



PEO  
Ammunition  
Joint Lethality



## PEO Ammo Has Life Cycle Responsibility for Ammunition Across Entire Spectrum of Army Transformation

- Buy, Store & Supply ALL Ammunition to the US Army
- Buy, Store & Supply ALL SMCA Conventional Ammo to DoD
- Develop Leap Ahead Munitions to Warfighter
- Manage Organic Industrial Base



**IM is Embedded in Our PM's Business Processes**



## Synergy of Lethality and Survivability

### PEO Ammo Vision

Deliver Conventional and Leap-Ahead Munitions Combat Power to Warfighters

### PEO Ammo Vision and Goals

### PEO Ammo IM Goals

#### PEO Ammo Insensitive Munitions Goals

To develop and acquire munitions which enhance survivability of logistical and tactical systems, reduce risk of injury to personnel, and are potentially more cost effective and efficient to transport, store and handle.

**The world's  
most lethal  
best performing  
and survivable  
munitions**

## IM Increases Safety

July 11, 1991- Camp Doha Kuwait City

49 Injuries  
Depleted Uranium contamination  
102 vehicles damaged/destroyed  
>24 buildings damaged  
\$15M destroyed ammunition



Iraqi Missile Capabilities

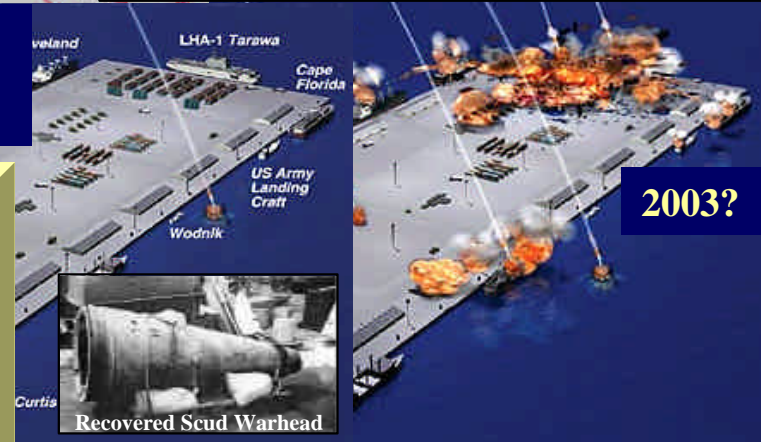


## IM Increases Logistics Survivability

Ports and Transportation Nodes are Lucrative Targets



Al Jubayl Harbor, 16 Feb 1991



# Why is IM Important?

IM Reduces System Vulnerability and Saves Lives





## Recent PEO Ammo IM Successes

### M720E1 60mm High Explosive Mortar Cartridge

#### Problem:

- Reacts violently to IM stimuli, particularly in fast cookoff environments
- Creates severe hazards to mortar resupply and transport and logistics systems.



M720

SCO  
EXP

FCO  
PDET

#### IM TESTS

BI  
B

FI  
EXP

SD  
DET

SCJI  
DET

#### Solution:

- New melt-cast explosive, PAX-21, with reduced shock sensitivity
- New HF-1 steel shell body to maintain effectiveness / lethality
- Plastic fuze adapter to prevent detonation of the HE during thermal cookoff
- New PBXN-5 fuze booster pellet.



M720E1

SCO  
PDET

FCO  
B

#### IM TESTS

BI  
B

FI  
EXP

SD  
DET

SCJI  
DET

#### Benefits/Results:

- Cartridge now passes fast cookoff.
- HF-1 steel body resulted in improved lethality.



Passes Fast Cookoff-  
A Most Important  
Thrust Area

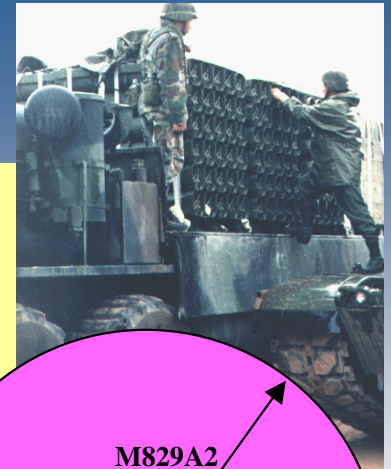
← GOOD    BAD →

ND
B
DEF
EXP
PDET
DET



## Recent PEO Ammo IM Successes

### M829A3 120mm APFSDS-T Tank Cartridge



#### Problem:

- Predicted to fail fast cookoff, fragment impact, and shaped charge jet impact tests.
- Significant hazards to resupply personnel, and transport and logistics systems.
- Requirement for maximum cartridge performance makes solutions very difficult to achieve.



(Not tested. Predicted to fail FCO, FI, SCJI, based on M830 test results)

M829A2 APFSDS-T	SCO	FCO	BI	FI	SD	SCJI
	?	●	?	●	?	●

#### Solutions: Interim Container-

- PA116 container modified to vent reaction gases
- Two meltable window panes made of fiberglass reinforced polyethylene ionomer oriented in a downward-facing position.



Interim Container	SCO	FCO	BI	FI	SD	SCJI
	B	B	B	EXP	ND	ND

#### Developing Container-

- Machine stamped channel (0.007-0.001 in depth) to create venting area

**Developing container (predicted results)**

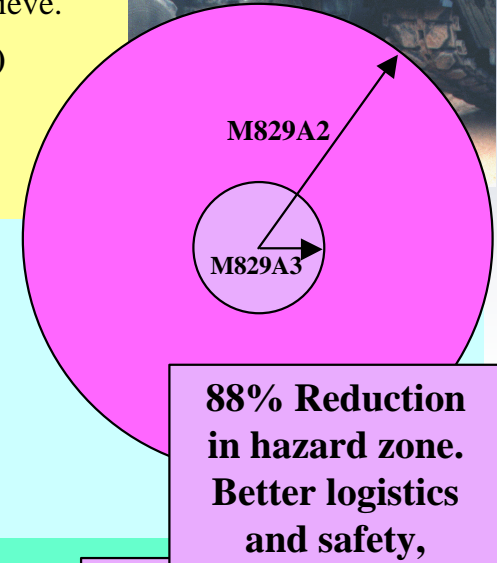
Developing container (predicted results)	SCO	FCO	BI	FI	SD	SCJI
	B	B	B	B	ND	ND

#### Benefits/Results:

- Superior survivability over the M829A2 predecessor
- Vented packaging design passes all IM tests except fragment impact
- Scored container predicted to pass all IM tests.
- Higher velocity, greater lethality.
- Reduced hazard arcs



ND	B	DEF	EXP	PDET	DET
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**Reduced vulnerability of Abrams MBT**

**Solution applies to all tank cartridges w/o HE warheads**

**Scored container predicted to pass all IM tests. Qualification FY04**



# Recent PEO Ammo IM Successes

## Modular Artillery Charge System (MACS) M231/M232

### Problem:

- Older artillery bag charges vulnerable to cookoff and impact threats
- Severe explosion hazards to battery personnel and equipment, and transport and logistics systems.



	IM TESTS					
	SCO	FCO	BI	FI	SD	SCJI
M3A1 (Green Bag)	EXP	DEF	EXP	EXP	ND	ND
M4A2 (White Bag)	B	DEF	DEF	EXP	ND	ND
M119A2 (Red Bag)	B	B	EXP	EXP	ND	ND
M203A1	DEF	DEF	EXP	EXP	ND	ND

### Solutions: Interim MACS

- Propellant grain dimensions below critical detonation diameter
- Less sensitive center igniter core
- Polyethylene spacers prevent rapid ignition of all charges
- Thermoplastic polymer disk vents container in cookoff



Interim MACS XM231

Interim MACS XM232

	SCO	FCO	BI	FI	SD	SCJI
Interim MACS XM231	DEF	B	B	EXP	ND	ND
Interim MACS XM232	DEF	DEF	DEF	EXP	ND	ND
Developing Container-	B	B	B	B	ND	ND

### Developing Container-

- Machine stamped channel (0.007-0.001 in depth) to create venting area

**Benefits/Results:** Least sensitive artillery charge to date, provides improved survivability for battery personnel, equipment, and transport and logistics systems, Less shock sensitive than predecessors.

- Survives rough handling, improves logistics
- Extends range
- Eliminates burning residual charges
- Reduces volatile organic compounds and eliminates lead

- Permits high rates of fire
- Less costly than current
- Current MACS- 20% O&S cost savings
- Scored container 20% cheaper than current
- Scored container program predicted to pass all IM tests.

Reduces vulnerability of Howitzer systems

Solution applies to all containerized propelling charges

Scored container predicted to pass all IM tests. Qualification 4QFY03





## Recent PEO Ammo IM Successes

### M782 Multi-Option Fuze Artillery (MOFA)

#### Problem:

- Originally developed with Composition A5 Lead and Booster
- Reacted poorly to IM stimuli, throwing hazardous debris in cookoff, sympathetic detonation, bullet impact tests.
- Creates hazards to artillery resupply and transport and logistics systems.

XM782 Multi-Option Fuze Artillery with Comp A5

Violent reactions with hazardous debris thrown long distances



#### Solution:

- Replaced Composition A5 Lead and Booster with less sensitive PBXN5

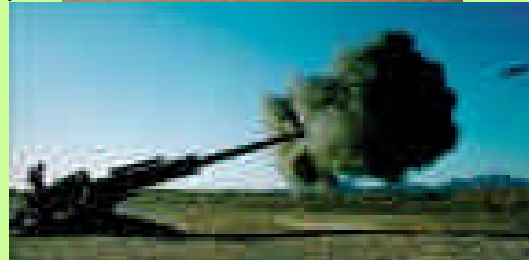
XM782 Multi-Option Fuze Artillery with PBXN-5

Mild reactions with no hazardous debris beyond 50 feet



#### Benefits/Results:

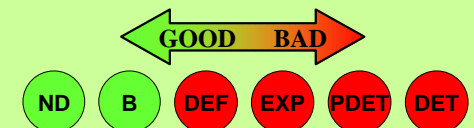
- Passes all IM tests
- Reduces logistics burden
- Faster setting, fewer setting errors
- Increased reliability because of robust design and improved producibility
- Reduces number of fuzes in U.S. inventory from 11 to 4
- Innovative electronics packaging and flex circuitry
- Reduced parts and interconnects
- Survivable against all known ECM threats
- Improved height-of-burst accuracy
- Improved time accuracy
- Improved battery performance



Changed Comp A5 Lead and Booster to PBXN5



Passes All IM Tests

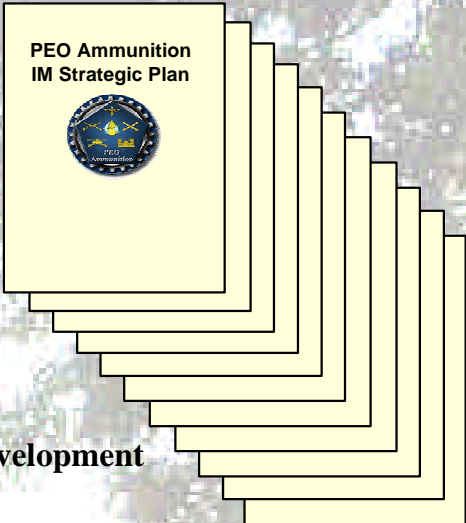




# PEO Ammo IM Strategic Plan

## The Path Ahead

- Develop IM Strategic Plan
- Identify mature IM technology
- Identify IM windows of opportunity
- Prioritize IM programs
- Execute programs
- Strategic Plan to include 

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- Implementation Memo
  - Executive summary
  - Listing of PEO-managed development and procurement programs
  - IM status of PEO programs (Net Assessment)
  - Summary of mature IM technologies (Tech Assessment)
  - Metrics for prioritizing IM efforts
  - Prioritization of PEO IM program efforts with supporting rationale
  - IM efforts overlaid onto development/procurement schedule
  - Individual IM Program summaries
    - Current and planned IM efforts
    - IM funding schedule
    - IM performance for baseline and goal by threat category
    - Development and production schedule with IM insertion
  - Individual IM Program details
    - Problem      Accomplishments
    - Solution     Program Schedule
    - Benefits