



TACOM



Lethality, Survivability, Mobility and
Sustainment for America's Army

Non-Lethal Technologies for Legacy to Objective Force Options

Non-Lethal Programs and Innovations

“Meeting the Needs of a Transforming Force”

2002 Mines, Demolitions and Non-Lethal Symposium & Exhibition
3-5 June 2002
Tampa, FL

John Cline
AMSTA-AR-CCL-D
U.S. Army TACOM-ARDEC
Com (973) 724-7317

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OUTLINE

- **Army NL Capabilities (pre-1995 to 2002)**
- **DoD NLW Policy & Joint Mission Area Analysis**
- **Army-led, JNLWP Concept Exploration Programs**
- **Army-led, JNLWP Pre-Milestone A Efforts**
- **Science & Technology Opportunities for the Future Combat System & Objective Force**
- **Full Spectrum Scalable Effects Capabilities**
- **Conclusion**



Army Non-Lethal Capabilities - Prior to 1995 -



Prior to 1995, the Army was minimally equipped to meet the demands for Non-Lethal Capabilities in support of Peace Keeping and Stability and Support Operations





Urgent NL Fieldings

Most Recent Military Operations

- 1995 to Present -





User Feedback on NL in Balkans



LTC Brown, Battalion Commander, Bn 709th (Task Force Falcon Provost Marshall)
“Bottom line is that our new equipment works well and the NLM kept us from having to kill someone as well.”



DoD Joint Non-Lethal Weapons Core Capabilities and Functional Areas

- **Joint Mission Area Analysis (JMAA)** -

Counter- Personnel*

- **Area Denial to Personnel**
- **Crowd Control**
- Incapacitate Ind'l Personnel
- Clear Facilities & Structure of Personnel



Counter- Materiel*

- **Area Denial to Vehicles**
(Vessels, Aircraft)
- Disable/Neutralize Equipment



*** Functional Areas / Tasks
Prioritized by all CINCs at
1996 DoD NLW User's
Conference; Joint Concept for
NLW's
&
per JMAA Dec 2000**

JMAA conducted IAW CJCSI 3170.01A, Requirements Generation System



Area Denial-Personnel CEP



Primary Mission Tasks

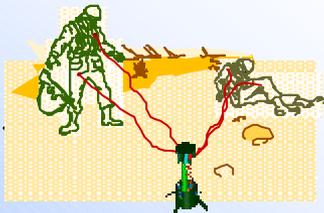
To Deny an Area to Personnel in:

- Urban/suburban environment
- Rural/open terrain environment

**Rapidly Employed,
Concertina Modular
Barrier System**



**Hand-emplaced
Munitions**



- *Blunt Impact*
- *RCA's*
- *Slippery Agents*
- *Malodorants*
- *Electric Stun*
- *Millimeter Waves*

**Crew Served,
Grenade Machine Guns
25 - 40mm**



**Mortars
60 - 120mm**



**Vehicle Mounted
Active Denial System**



**Hydra 70
2.75 in Rocket**



UGV's



UAV's



**Vehicle
Launched
Munitions**



**Artillery
105 -155mm**



Crowd Control CEP



Primary Mission Tasks

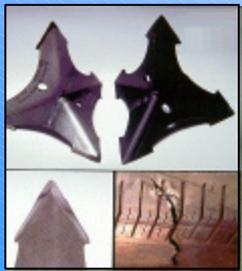
- Contain or stop the crowd from advancing
- Disperse a crowd between 50-1000 meters
- Direct the crowd movement
- Isolate specific individual(s) within a crowd
- Separate Belligerents
- Disperse a crowd within 0-50 meters

Area Denial to Vehicles CEP



Primary Mission Tasks

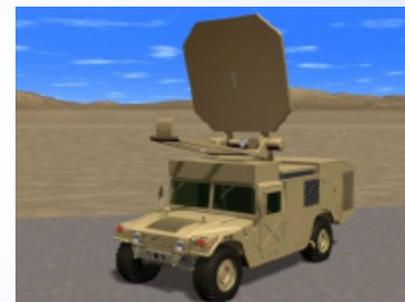
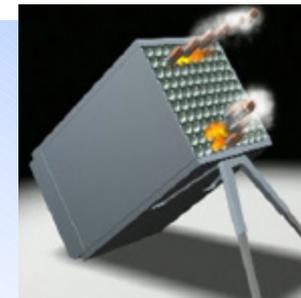
- Deny an area to land vehicles
- Stop a vehicle-urban/suburban environment
- Channelize vehicles
- Stop a vehicle-open/rural environment



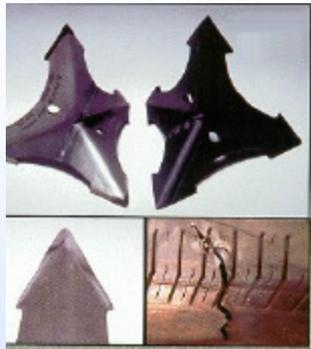
Examples of Crowd Control Candidate Technologies



- Barriers
- Sound
- Air Vortices
- Temperature
- Water
- Visual Dazzlers (Light, Lasers)
- Chemicals:
 - RCA Type (Malodorants, Irritants, etc.)
 - Other (Anti-Traction Materials)
- Directed Energy (Laser, Millimeter Wave)
- Electric Stun
- Enhanced Blunt Impact
- Combined Effects (Multi-Sensory, Flash/Bang, etc.)
- Legacy & Objective Force Delivery Platforms
 - M16/ M4, M203, MK19, 60 & 81mm Mortars, etc.
- Other Platform Capabilities (Robots, UAV/UGVs)



Examples of Non-Lethal AD-V Candidate Technologies



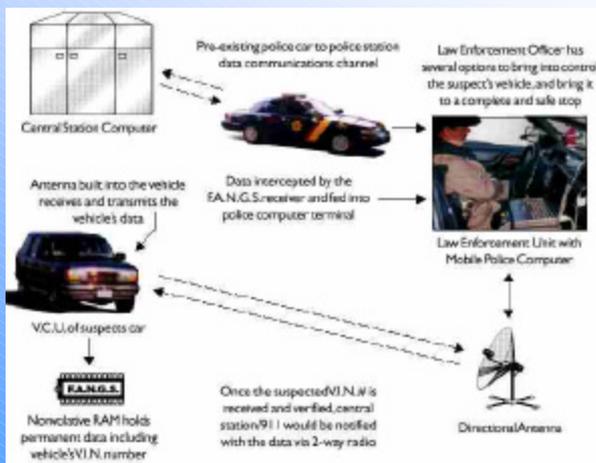
Caltrops



M1, Portable Vehicle Arresting Barrier, (PVAB)



Standoff Radio Frequency Ground Vehicle Stopper (ARL-GVS)



**Example "Cooperative System"
-Frequency Activated Neutralizing Generator System (FANGS)**



Anti-Traction Material (USMC)

Conventional Standoff Delivery Platform





Pre-Milestone A Programs



Objective Individual Combat Weapon (OICW) NL Round



USER PAYOFF

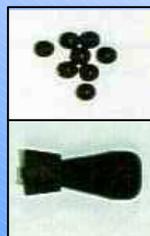
- Long Range (250m) Counter Personnel capability for Individual Soldier
- Range Selectable NL Airburst Capability
- NL Rd for Objective Force weapon system
- Maintains dual L / NL system capability

Non-Lethal Mortar Munition



- Long Range (2+ km)
- Only Indirect Fire NL capability
- Deployable from Existing Platform
- Applicable to Interim Brigade Combat Team

Mk19 NL Munition



- Rapid-fire, Short range, Crowd dispersal capability
- Uses Existing Joint Service Weapon
- Based on Kosovo After Action Report



Overhead Liquid Dispersion System (OLDS)

Dispersion System Testing

Test # PL-5

Date: 03-10-00

Video frame rate 1000 FPS

Contract# DALL30-99-C-1072

PRIMEX
AEROSPACE COMPANY

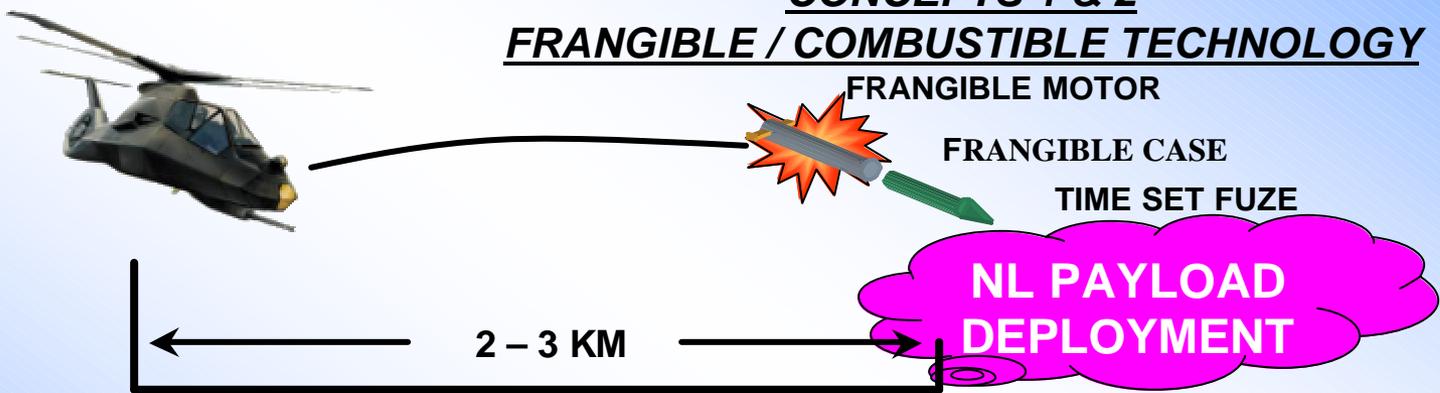




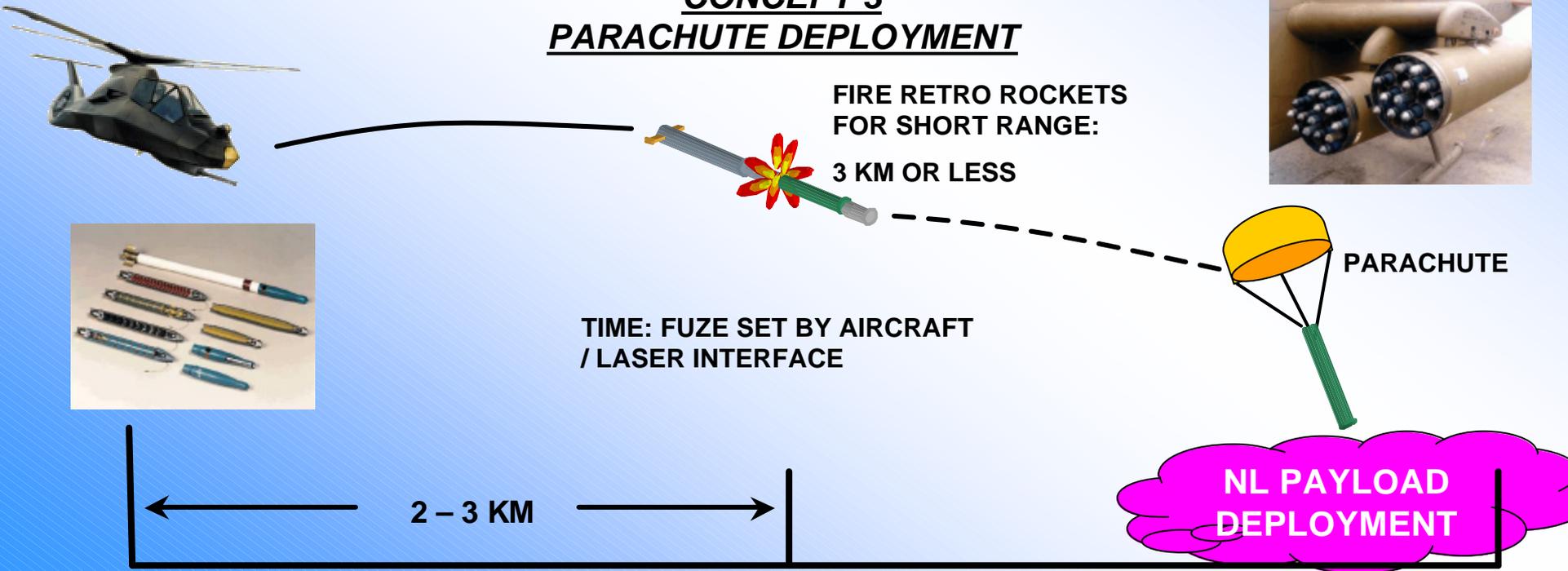
Long Range Standoff Aviation Delivered NL Munitions



CONCEPTS 1 & 2 FRANGIBLE / COMBUSTIBLE TECHNOLOGY



CONCEPT 3 PARACHUTE DEPLOYMENT



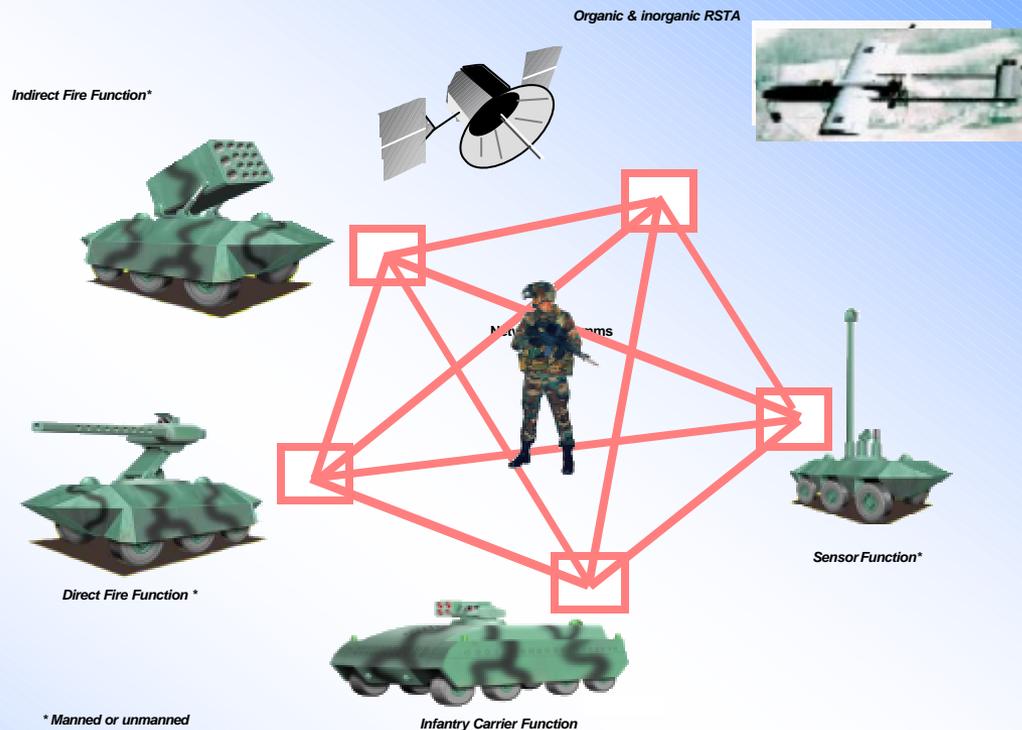


Future Army Requirement Driving Need for NL Technology



Future Combat Systems (FCS) Munitions/Armament

- Family of Systems for the Army Objective Force
- **#1 Army Modernization Priority**
- Mission Needs Statement: **FCS "will...include precision and non-lethal capabilities to minimize collateral damage."**
- Army/DARPA funded development program
- FUE FY10





Potential NL S&T Opportunities for Army's Objective Force & Future Combat Systems



- **Aversive Audible Acoustics**
- **“NL Fires” Warhead / Payload Technology**
for:
 - **Objective Force Precision**
 - **Area NL Effects**
- **Non Lethal Counter Materiel**
 - **RF-DEW**



Non-Kinetic, Anti-Personnel
Delay, Deterrence, Aversion



“Tunable fires”

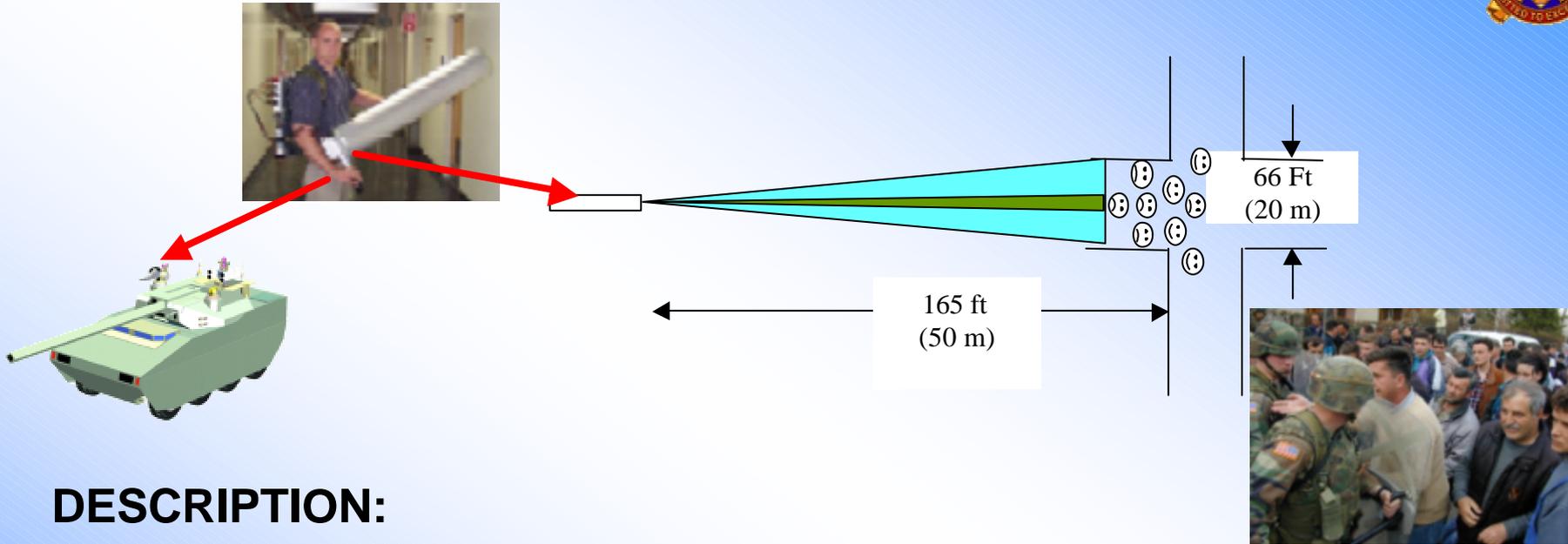


Reversible Effect, Standoff
Vehicle (Engine) Stoppers





Audible Aversive Acoustic Device for FCS



DESCRIPTION:

- Vehicle Mounted or Hand-Held
- Sound Emission Below OSHA Standard for Permanent Hearing Damage
- Area Broadcast or Narrow Beam Modes
- Non-Kinetic, NL Counter-Personnel Device (“CNN Factor”/ Media Acceptability)
- Aversive to Target with No Fatality / Injury
- Deep Magazine, Reduced Logistics (Rechargeable from Vehicle Power)
- Low Cost, Mounted / Dismounted Capability
- Engagement Range: 50 – 75m
- Environmentally Benign (No Clean-Up, No Energetic Materials)



NL Fires Capability for FCS



FCS Smart Cargo Payload



DESCRIPTION:

- NL Counter-Materiel Capability for FCS Smart Cargo Rd
- Multi-Threat Capable (Electronic Components, Vehicles)
- 2 to 50 km Engagement Range
- Reduced Logistics Burden from Potential Selective Effect Munition
- Provide NL Counter-Materiel Payloads for Line-of-Sight / Beyond LOS Delivery from FCS Smart Cargo Rd



NL Multi-Mission, Counter Materiel Capability for FCS



DESCRIPTION:

- Standoff Vehicle/Equipment Stopping Capability
- 250m to 500m Engagement Range
- No Fatality / Injury to Occupants, Bystanders
- Potentially Reversible Effects on Vehicles
- All Weather, Multi-Threat Capable (C4I, Vehicles, etc)
- Reduced Logistics Burden
- Rapid, Affordable Reuse

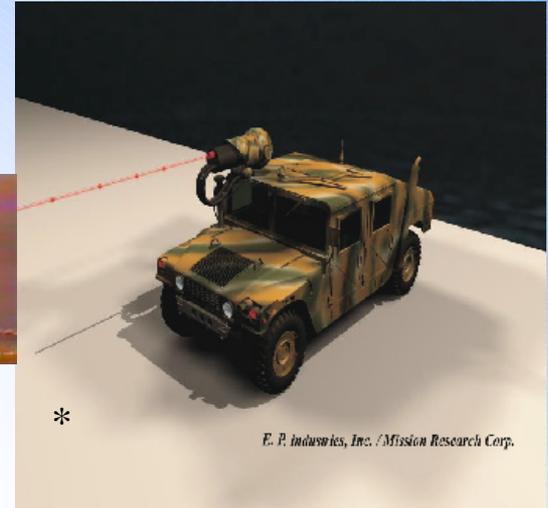
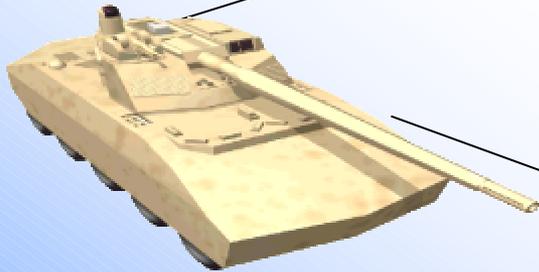




Other Potential NL S&T Opportunities for Army's Objective Force / FCS



- Crew-Served Weapon Pulsed Energy Projectile (*) (Impulse Laser)



- Vehicle Mounted Active Denial System (**) (Millimeter Wave)



* - Based on JNWLP Pre-MS A Effort

** - Based on JNLWP Pre-MS A Effort and ACTD)



Roadmap for Army Scalable Effects Capabilities

Fiscal Year

98

00

02

04

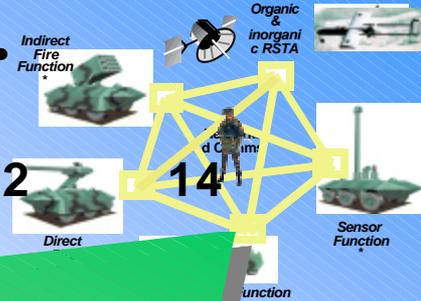
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Vision-supported Full spectrum relevance/use Army Objective Force/FCS

JMAA

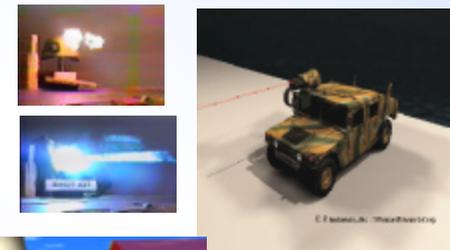
Joint NL Vision

Tactical/Operational NLW - includes DEW Possible Strategic Options TO&E inclusion

Militarized NL Weapons Tactical (USA Capabilities Set) Joint Service RDA



FCS Smart Cargo Rd



COTS/ NDI NL Weapons Tactical/Force Protection

- **USMC Capability Set**
- **US Army Capabilities Set**





Legacy to Objective Force - Full Spectrum Scalable Effect Capabilities



Fully integrate scalable effect capabilities into the Objective Force to *delay, disrupt, or degrade* the threat, combat functions, and facilities in pursuit of operational and tactical objectives with the *minimum force necessary*

Non-Lethal Small Arms for Legacy to Objective Force



Non-Lethal Mortar Munition



Applicable to:

- **Counter Mobility**
- **Area Denial**
- **MOUT**
- **Human Shield Scenarios**

Minimizes:

- **Civilian Casualties**
- **Collateral Damage**
- **Destruction of Vital Infrastructure**



Non-Lethal "FIRES" for Future Combat System



Emerging Technologies



Multi-Mission Counter-Materiel Capability



Conclusions



- **Develop technology for longer-range NL Capabilities**
- **Maintain and enhance Legacy Force NL Capabilities**
- **Integrate NL Capabilities into the Interim and Objective Force**
- **Continue pursuit of Army S&T and RDTE for Investment in NL & Scalable Effect Capabilities for the Objective Force & Future Combat System**
- **Provide the Army's Objective Force with Scalable Effect Capabilities across the Full Spectrum of Conflict**



QUESTIONS?

Back-Up

Multi-Mission NL Capability for FCS

Counter-Personnel / Materiel



Active Denial System (ADS)

Objective: Provide Long-Range Anti-Personnel Non-Lethal Force Option to Commanders

- Nonlethal antipersonnel directed energy weapon
- Long range, speed of light, line-of-sight, deep magazine
- Energy beam creates a directional sensation of pain, causing repel without damage



Ground Vehicle Stopper (GVS)

Objective: Stop hostile vehicle at safe standoff ranges without damage to occupants or vehicle.

- Uses RF energy to disrupt vehicle's electronic engine controls (i.e. flood/lean engine) at 100's m
- Disables vehicles without direct contact (may be used with mechanical barriers)
- Non Lethal for vehicle occupant and stops vehicles under driver control



Continuing Need for Non-Lethal Capabilities

