

# ***ARDEC & Picatinny Community Support to Southwest Asia***

*Presented to:*

## ***NDIA Armaments Technology Seminar & Exhibition***

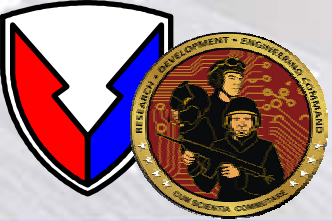
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**973-724-6198**

**14 June 2005**



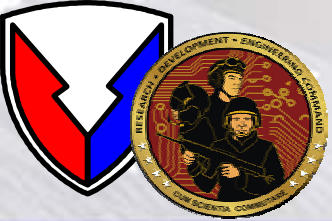
# ARDEC at a Glance



- Established “Center of Mass” for Armament Systems and Munitions for Joint Services
- ARDEC Personnel = 2679; >600 new hires since FY99
- \$100M invested in modern experimental R&D facilities since mid-90’s
- Proven track-record supporting transition of technologies to the field; since Nov 03.....
  - 9 Type Classifications
  - 16 Material Releases (MR)
  - 10 Urgent MR (17 since early FY03)
- Strong partnerships with Industry, Academia, and other Government agencies.
- In-house rapid prototyping initiatives overcoming production problems or providing new desired capabilities to field in near term
- >\$125M Tech Base portfolio addressing Joint needs



***2004 Army Large R&D Lab of the Year***



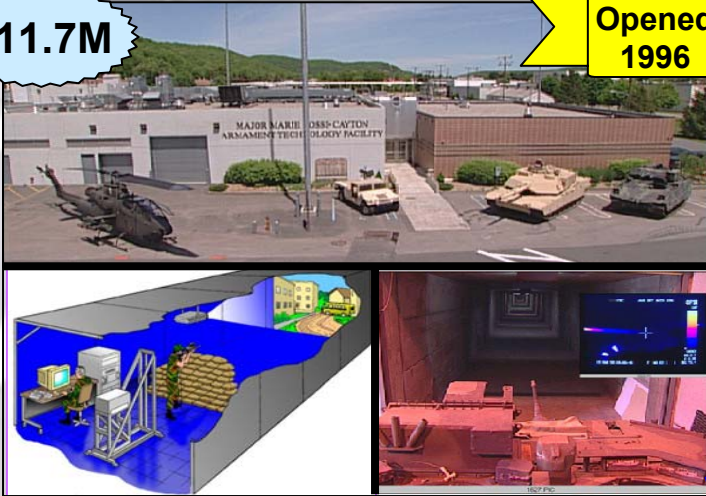
# World Class Facilities

## Most Recent in Operation



\$11.7M

Opened  
1996



Armament Technology Facility

\$8.8M

Opened  
2000



Davidson Advanced Warhead Development Facility

~\$45M in Facility Modernization invested over last 10yrs

\$8.4M

Opened  
2003



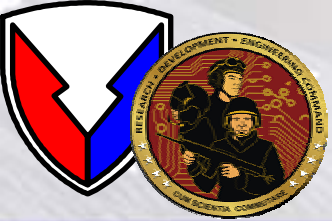
Precision Armaments Laboratory

\$15.5M

Opened  
2005



Armament Software Engineering Center



# World Class Facilities

## Breaking "old" grounds



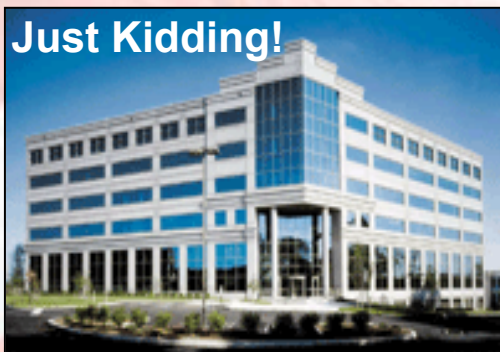
### High Energy Propellant Formulation Facility

- MCA Funded - \$17.7M
- Planned Completion – FY07
- 45,000 ft<sup>2</sup> -
  - Propellant Pilot Plant /
  - Characterization Laboratories /
  - Magazine Storage / Offices



### Pyrotechnic Research & Technology Complex

- MCA Funded - \$9.9M
- Planned Completion – FY07
- 33,000 ft<sup>2</sup> –
  - Engineering Offices & Laboratories
  - Pilot manufacturing facility
  - Energetic stowage

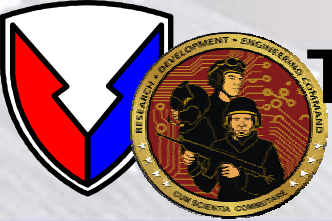


**Just Kidding!**

**Actual  
Building  
Concept  
Available  
Jul 05**

### Explosives R&D Loading Facility

- MCA Funded - \$8.0M
- Groundbreaking Dec 05; Completion – FY07
- 28,000 ft<sup>2</sup> –
  - Melt Pour Operations & Engineering
  - Climate Controlling Machining
  - Explosive Pressing, Cast Cure, & X-Ray



# Type Classification & Material Releases

## Some Examples - FY04 to Present



### Type Classification Items

- M85 Remote Activation Munitions System Trainer
- M111 Improved Position, Azimuth Determining System
- M192 Lightweight Ground Mount
- M240H- 7.62mm Aviation Machine Gun (Aviation Version)
- M255A1 Flechette Warhead, 2.75 Inch Rocket
- MK281 Cartridge, 40mm TP-T
- M393A3/M467A1 Cartridges, Tank 105mm
- HE441D RS 84mm Munition
- HEAT551C RS 84mm Munition

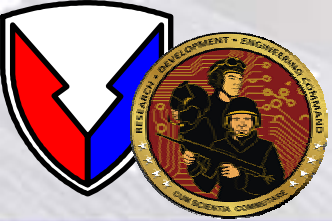
### Materiel Release (MR) Items

- M19/M20 Modernized Demolition Initiator
- CHARGE, PROPELLING, 155MM: M232 (MACS)
- Cartridge, 60mm: Smoke, WP, M722A1 w/ Fuze PD/DLY M783
- M769, 60mm, Full Range Practice Cartridge (FRPC)
- M829A3, Cartridge, 120mm, Armor Piercing, Fin Stabilized, Discarding Sabot with Tracer (APFSDS-T)
- M879, 81mm, Full Range Practice Cartridge (FRPC)
- M111 Improved Positioning & Azimuth Determining System
- M1155 Portable Inductive Artillery Fuze Setter (PIAFS)
- M303 Special Operations Forces Demo Kit
- M95/M96 Mortar Fire Control System
- Cartridge, 9mm, Jacketed Hollow-Point,
- M255A1 Flechette Warhead, 2.75" Rocket
- M192 Lightweight Ground Mount

### Urgent MR Items

- XM101 Common remotely Operated Weapon Stations (CROWS)
- M930E1 120mm Illuminating Mortar Cartridge
- X26E Advanced Taser Weapon and Associated Equipment
- XM32 Lightweight Handheld Mortar Ballistic Computer
- M107 Cal .50 Long Range Sniper Rifle (LRSR)
- FN303 Less Lethal Launcher
- M211 and M212 Flare: Countermeasure
- Non-Lethal Capabilities Sets
- AT4 Confined Space High Performance Weapon
- MP5-A5 9mm Submachinegun
- Lightweight Shotgun System
- M203 Grenade Launcher (GL) Day/Night Sight (DNS)

**Supporting Transition of Technologies to Production/Field During War Time**

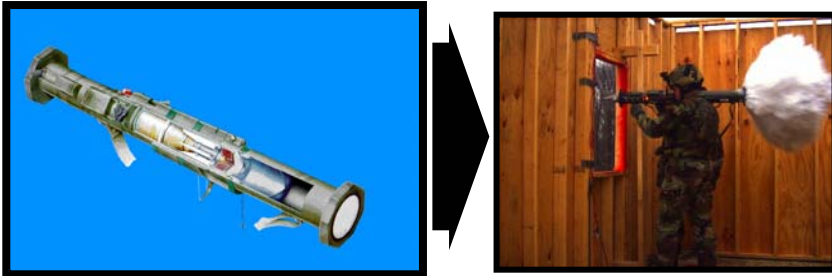


# Urgent Fieldings

## Some *FY03/04* examples



### *AT-4* Confined Space (CS)



- Enables safe firing in MOUT environments
- Same performance as AT-4
- ~800 systems to Army and SOCOM FY03/04

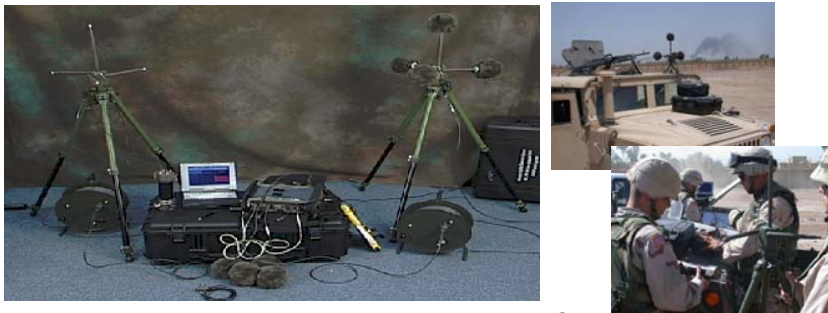


### *XM32* LtWt Handheld Mortar Ballistic Computer (LHMBC)



- Computes ballistics, gun pointing data and tactical fire control for US 60, 81 & 120mm mortars faster and more accurate than M23 MBC
- 32 units fielded to 3/2 Stryker Brigade Aug 04

### *Gunfire Detection System (GDS)*



- Acoustically locate small arm fire origins
  - Provides azimuth, elevation & range
  - 360 degree coverage
- >100 systems fielded to Army and SOCOM since Aug 03

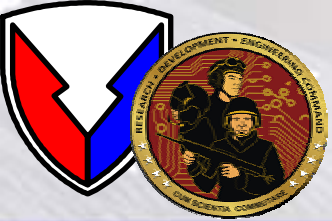


### *M211/212* Countermeasure Flares



- Broadens countermeasure signature to defeat all fielded Surface-to-Air Missile (SAM) Threats
- > 65,000 Flares fielded to Army & Air Force since Jan 03





# Urgent Fieldings

## Some FY04/05 examples



### M107 0.50 Cal Sniper Rifle



- First .50 cal semi-auto sniper rifle
- Effective against materiel/personnel to 2km
- Multiple Urgent Releases in FY04/05
- Full Materiel Release approved Jan 05

### X26E TASER



M26 Advanced Taser

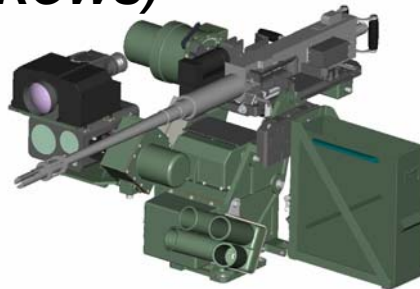


X26E Taser/  
M4 Adaptor



- Adaptation from original M26 TASER
- X26E provides readily available non-lethal capability to XM-4 carbine
- Urgent Fielded 350 X26E TASER since May 05

### XM101 Common Remotely Operated Weapon Station (CROWS)



- Enables User to engage targets while under protected under armor
- Fully stabilized firing of M249, M240, M2, & MK19
- Urgent Fielded Feb 05

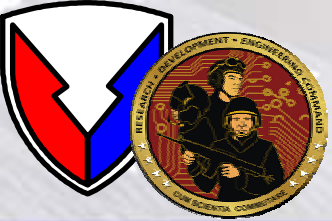


### M930E1 120mm Illuminating Mortar Cartridge



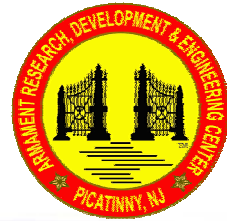
- Responded to Urgent Requirement
- Standard white light illumination
- Reworked M930 stockpile to meet current need
- Urgent Fielded in 95 days (Feb 05)



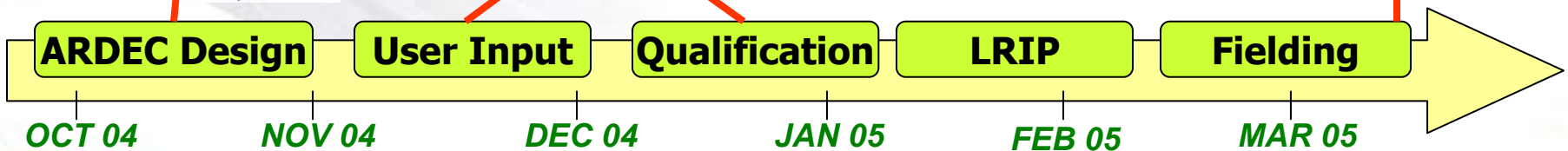
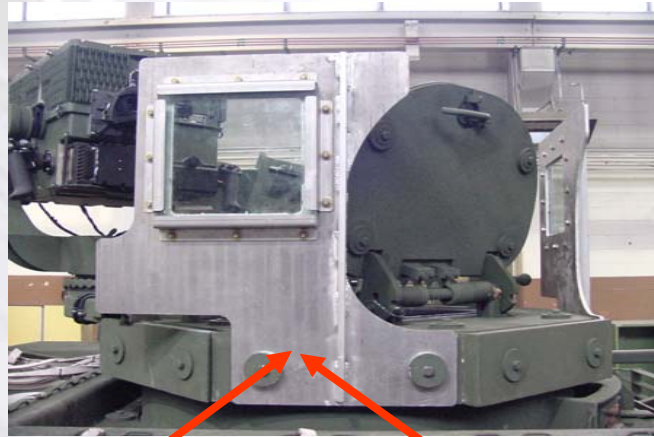
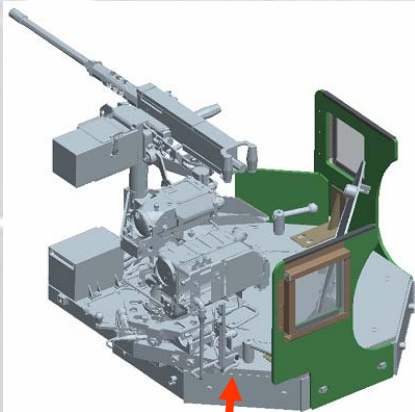


# Rapid Prototyping Initiatives

## Examples Supporting Production Requirements



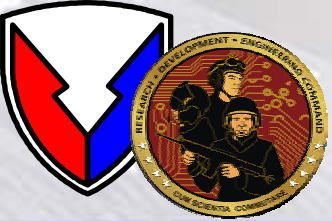
### Stryker Ballistic Shield



- Lightweight (145lb) Cupola mounted ballistic titanium protection w/armor windows
- Leverages MANTECH for low-cost Titanium processing and manufacturing
- ARDEC producing 136 kits in response to Stryker Brigade urgent need
- 70 kits produced and shipped; >30 kits installed and in operation
- Spiral improvements to kit underway

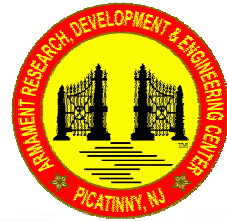




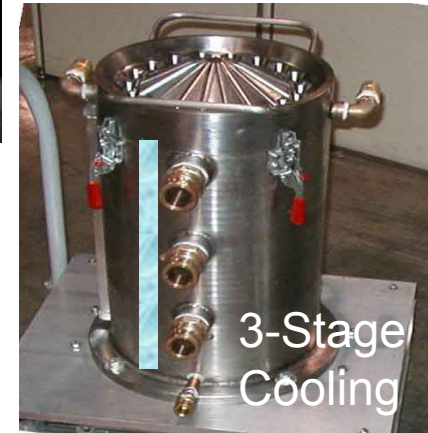
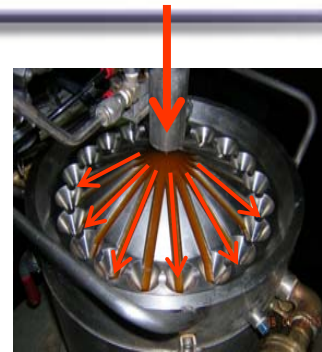


# Rapid Prototyping Initiatives

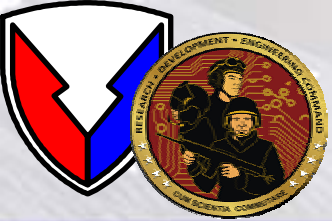
## Examples Supporting Production Requirements



### M54A1 Burster Tube Loading



- Problem: M54A1 production problems impacted fielding of M110A2 to USMC
- ARDEC developed new melt pour & controlled cooling process
- 7000 Burster Tubes loaded/delivered by ARDEC to Pine Bluff by Jun 05
- ARDEC executing new requirement for additional 7000 burster tubes
- Technology transfer of ARDEC process to industry underway



# Rapid Prototyping Initiatives

Examples of “Tech Push” for Early User Demo’s



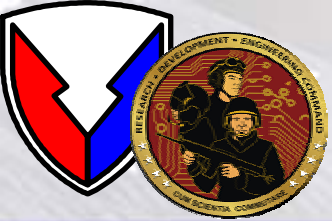
## Special Weapon Observation Reconnaissance Direct-Action System (SWORDS)



*3/2 Stryker Brigade  
Demo in Kuwait  
Nov 03*

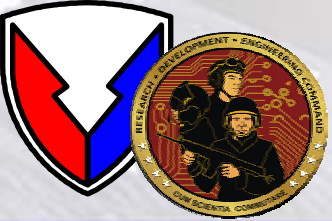


- Demonstrates small, low-cost, remotely operated weapon system
- Remotely Operated Recon, Security, Sniper Asset with increased weapons accuracy & control
- Early User design feedback from Stryker Brigade, 10<sup>th</sup> MD, & SOCOM
- Safety Confirmation Testing continuing to support potential Urgent Materiel Release Oct/Nov 05
- Transition agreement in place with Robotic Systems - Joint Project Office



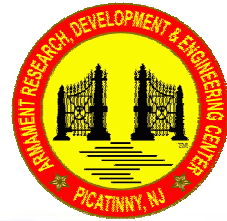
# Special Weapon Observation Remote Direct-Action System (SWORDS) *Live Fire (w/M240B 7.62mm Machine Gun)*



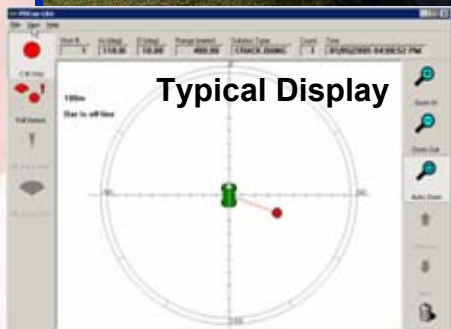


# Rapid Prototyping Initiatives

Examples of "Tech Push" for Early User Demo's

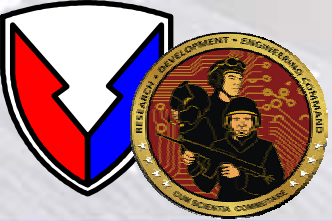


## Remote Weapon Acoustic Counter Sniper System



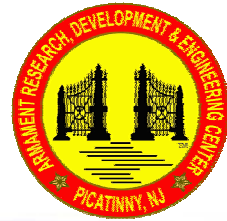
- Joint ARDEC, AMC-FAST, PM-Soldier Weapons, & Industry Program
- Integrates 360° acoustic detection & location with remote weapon station
- Automatic/manual weapon position
- On-the-move weapon position updates
- USARPAC evaluation in CONUS and Limited Safety Release Jul 05
- ARDEC & PM working path ahead for evaluations in Iraq Oct/Nov timeframe

**Enhances Situational Awareness of the most Critical Threats....Shooters!**

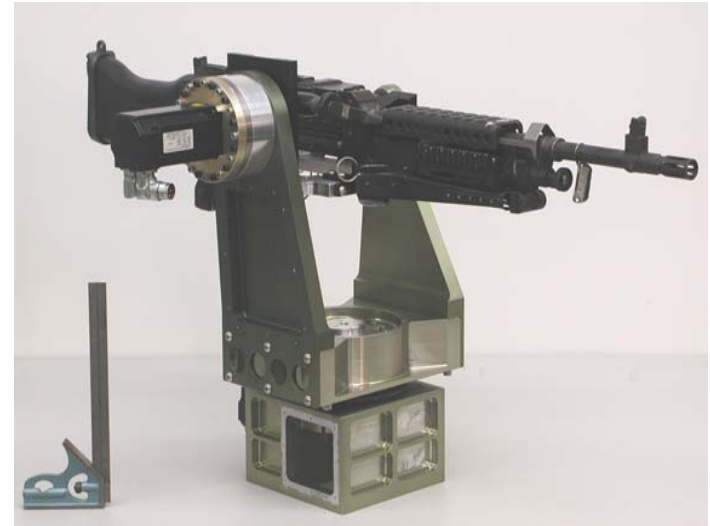
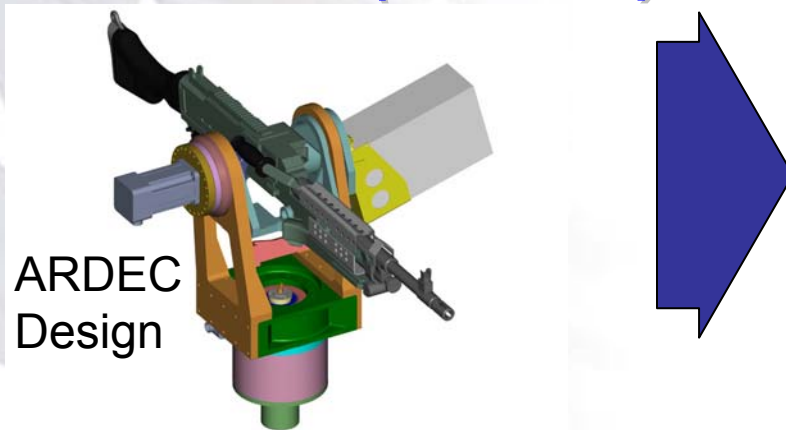


# Rapid Prototyping Initiatives

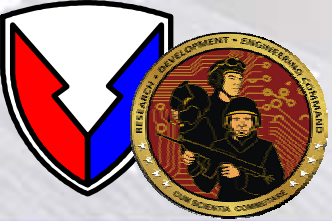
Examples of “Tech Push” for Early User Demo’s



## Picatinny Lightweight Remote Weapon Station (PLRWS)



- Joint ARDEC, PM-Soldier Weapon (PM-SW), and REF Program
- Lightweight remote mount for M249, M240, & ACSW applications
- Target Wt: <150lbs with weapon/ammo (GOAL MET)
- Compliments CROWS-class systems
- 2-Axis Stab; 360° continuous rotation; Elevation Range: +45° to -15°
- SAFC II sight integration and hardstand/vehicle testing Sept/Oct 05
- ARDEC working path ahead under PM-SW Remote Mount Strategy

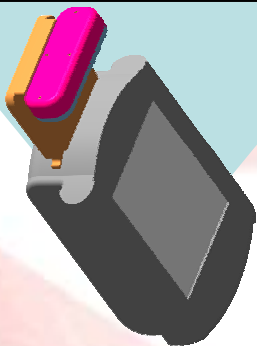
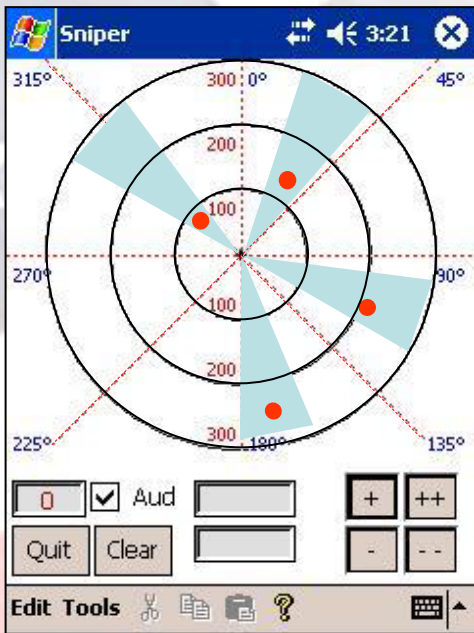


# Rapid Prototyping Initiatives

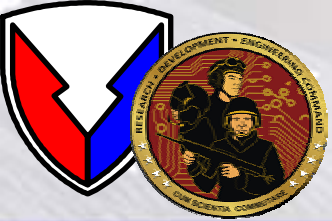
Examples of "Tech Push" for Early User Demo's



## Early Attack Reaction Sensor (EARS)

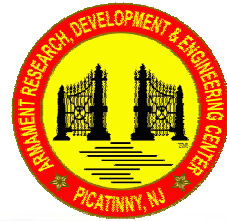


- Joint ARDEC and AMC-FAST Program
- Portable Hand-held Gunfire Detection System to detect/range small arms gunfire origin for individual soldier out to ~150m+
- PDA Display Outputs: Shockwave Alert, Muzzle Blast Bearing Estimate, Shooter range w/ Audio Alert
- Successful Proof of Concept at ARDEC Nov 04 out to 100m
- Technical demonstration at APG Aug 05
- User demonstration Dec 05
- Future Capability:
  - Wireless network - triangulate to provide high localization accuracy.
  - Vehicle mount & helmet mount application



# Rapid Prototyping Initiatives

Examples of “Tech Push” for Early User Demo’s



## Non-Lethal Options for Theater Internment Facility (Camp Bucca)

Typical Compound Area



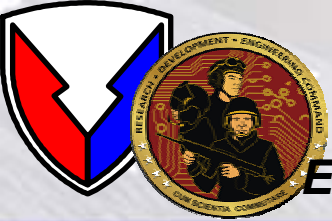
Vehicle Mounted Modular Control Munition



Picatinny Air Launcher



- Response to 18<sup>th</sup> MP BDE Commander request for site survey team to provide non-lethal technology options to control detainee populations during riots
- Joint USAMPS, ARDEC, and JNLWD survey team visit 25-29 April 2005
- Longer stand-off NL munitions primary User need
- ARDEC prototyped technology options for demonstration in theater in < 72hrs
- VERY POSITIVE User feedback from BDE Commander; Operational Need Statements in process

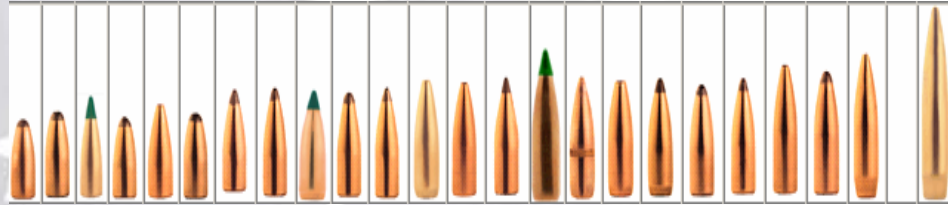


# Engineering Analysis/Evaluation

Example of evaluation of standards & technology performance



## M855 5.56mm Terminal Ballistics Assessment



M855 (62 grains @ ~2800 fps)



### Purpose:

- **Standardize gelatin block test methodology amongst DOD and other federal agencies**
- **Establish ranking methodology for lethality of bullets**

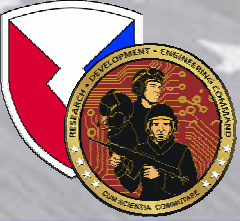
### Product:

- **Gelatin Block Test Standardization Manual (COMPLETED)**
- **Ranking of “off the shelf” bullet designs based on lethality**

### Payoff:

- **Allows any Gov't agency/contractor to share data with confidence.**
- **Determine if there is a more effective 5.56mm bullet than M855**





# ***In Summary....ARDEC/Picatinny...***



- **Proven track record of rapid transition of technology to the field**
- **Demonstrating new technology concepts enhancing warfighter capabilities**
- **Rapid prototyping processes solving production issues to meet warfighter needs**

## ***ARDEC & Picatinny Community.....***

***Products, people, and processes enabling our ultimate customer, the soldier, to “take care of business” throughout the spectrum of conflict!***