



Office of the Project Manager for Close Combat Systems

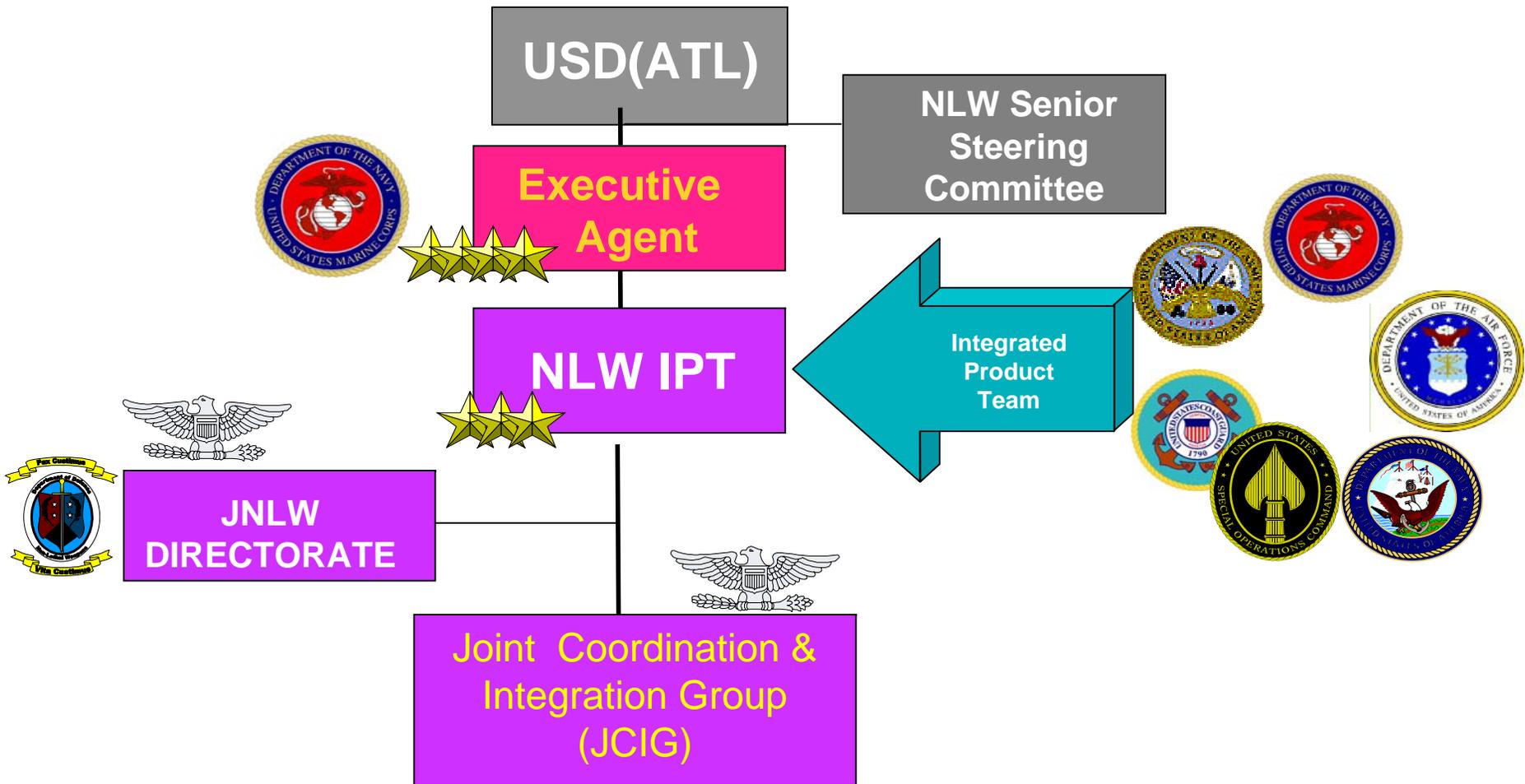


Joint Non-Lethal Weapons Program

Non-Lethal Mortar Cartridge (NLMC)

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DoD JOINT NON-LETHAL WEAPONS PROGRAM



Army Roles in NLW



Single Proponent for U.S. Army Nonlethal Applications

- The U.S. Army Military Police School (USAMPS), at Fort Leonard Wood, MO is the single proponent for Army Nonlethal Applications, effective 12 Sep 00.
 - Combat Developer
 - Training Developer
- Responsible for coordinating w/ the other TRADOC schools. Utilizing an Integrated Concept Team approach. (6th NL ICT was 3-4 Sep 2003 @ USAMPS)

Army Materiel Developers



Project Manager for Close Combat Systems

❖ The Project Manager – Close Combat Systems (formally PM-MCD), located at Picatinny Arsenal, NJ, has program management responsibility for Army Non-Lethal Materiel programs, and establishing the Army’s Non-Lethal Capabilities Sets.



Systems Manager for U.S. Army Non-Lethal Technology Integration

❖ The Tank-automotive and Armaments Command - Armament, Research, Development and Engineering Center (TACOM-ARDEC), Close Combat Armaments Center (CCAC), located at Picatinny Arsenal, NJ, has responsibility for leading coordination of Army NL Technology development.

Current Non-Lethal Limitations



Non-Lethal Weapon Challenge



Tactical Non-Lethal Advantages

Increased Standoff = Increased Reaction Time

Establish Intent = Measured Response



The NLMC Challenge

The JNLWP laid a stringent requirement on the program: no portion of a mortar cartridge, or its payload(s) could impact the ground with a kinetic energy greater than 58 ft-lbs.

NLMM Background

- **Joint Service NL IPT designated Army (ARDEC) as lead FY00.**
- **Two Contractor proposals selected for funding.**
- **ARDEC In-House activities initiated.**

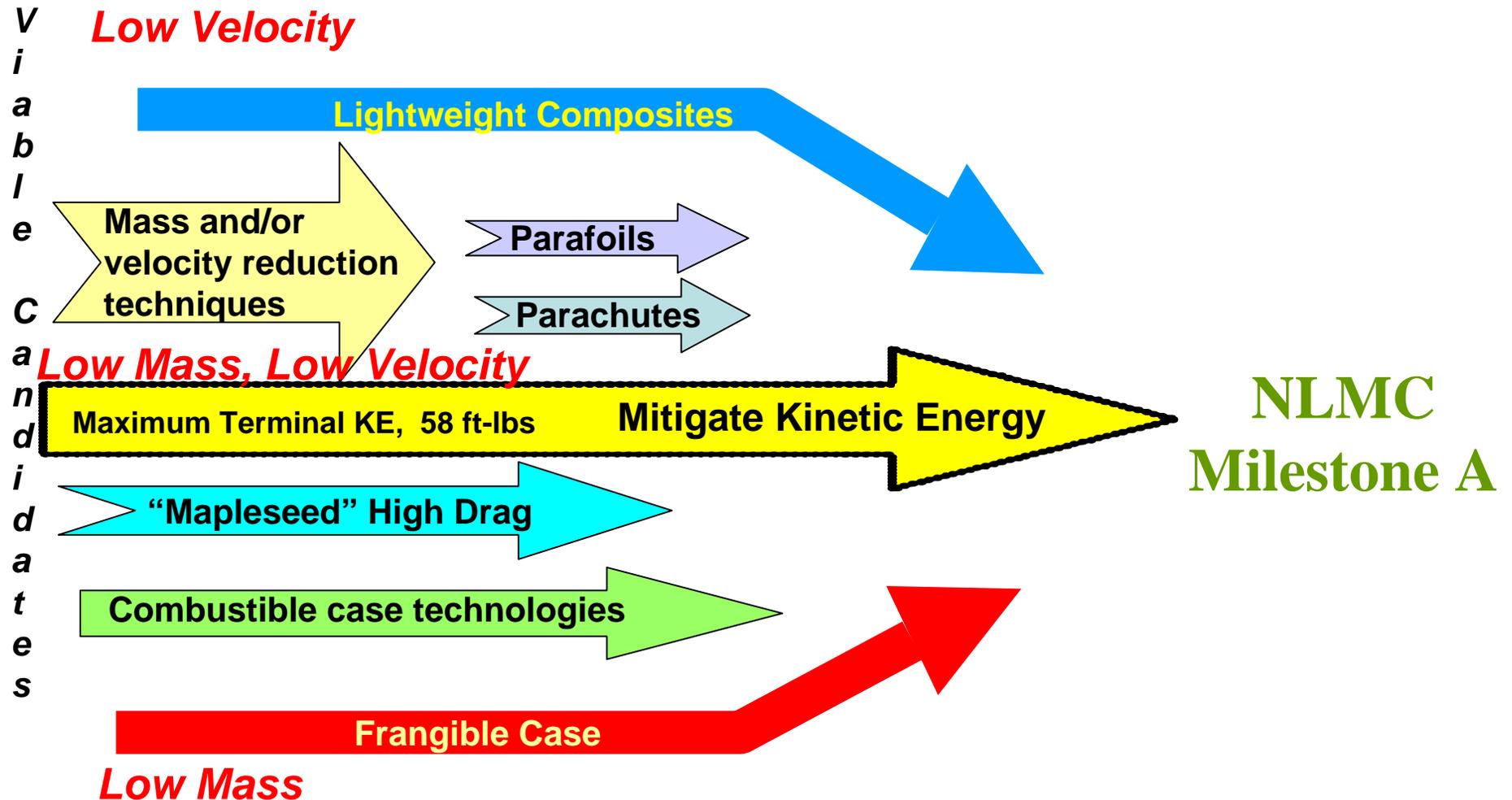
NLMC Requirement

22 Jan 03 Future Combat System (FCS)
Operational Requirements Document (ORD):

Requires an FCS NLOS Mortar

“....which must be capable of firing the full family
Of Mortar Ammunition...to include...
...non-lethal.....and scaleable effects
to achieve the desired effects.”

NLMC Initial Design Options



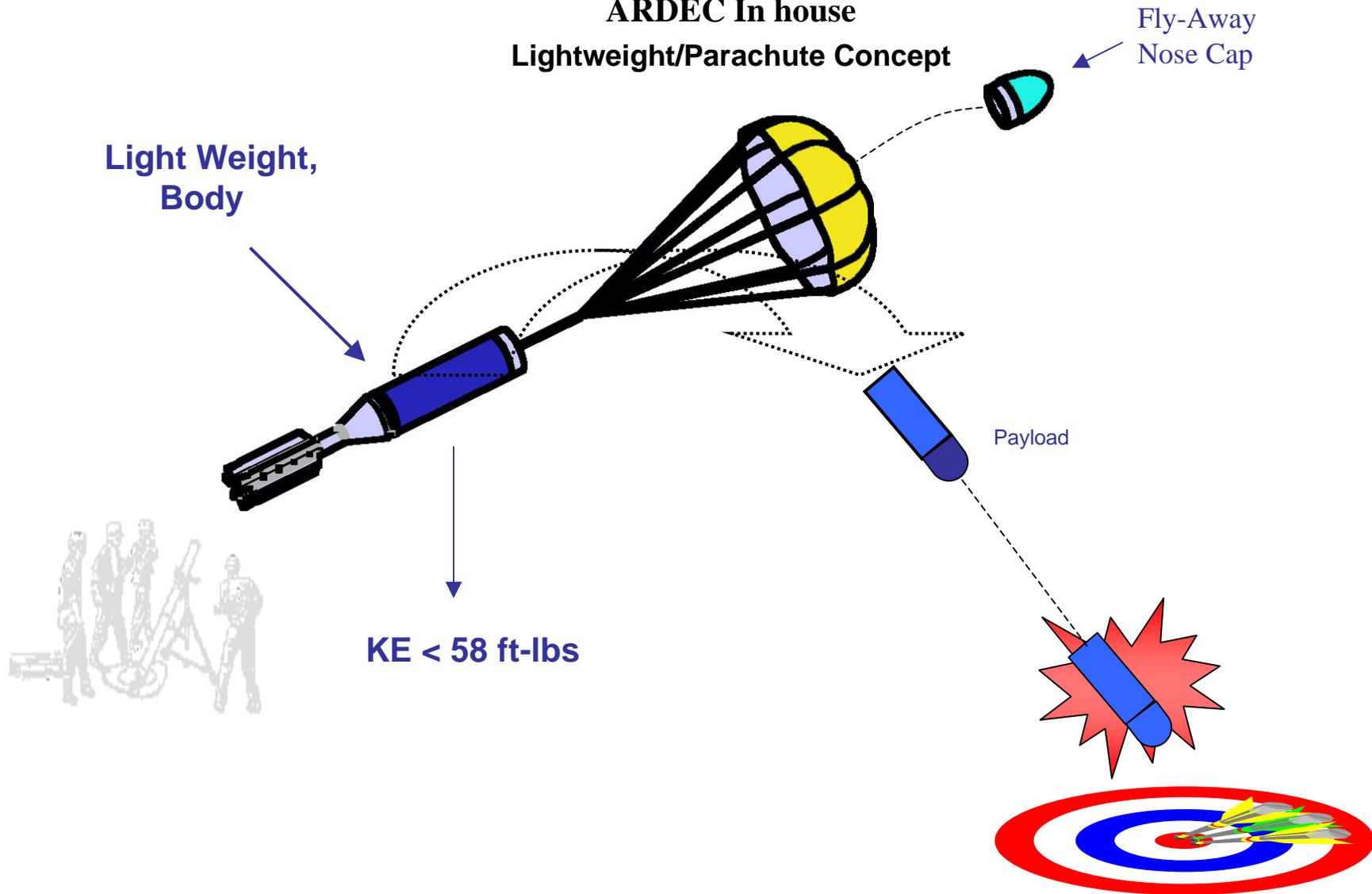
Key objective: Mitigate Terminal Kinetic Energy

Initial Design Results

- ***Original Contractor Efforts Not Successful:***
 - ***Twin Parachutes.***
 - ***Combustible Case.***
- ***ARDEC IPT Designs:***
 - ***Cartridge Using Illum Round Technology.***
 - ***Double Vane Decelerator.***
- ***Payload investigations Initiated.***

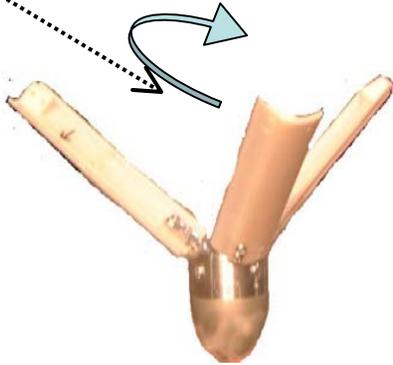
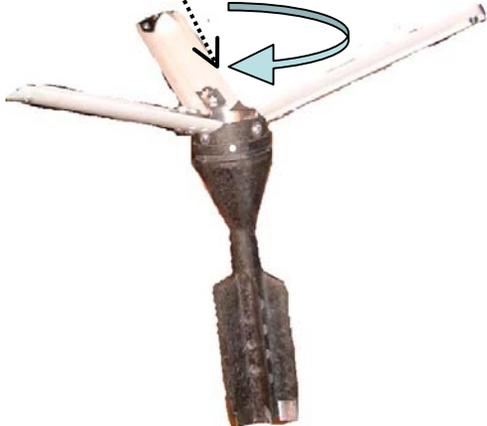
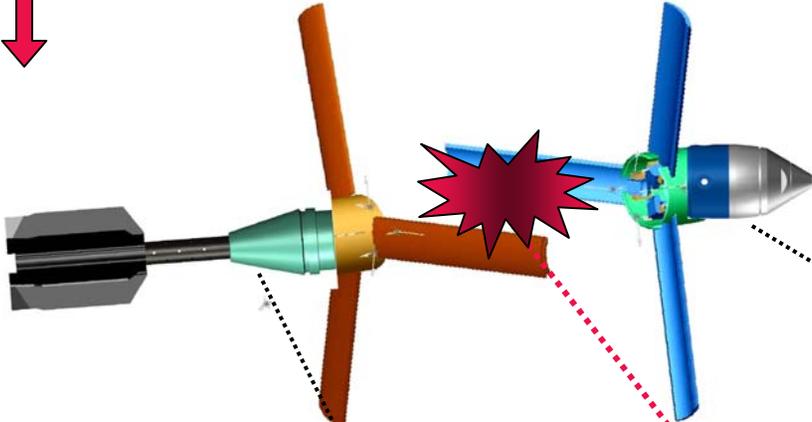
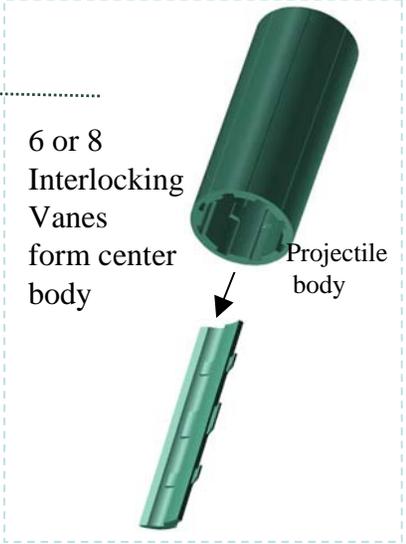
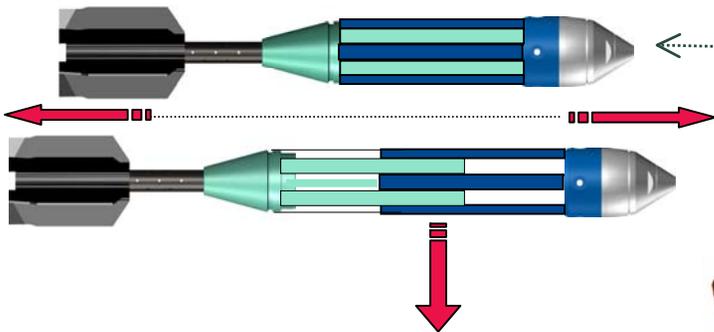
Parachute-Forward Ejection (Fuze in rear)

ARDEC In house
Lightweight/Parachute Concept



Double Vane Decelerator (DVD)

Velocity Mitigation High Drag concept



NLMC divides into forward and aft during explosion event
Allowing payload to Disburse over target.



NLMC Overhead Dispersal Concept

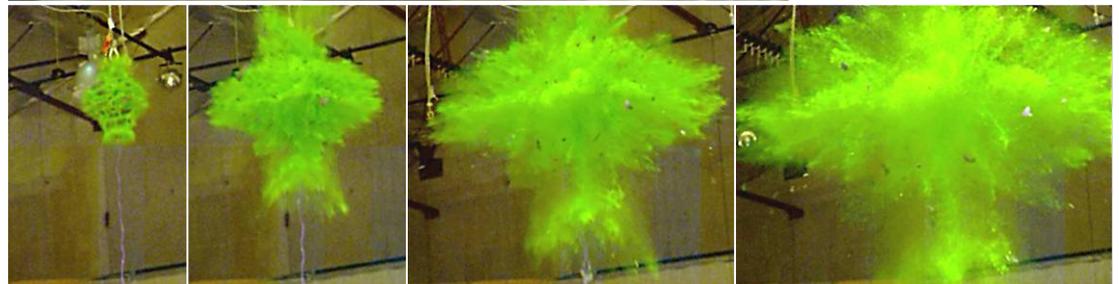
- **GD-OTS awarded study contract in 2001-2002 (DAAE30-01-M-1444)**
- **Customer: US Army TACOM-ARDEC (Picatinny Arsenal)**
- **Program Accomplishments:**
 1. Performed design trade studies for 2 approaches (frangible case & non-frangible dispenser)
 2. Performed structural analysis of candidate frangible case materials
 3. Developed methods to optimize frangible case design resulting in improved dispersion and reduced KE effects
 3. Conducted static liquid payload dispensing tests for both frangible and non-frangible case concepts
 4. Produced hardware for horizontal gun firing, risk reduction tests
 5. Conducted successful live-fire demos in Nov02 and Feb03 using a frangible case configuration.



Static Test Hardware (81mm mortar)



Non-Frangible
Static Test
81mm mortar



Static Test for for frangible case (OLDS contract DAAE30-99-C-1072)

November 02 Firings

“M Field” Edgewood Arsenal MD

•Objectives:

- Flight Test In-House Parachute Concept
(modified M853 with simulated payloads)**
- Demonstrate Liquid Dispersal Concept
(modified M853 with frangible centerbody)**
- Evaluate Additional Payloads
(M301 with Flash Bang, Screamers and simulated CS)**

November 02 Results

In-House Parachute Concept - 1 for 3

Liquid Dispersal Concept - 2 for 2

Payloads:

Flash Bang – thermal damage

Screamers and simulated CS – no problems

February 03 Demo

Aberdeen Proving Ground “Old Bombing Range”

Purpose: Demonstrate that the NLMC can meet the following Pre-Milestone A Exit Criteria:

- a. Range: 2500m***
- b. Terminal Kinetic Energy: 58 ft-lbs max***
- c. Accuracy: CEP <1 ½% Range***
- d. Effective Area of Coverage > 25m²***

February 03 Results

- ***Successful Static Firing of Screammers.***
- ***One GD-OTS Rd Fired Successfully.***
- ***ARDEC parachute rounds Performed well,
but Magic Fire Fuze Problems Occurred
with Last Two Firings.***

Other Events/Activities

- ***First Human Effects Review Board Meeting Held 13 March 2003***
- ***Army, Navy & Air Force Concepts of Employment Prepared***

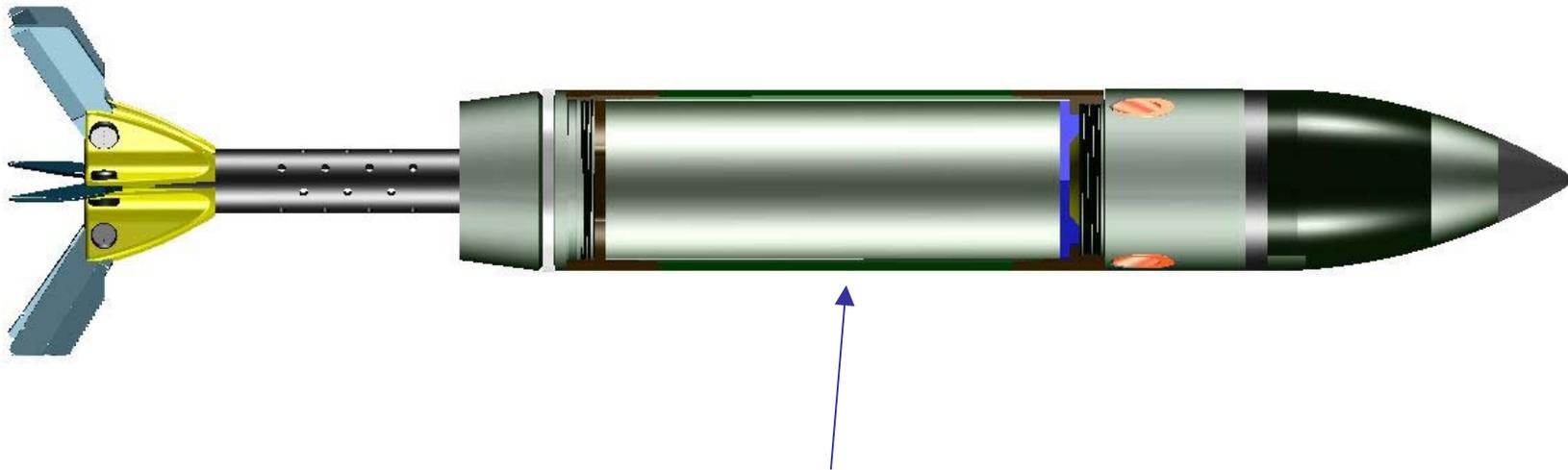
Where We're Going

- ***Single Parachute Design Being Modified to Incorporate M776 60mm Fuze***
- ***DVD Design & Fabrication Ongoing, Flight Testing Planned This Fall***
- ***ECBC has Begun Artillery/Mortar Malodorant Payload Study***
- ***HECOE to Perform Penetrating Injury Study***
- ***Milestone A Decision Expected Shortly***
- ***GD-OTS Continuing Liquid Payload Dispersal Studies***

Where We're Going (Cont'd)

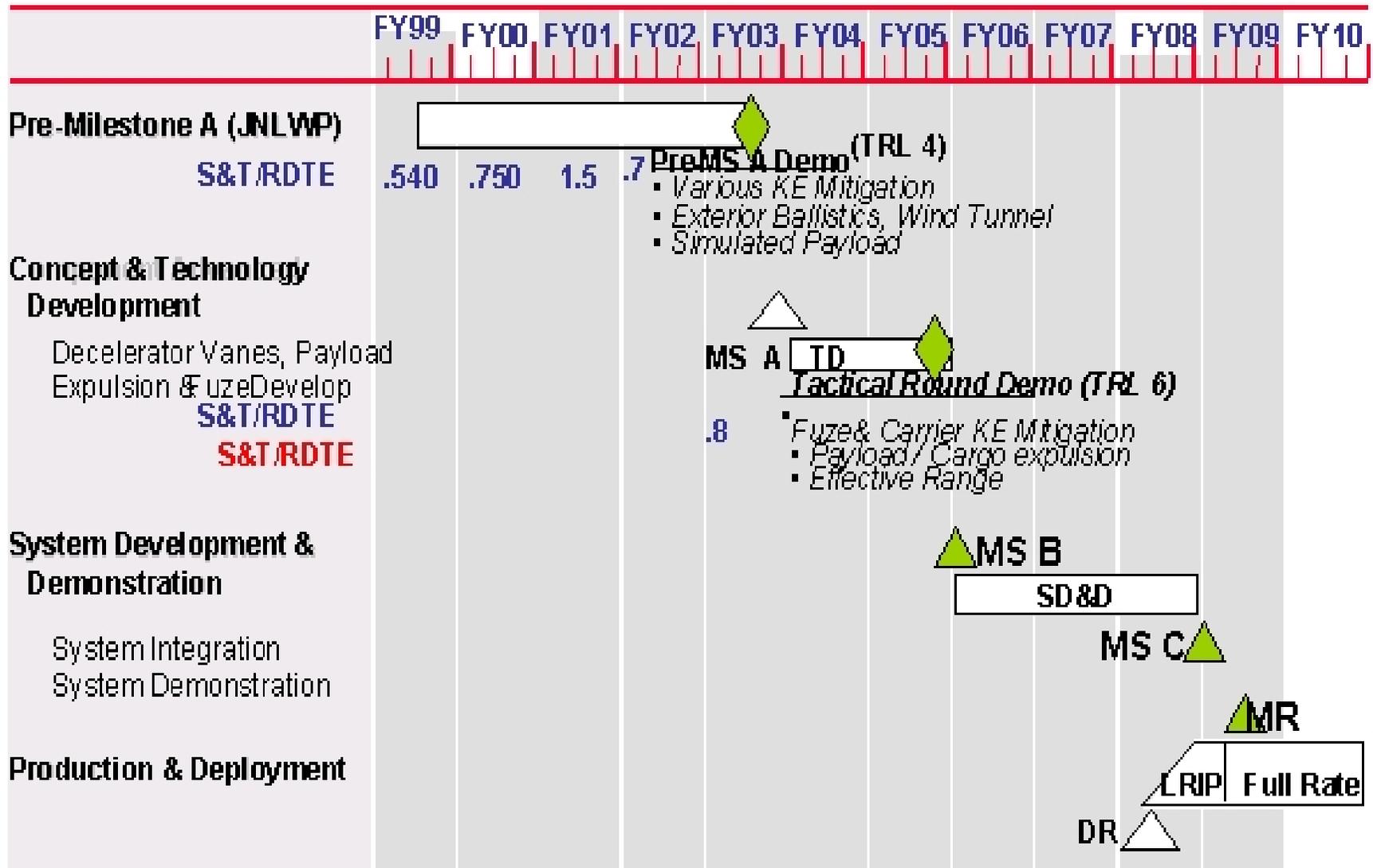
- ***120mm Cartridge Design Initiated Utilizing the XM984 as a Vehicle (Same Design Team)***
- ***Either KE Reduction Scheme Capable of Meeting Existing Mortar Performance Envelopes***
- ***Phase A and Phase B Envisioned as a total 60 Month Program with Type Classification in 4QFY08-1QFY09***

XM984 120mm Cargo Rd



Payload Section capable of carrying 50+
Non-Lethal Submunitions

Non-Lethal Mortar Mmunition Program Plan

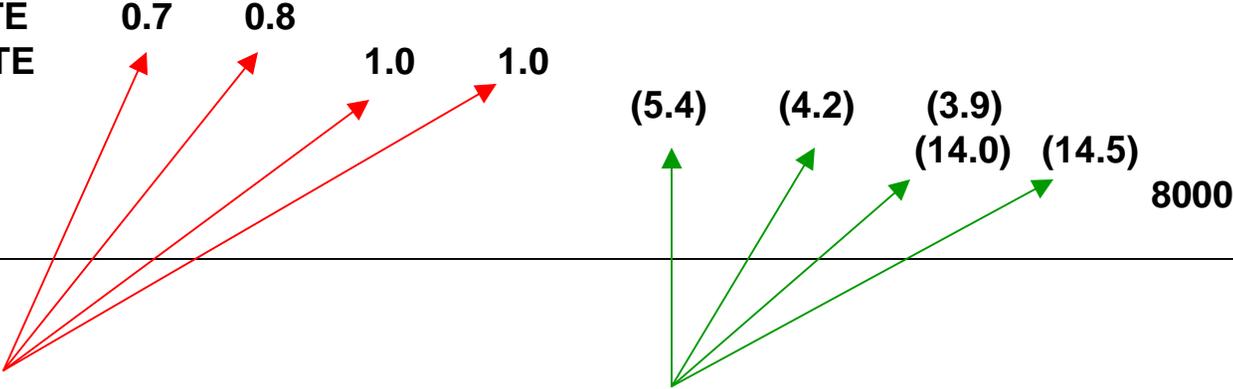


NLMC FUNDING PROFILE

	FY02	FY03	FY04	FY05	FY06	FY07	FY08	FY09
Funded RDTE	0.7	0.8						
(6.2-6.3) RDTE			1.0	1.0				
(6.4 –6.5)					(5.4)	(4.2)	(3.9)	
PAA (\$M)							(14.0)	(14.5)
Units								8000

JNLWD

ARMY



Enhanced Capabilities
Provide New Tactical and Operational Opportunities

