - **All Mechanical, Electrical & Software Design & Dev**
  - **Early Fielding Production – 130 EPIAFS**
- **Successfully Fielded: Iraq & Afghanistan**
  - **JLW-M777E1 & Paladin**

ENHANCED PORTABLE ARTILLERY FUZE SETTER (EPIAFS) SUPPORTING EXCALIBUR



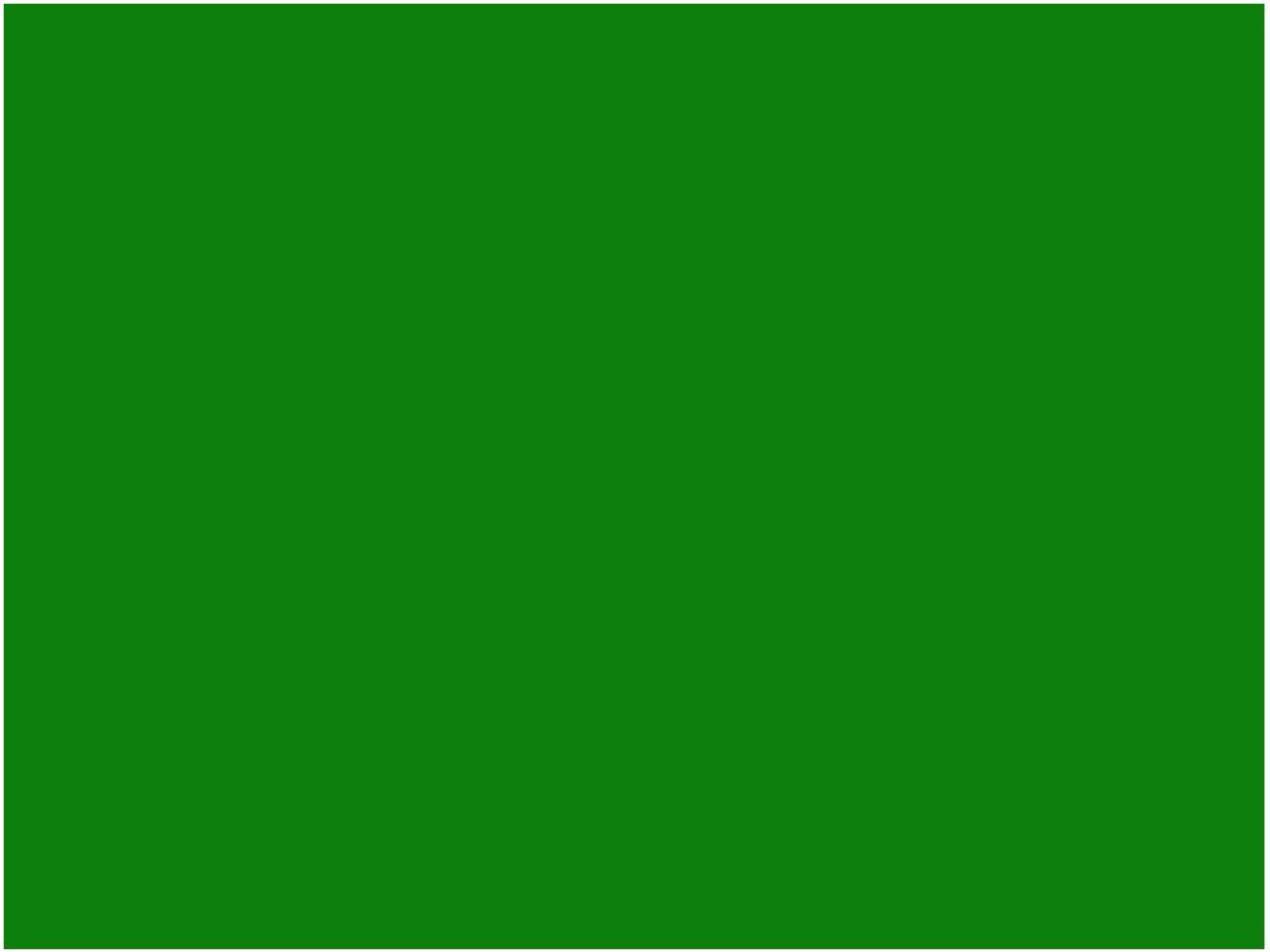
ARDEC Fuze Division In-House Production







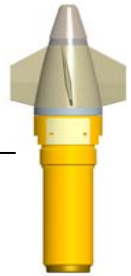
Excalibur Video



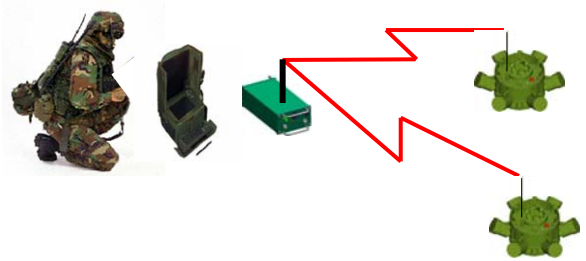
Fuze Technology Integration

- Technology Insertion To Current Munition Items
- Addresses Industrial Base Single Point Failure Issues
  - Risk Mitigation:
    - Battery Aging
    - 2nd Source M734A1 Signal Processor
    - 2nd Source Tuning Fork Crystal
  - Block Upgrades:
    - Improved Bunker Defeat Munition Sensor
    - Standardization of Hand Grenade Fuzes
- PEO Ammunition / User Payoff:
  - Insert Current Technology Into Today's Munitions
  - Preclude Obsolescence By Incorporating Component Technology
  - Provide Safer, More Reliable and More Lethal Munitions

ARDEC Fuze Division Developmental Programs

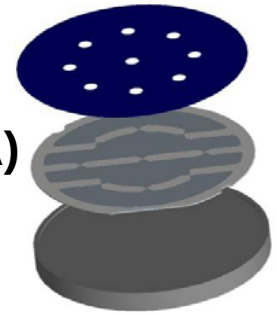


- **XM784 / XM785 ET Mortar Fuze**
- **Precision Guidance Kit (PGK)**
- **40 mm Proximity Fuzing**
  - Non-Lethal & Lethal
- **40mm Micro Electro-Mechanical Systems (MEMS)**
  - Includes Self-Destruct Fuzing
- **Self Destruct Fuze for M864 RECAP**
  - XM1162 / XM242
- **Network Munitions**
  - Intelligent Munition System (IMS)

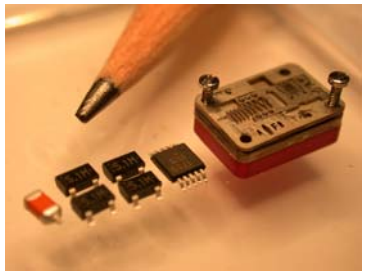


Army Technology Objective
Fuze and Power for Advanced Munitions

- **Fuze Technology Thrusts:**
  - Multi-Point Electronic Safe & Arming Devices (ESAD)
  - Micro Electro-Mechanical Systems (MEMS) Safe & Arming (S&A)
    - Large Caliber Applications
  - Advanced Sensors
    - Proximity Sensors For Direct Fire Applications
    - Environmental Sensors / Impact Sensors
- **Power Source Technology Thrusts:**
  - Thermal Battery Prototypes
    - Higher Energy Densities In A Smaller Volume
  - Novel Liquid Reserve Battery Prototypes
    - More Producible and Cost Effective
  - Hybrid Power System Prototypes
    - RF & Piezo Electric Harvester
    - Thermophotovoltaic
    - Super Conductors



Multi-point Initiation



Thermal Battery Improvements

In Summary – ARDEC …

- **Global Leader In Armaments Technology Solutions**
- **Forging Partnerships Within Fuzing Community**
  - **DoD Contractors / Academia / DoE Partner Labs & OGAs**
- **Focus On GWOT Support**
  - **Continually Work w/ Soldier To Dev New Armaments**
  - **Improve Fielded Systems**
  - **Quickly Resolve Field Problems**

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