ARDEC Overview

Presented by:

COL Scott Flynn
Director, Enterprise & Systems Integration Center (ESIC)
14 May 2008
- Population 4,237
- 6,493 Acres
- 804 Buildings
- 64 Laboratories
Armament, Research Development & Engineering Center - Executive Team

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

Senior Research Scientist for Warhead Technologies
Mr. Richard Fong
X2516

Tech Base/MANTECH
Ms. Barbara Machak
X7019

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

Munitions Engineering Technology Ctr.
John Hedderich III
x6173

Financial Management Office
Ms. Mary Manser
X8625

Munitions Engineering Technology Ctr.
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Technology Driven. Warfighter Focused.

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

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

Armaments Expertise (Core Competency)

Weapons & Software Engineering Center

Munitions Engineering Technology Center

Weapons
Fire Control & SW
Munitions
Fuze & Precision Armaments
Energetics, Warheads & Environmental
Explosive Ordnance Disposal

Enterprise & Engineering Management (Core & Support Competencies)

- Innovate Products and Processes (Key Work Process)
- Manage Product Development (Key Work Process)
  (Project Management, Systems Engineering, Configuration Management, Modeling & Simulation, Logistics, Quality, Safety & Reliability) (Major Sub Processes)
- Implement Business Strategies (Key Work Process)
- Manage Competencies (Key Work Process)
- Manage the Enterprise Portfolio (Key Work Process)

Financial Management (Support Competency)

- Financial Systems (Major Sub Process)
- Deploy Enterprise Excellence (Key Work Process)

Innovation (Core Competency)
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

Proven Track Record – ARDEC Field Transitions
46 MR (23 UMR): FY07 & 08
Picatinny's Mission: Life Cycle Engineering & Support

Research & Development
- CROWS Lightning
- Excalibur
- Electro Magnetic Gun
- Plasma Arc Furnace
- Cryofracture

Demilitarization
- M240B 7.62MM Machine Gun

Production
- Lake City Army Ammunition Plant
- M777A2 Lightweight 155mm Howitzer
- M110 Semi-Automatic Sniper System

Field Support
- Abrams Main Battle Tank
- 40mm Multi-Shot Launcher

Lake City Army Ammunition Plant

Picatinny's Mission: Life Cycle Engineering & Support

TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.
R&D and Experimentation Facilities
Major Examples

Davidson Advanced Warhead Development Facility
- Maximum 50 TNT equivalent capability
- 100m indoor warhead test range

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

Armament Technology Facility
- 100 & 300m indoor ranges
- Environmental chambers

Armament Software Engineering Cntr
- Integrated S/W & H/W development/integration
- Multi-platform SOSI highbay capability

Opened
2000
$11.7M

Opened
2003
$8.8M

Opened
1996
$8.4M

Opened
2005
$15.5M

Level 5 CMMI Certified
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

Pyrotechnic Research & Technology Complex  Opening FY08
- 33,000 ft2 Engineering Offices & Laboratories
- Pilot manufacturing facility
- Energetic stowage

High Energy Propellant Formulation Facility  Opening FY08
- 45,000 ft2 Propellant Pilot Plant
- Characterization Laboratories
- Magazine Storage / Offices

Explosives R&D Loading Facility  Opening FY09
- 28,000 ft2 Melt Pour Operations & Engineering
- Climate Controlling Machining
- Explosive Pressing, Cast Cure, & X-Ray

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ARDEC In-House Capabilities

- Engineering Modeling and Simulation
- Electromagnetic Environmental Effects (E³)
- 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
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
• 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
• 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
• 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 (EPIAIFS) SUPPORTING EXCALIBUR

GPS satellite

Fire Control / AFATDS

Target

ARDEC Fuze Division In-House Production
Excalibur Video
• 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
• 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)
• 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
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