



# U.S. ARMY ARMAMENT RESEARCH, DEVELOPMENT, & ENGINEERING CENTER (ARDEC)



**TECHNOLOGY DRIVEN. WARFIGHTER FOCUSED.**

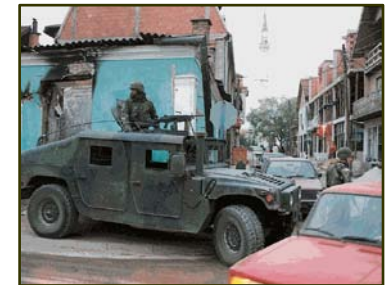
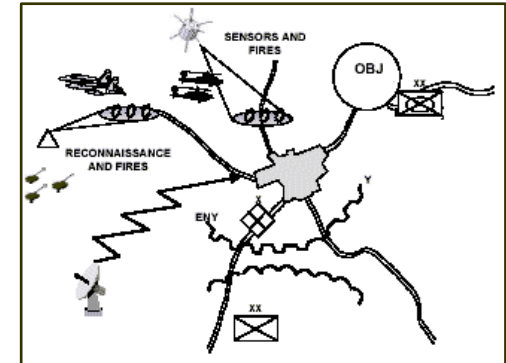
**Henry Kerwien**

**Scalable Lethality: 'Dial-a-yield' approach to greater precision engagement**

**17-20 May 2010**

Distribution A: *Approved for public release.*

- Scalable Lethality provides more engagement options
  - Improves Weapon Effectiveness
  - Reduces Collateral Damage
- Enables Military Operations in Complex Environments (MOUT, Defilade, Wooded Terrain, In the Open)
- Applicable to a range of munition calibers (Missiles, Artillery, Medium Caliber)
- Requires Integrated Advanced Component Technologies (multi-purpose energetics, reactive materials, advanced fuzing & lethal mechanisms)



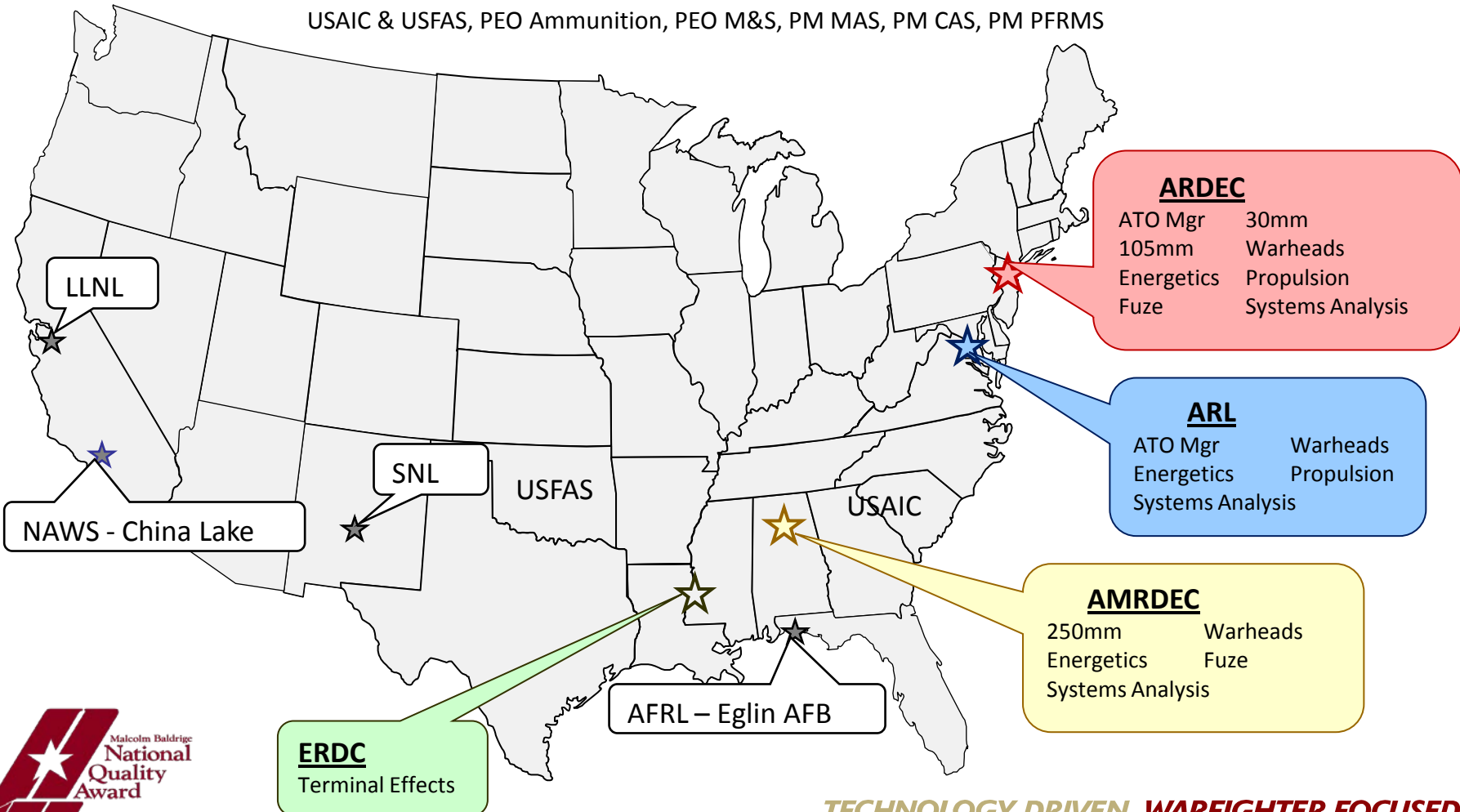
**Key User-Identified Need**

ARDEC, AMRDEC, ARL & ERDC Core IPT Members

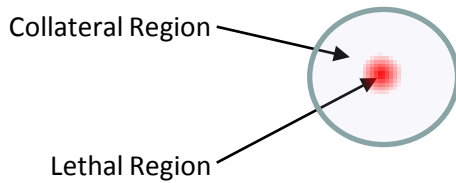
LLNL, AFRL, SNL & China Lake are Shell IPT Members

Demonstration objectives and requirements are coordinated with

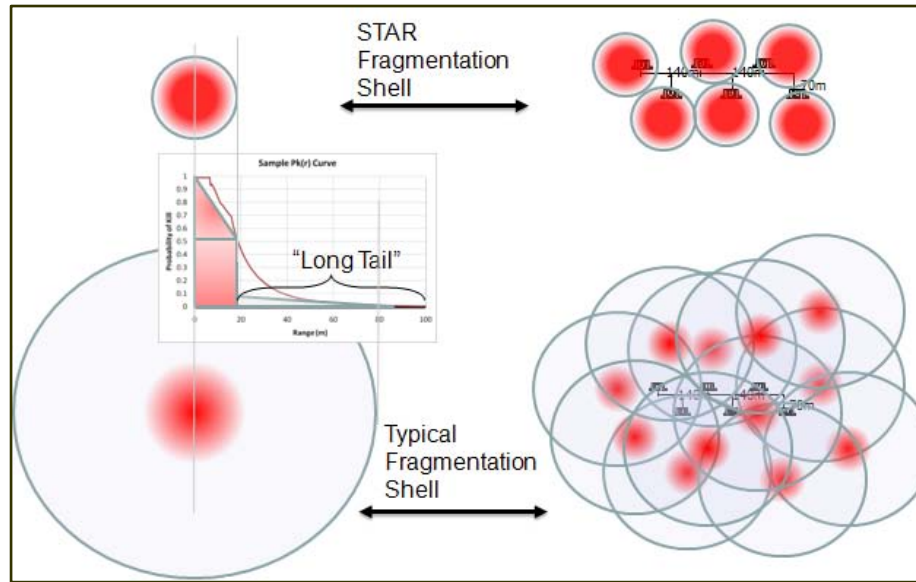
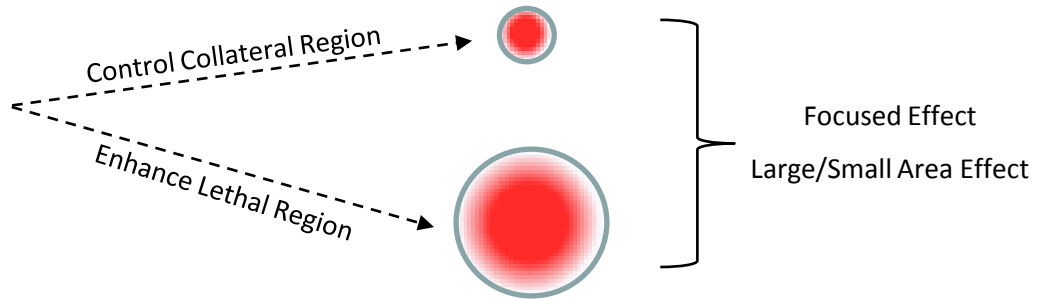
USAIC & USFAS, PEO Ammunition, PEO M&S, PM MAS, PM CAS, PM PFRMS



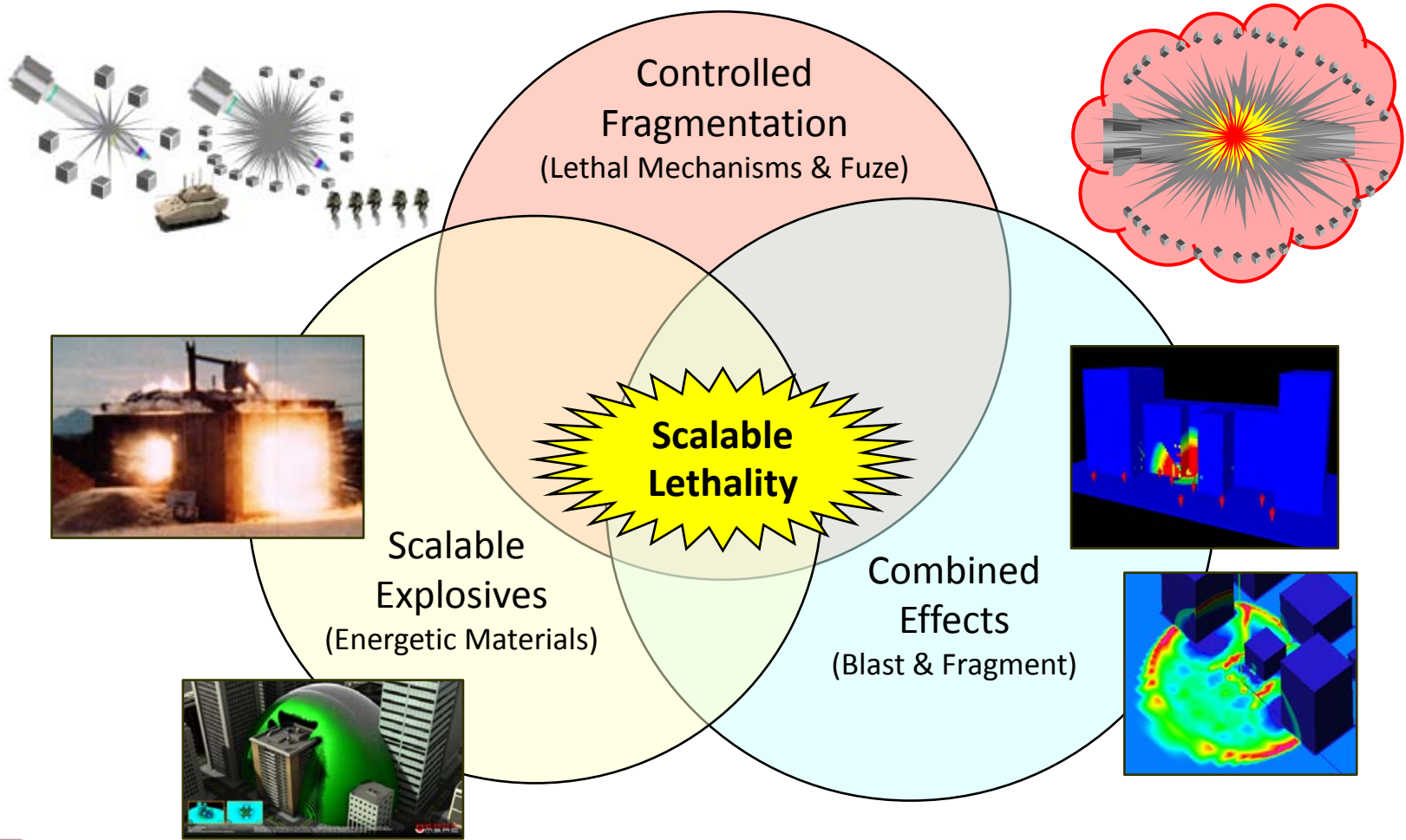
## Current Munitions



## Scalable Munitions



**Provides Increased Effectiveness with Reduced Logistics**



**Effectiveness Assumes Precision Delivered**





## Advanced Energetics

- Combined Effects/Scalable Explosives
- Reactive Materials – IM Performance & Increased Controlled Energy Output
- Dual Purpose Energetics/Rocket Assist

## Warheads

- Directional/Selectable/Preformed Fragmentation
- Liners/Composites
- Reactive Materials - Output Energy, IM Compatibility, Reactive & Consumable Fragments

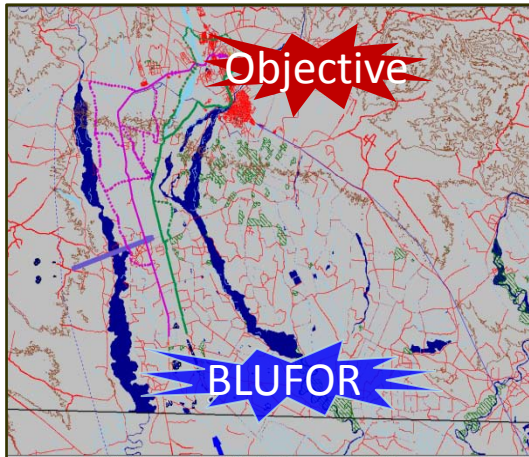
## Fuze & Power

- Height of Burst Algorithms (HOB)
- Initiation Train
- Hybrid Power Sources/Thermal & Liquid Reserve Batteries

## Advanced Propulsion

- Coated Single Base or Hybrid Propellant
- Ballistic Efficiency/Flat Temp Profile
- Increase MV/Range
- Cooler Flame Temp
- Deterrent Migration/Shelf Life/Cost
- Advanced Igniters



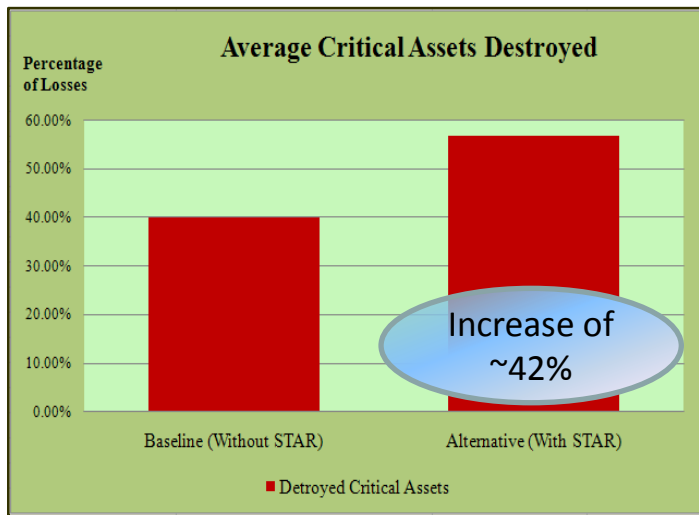


## • Force Level Effectiveness Analysis

- RDECOM Modeling Architecture for Technology, Research, and Experimentation (MATREX)
  - Virtual Test Bed utilizing ARDEC Armaments Server

85% Fewer Individual Combatant Losses  
 17% Fewer Aircraft Losses  
 6% Fewer Ground Platform Losses

154% More OPFOR Individual Combatant Losses  
 34% More OPFOR Ground Platform Losses  
 30% More OPFOR Air Defense Losses



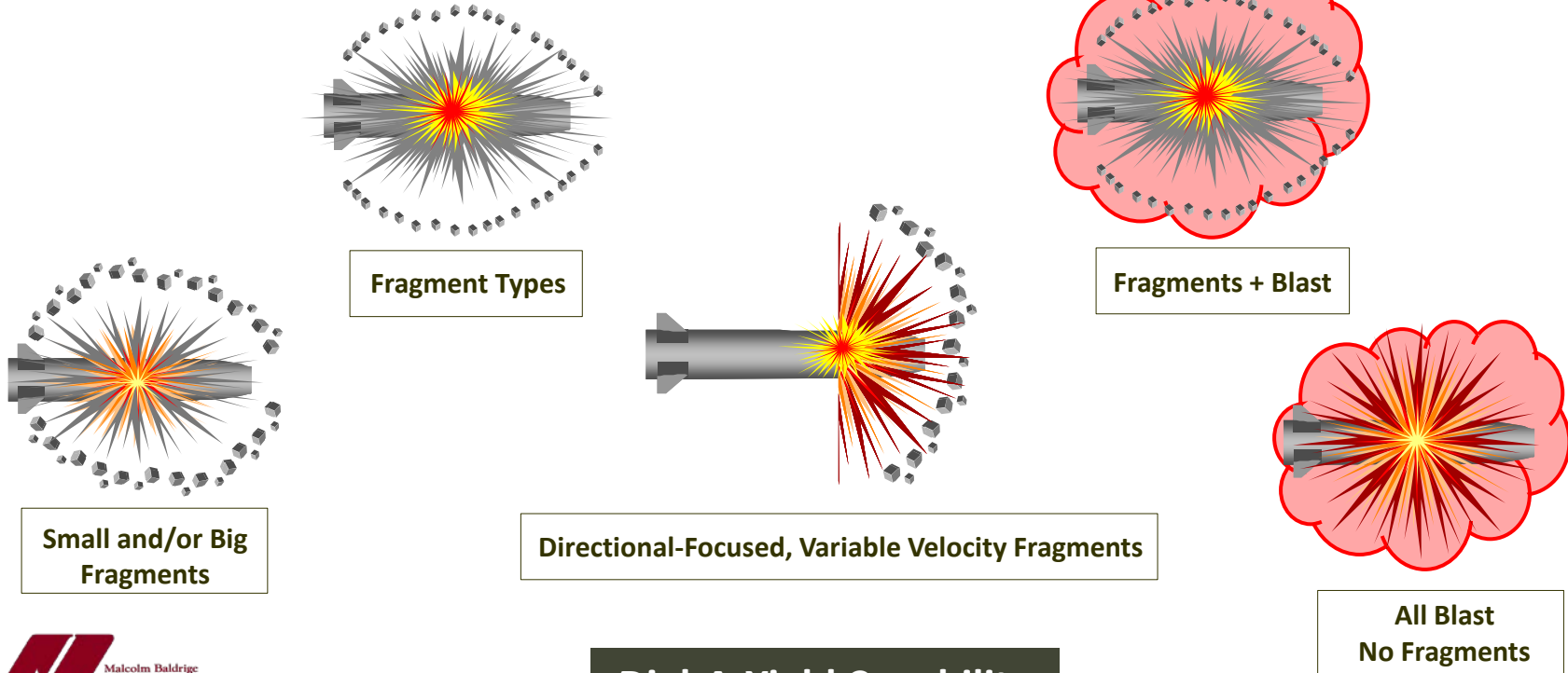
- Scalable Lethality Enabled Engagement of Targets in Collateral Damage Sensitive Sites
- Attacks on otherwise protected targets forced relocation of critical OPFOR assets and prevented OPFOR from returning fire
- Destruction of OPFOR Air Defense Systems Enabled BLUFOR Aircraft to Participate in Battle and Identify & Engage Targets

## The Entire Force Benefits from Scalable Lethality



- Warfighter selects lethality based on target type
  - Fragmentation for Personnel & Materiel
  - Blast against Structures
  - Hardened for Penetration of Bunkers & Structures
  - Focused Effects – Point Target

All in 1 round



**Dial-A-Yield Capability**



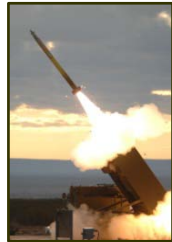


**Demonstrations  
in 2011**

## Capabilities to Demonstrate



250mm (GMLRS)



- Scalable Explosives – Deflagrate-to-Detonate
  - Effective against structures and personnel in complex environments where collateral damage is a concern

105/155mm Artillery



- Controlled Fragmentation & Blast
- Hardened against Structures
- Advanced Fuzing & Power Sources
  - Effective against structures and personnel in complex environments where collateral damage is a concern

30mmx173mm Medium  
Cannon Caliber



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- Applicable to a range of munition calibers (Missiles, Artillery, Medium Caliber)
- Integrated Advanced Component Technologies



**42% More Effective than Conventional Munitions**

## CONTACT INFORMATION

**Henry Kerwien**

ARDEC Project Officer/ATO Manager

RDAR-EIP

Bldg 3022

Picatinny Arsenal, NJ 07806-5000

(973) 724-4447

DSN 880-4447