



49th Annual NDIA Fuze Conference ARDEC Overview



Presented by:
COL John Merkwan
ARDEC Deputy Director

ARDEC Video



U.S. Army Armament Research, Development & Engineering Center (ARDEC)



Mission: Provides fully integrated life cycle engineering (from R&D to demil) for armaments and munitions in support of the Army, Program Executive Offices, the Single Manager for Conventional Ammunition, Air Force, Navy, Marines, Coast Guard and Special Operations Forces

- **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

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

We Are Army Lethality

- **Picatinny (All Tenants) = 4,227**
(Consists of ARDEC, PEO-Ammo, Dep PEO-GCS, PM Soldier Weapons, Military (OFC, WO, ENL) & other DoD Tenants)

- **ARDEC (All Sites) = 2679**
 - **Picatinny Site = 2261**
 - **Benet (Watervliet Arsenal) = 236**
 - **Rock Island Arsenal = 122**
 - **Adelphi & APG = 60**

- **S&E average 20 years experience = 30,000 man-years of highly specialized experience in critical multidisciplinary field (no commercial equivalent)**

- **S&E New hires from April 99 to date = 590**

- **Acres = 6,493**

- **Buildings = 804**

- **Laboratories = 64**

- **Intellectual Property:**

- **Invention Disclosures - 61**
- **Patent Applications – 42**
- **Patents Issued – 24**

- **Patent License Agreements = 10**

- **Growth and Success through Cooperative Research and Development Agreement (CRADA) = 106**

- **World Recognized Armaments Authority**



**Providing the lethality
technology for over 90%
of the Army's Munitions**

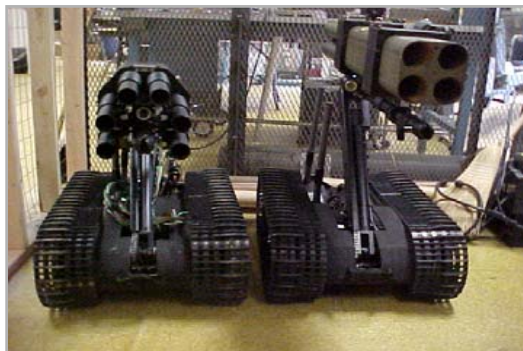


Significant Technical Accomplishments



Development

TALON- US Army's First Functioning Lightweight Weaponized Robotic Platform



Key Product Transition To PEO XM395 Precision Guided Mortar Munition (PGMM)



Fielded for SOCOM

84mm High Explosive Dual Purpose & 84mm Area Denial Munitions For Multi-Role Anti-Armor Antipersonnel Weapon (MAAWS)



HEDP 502 IM



ADM 401 Flechette



New Extra Large 7.5" EFP For M303 Special Operations Demo Kit

Enduring Freedom URGENT Releases

Non-Lethal Capability Set



M898 Sense & Destroy Armor (SADARM)



Future

Autonomous Projectiles

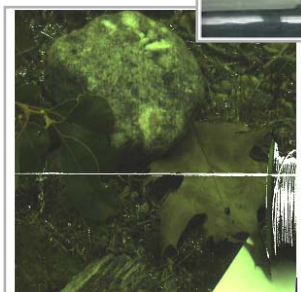


Fielded for Army, Marines

World's First 81mm M816 IR Mortar Illuminating Cartridge



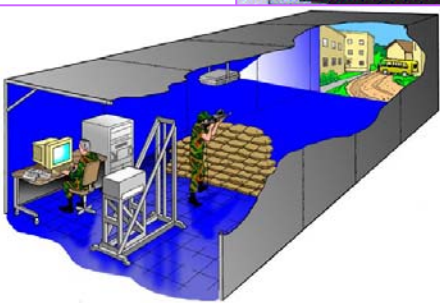
XM107 .50 Cal Sniper Rifle



Hyperspectral Imaging Devices



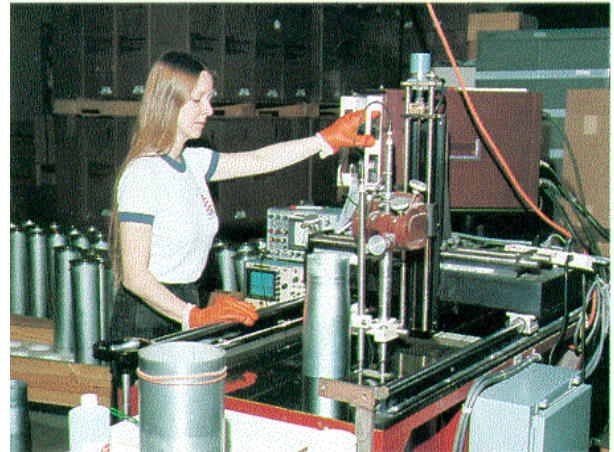
World Class Facility



Armament Technology Facility

Army Propellant Surveillance Laboratory

Davidson Advanced Warhead Development Facility



Acoustics Technology Laboratory

Non Destructive Evaluation Facility

Precision Armaments Laboratory



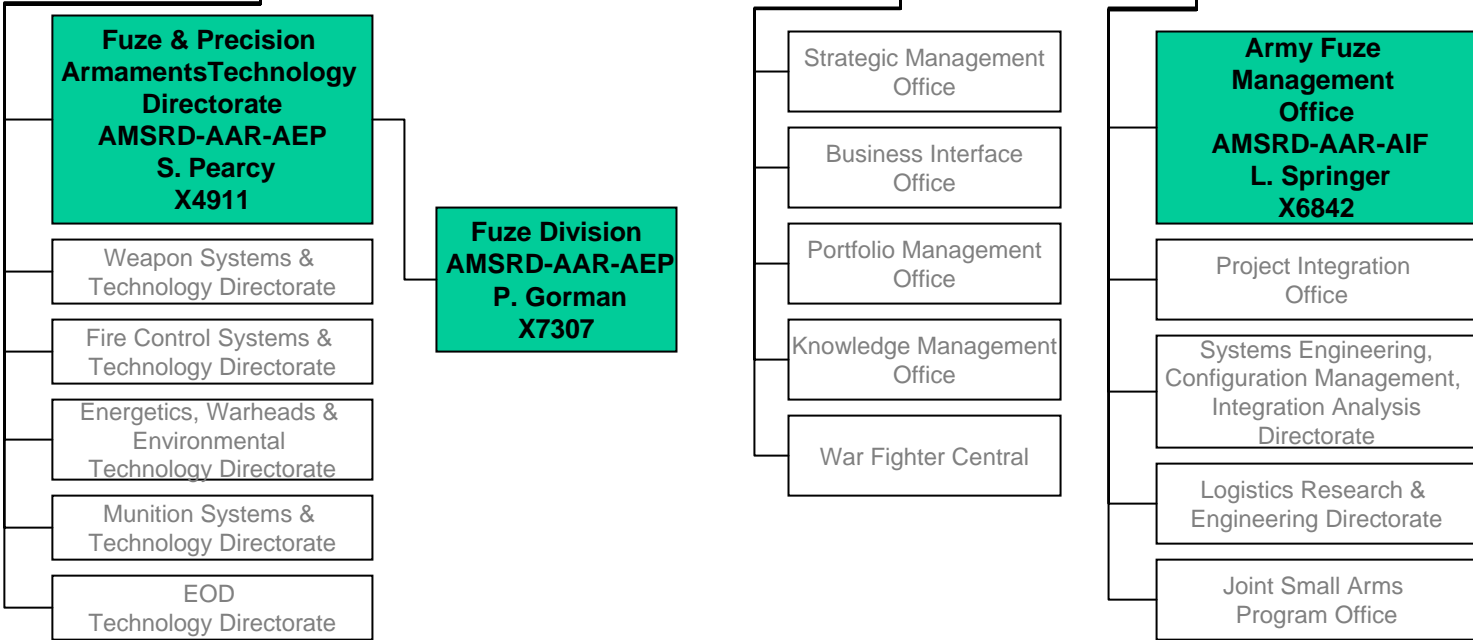
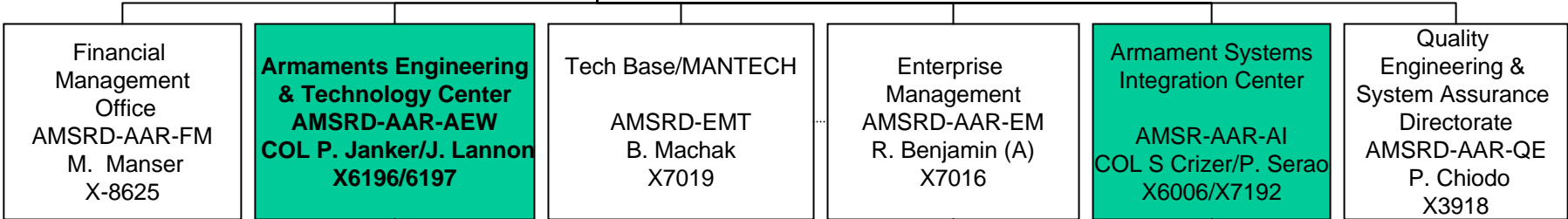
ARDEC Organization Structure



Director
 AMSRD-AAR-D
 J. Hedderich III
 X-7012

Deputy Director
 AMSRD-AAR-DD
 COL J. Merkwán
 X-7000

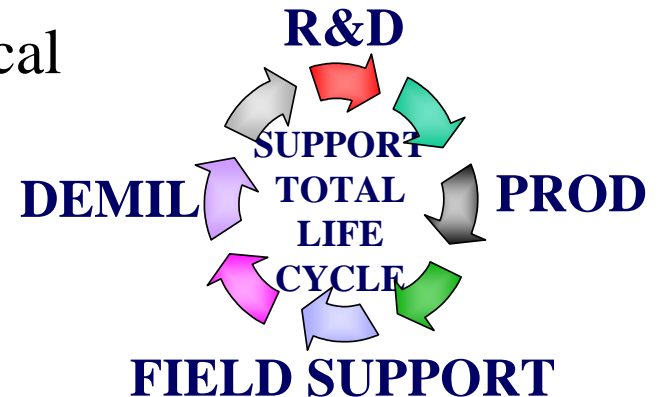
Special Staff
 Sgmt Major: AMSRD-AAR-SM, SGM Bell, X6434
 IG: AMSRD-AAR-IG, J. Szatkiewicz, X6426
 IRAC: AMSRD-AAR-IR, D. Murawski, X6360
 Legal: AMSRD-AAR-GC, D. Scott, X3410
 SB: AMSRD-AAR-SB, R. Burdett, X4106
 OA: AMSRD-AAR-AO, P. Rowland, X7243
 PM: AMSRD-AAR-PM, R. Clawson, X4057





ARDEC Fuze Division

- Total Life Cycle Fuzing Responsibility
- Fuze Products
 - Proximity, Time, Point Detonating & Delay Fuzes
 - Safe and Arming (S&A) Devices
 - Mechanical / Electro-Mechanical
 - Electronic S&A (ESA)



**Fuze Competency Resides In
The ARDEC Fuze Division**



ARDEC Fuze Division Con't



- Related Fuze Technologies
 - Advanced Sensors
 - Low Cost, Gun Hardened Electronics
 - Micro Electro-mechanical Systems (MEMS)
 - Electromagnetic Environmental Effects (E³)
- Fuze Division Interface
 - User Communities (Ft Benning, Ft Sill etc.)
 - PEO Ammunition
 - PM CAS, PM MAS & PM CCS
 - Army Fuze Management Office (AFMO)
 - Management Oversight Of Fuzing
 - Chairs Army Fuze Safety Review Board (AFSRB)
 - Staffed By ARDEC Personnel



ARDEC Fuze Division Con't



- Fuze Division Interface Con't
 - PEO Missiles & Space
 - Close Combat Weapon Systems (PM CCWS)
 - Aviation Rockets & Missiles (PM ARM)
 - Aviation & Missile Research & Dev (AMRDEC)
 - National & International Fuze Related Committees
 - Army Fuze Safety Review Board (AFSRB)
 - DoD Fuze Committees
 - Testing Facilities (APG, YPG etc.)



ARDEC Fuze Division Developmental Programs



- **XM784/785 ET Mortar Fuze**
- **XM395 PGMM Fuzing**
- **Course Correcting Fuze (CCF)**
- **EPIAFS**
- **XM 982 EXCALIBUR (integral Fuze)**
- **Medium Caliber Bursting Munitions**
 - XM25 – Shoulder Fired Weapon
 - XM307 Advanced Crew Served Weapon (ACSW)
- **40 mm Proximity Fuzing**
 - **Tactical & Non- Lethal**



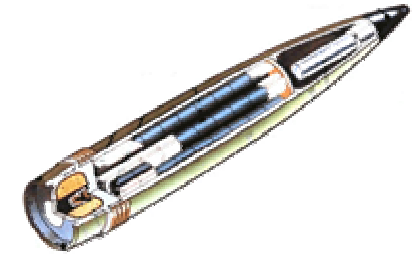


ARDEC Fuze Division Developmental Programs Con't



- **Self Destruct Fuze for M864 RECAP**

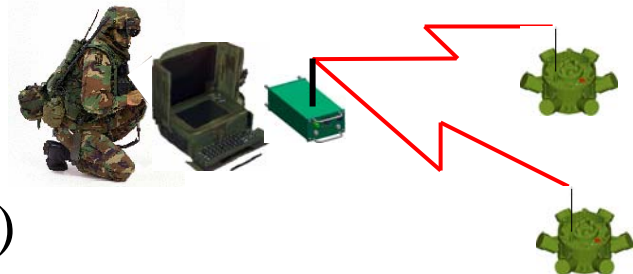
- XM236
- M223E1 & CL3677 (IMI)



- **Networked Munitions, Countermines, Demolitions**

- Network Munitions

- Spider
- Intelligent Munition System (IMS)



- Ground Stand-Off Mine Detection System (GSTAMIDS)

- MI RAMS & SYDET – demolition (ESAD)

- **APKWS Block II**



ARDEC Fuze Division Production Programs



Artillery Fuzes

- M782 Multi Option Fuze for Artillery (MOFA)
- M762A1 / 767A1 Artillery Electronic Time (ET)Fuze
- M234 Self destruct Fuze
- PIAFS



Mortar Fuzes

- M734A1 Multi Option Fuze for Mortars
- M783 Point Detonating Fuze for Mortars
- M772/M776 Mechanical Time Fuzes
- Mortar practice fuzes
- M935 Point Detonating / Delay



Grenade Fuzing

- M213 for M67 grenade
- M228 practice
- M201A1 for M18 Smoke
- M201A1 MOD2 stun grenade





ARDEC Fuze Division Production Programs Con't



Med Caliber Fuzes

M549 / M549A1

M759 (30 mm)

M550 Escapement (S&A)

Rocket/missile Fuzing

M423, M439, M442 –2.75 inch rocket.

MK 420-BDM



M789 w/M759 FUZE

Countermines/Demolitions/AT munitions

APOBS Fuzing _____

M1134A3 for MICLIC

M147 TDFD

M87A1 Volcano



Tank Fuzes

M774 Point Initiating Base Detonating (M830A1)

M74 Proximity Switch (M830A1)

M578E1 Base Detonating (M393 Cartridge)

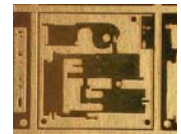
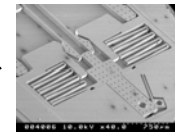


Army Technology Objectives

Enabling Fuze Components For Advanced Munitions



- Technology Thrusts:
 - Multi-Point Electronic S&A's
 - Micro Electro-mechanical Systems (MEMS)
 - Advanced Stand-Off & Safety Sensors
- User Payoff:
 - Tailored Lethality – Reduce Logistic Burden
 - Smaller Electronics – Increased Warhead Sizes
 - Increased Soldier Safety
 - Technology Affordability

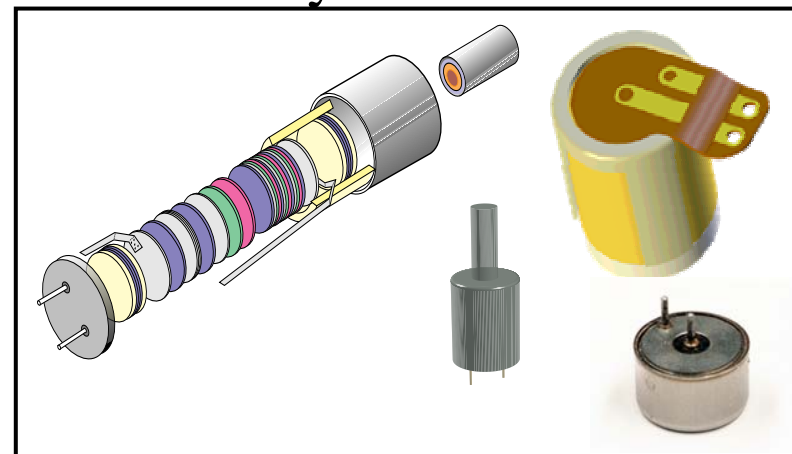




ARDEC ATO *Common Modular Power Systems For Advanced Munitions*



- Technology Thrusts:
 - Thermal Batteries
 - Improved Liquid Reserve Batteries
 - Alternative / Hybrid Energy Systems
- User Payoff:
 - Meet Energy Demands Of Future Weapons Systems
 - Power Source Reliability and Producibility
 - Power Source Modularity / Commonality
 - Technology Affordability

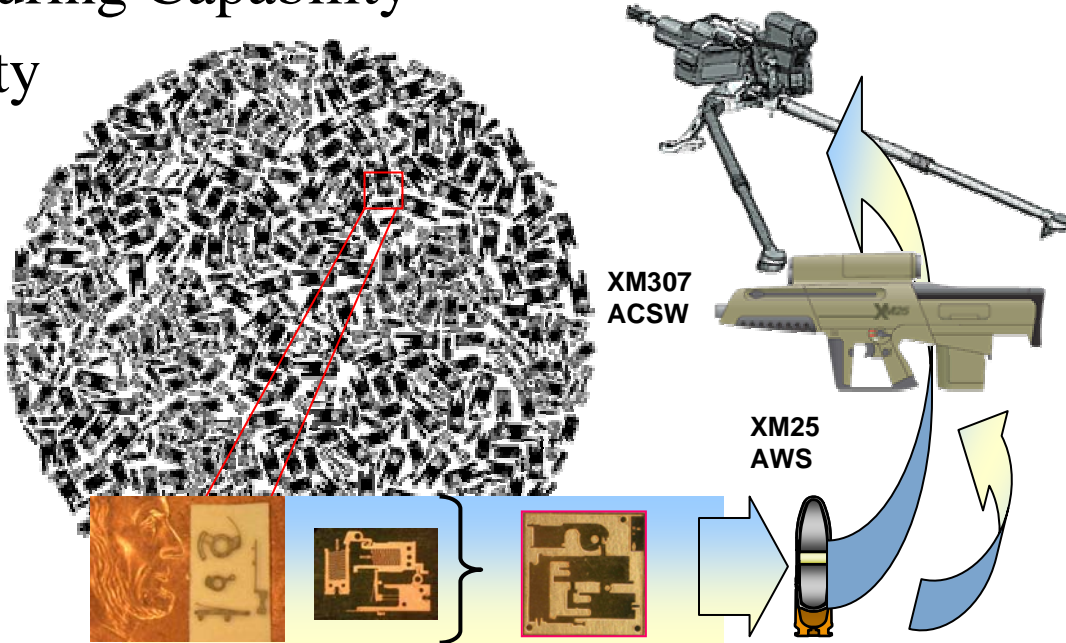




ARDEC - Manufacturing Tech Objective MEMS Safe & Arming (S&A)



- Leveraged Off OICW System Enhancement STO Success
- Technology Thrusts:
 - Make MEMs-Based S&A Devices Produccible
 - Scaleable Micro-Scale Explosive Loading Technologies
- Payoff:
 - High Volume Manufacturing Capability
 - Technology Affordability



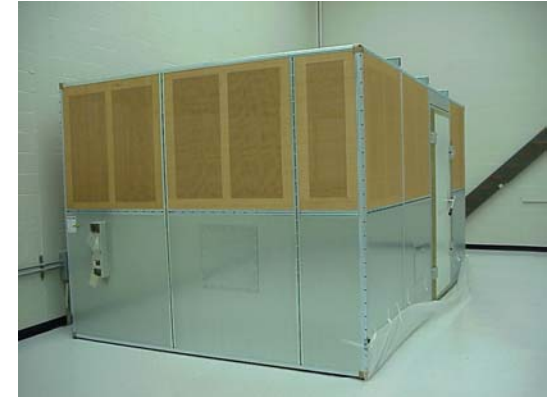


Fuze Development Center



- **Provides Rapid Response to User/Customer Fuzing Needs**

- Facilitates Gov't / Contractor Joint Efforts
- Over 10,000 Sq. Ft of Floor Space
- Supports Near Term & Far Term Initiatives



- **Special Capabilities:**

- SMT Line For Flexible Circuit Development.
- Failure Analysis Testing.
- Screen Room for Handling EED's
- Machine Shop



- **Future Capabilities:**

- Clean Room To Develop MEM's LAP Process
- Future Unique Test Capabilities.
- LAP'ing Of Micro Dets and ESA's With Multipoint Initiators





ARDEC Overview Summary



- **Fuze Competency Resides In The ARDEC Fuze Division**
 - **Total Fuze Life Cycle Responsibilities**
- **ARDEC Well Represented At This Conference**
- **Recent Technology Investments:**
 - **Advances Battlefield Capabilities**
 - **Puts ARDEC In Best Position To Support Warfighter**

**Fuzing Is At The Forefront Of
Safety & Lethality**