DoD Non-Lethal Weapons Program

Joint Non-Lethal Weapons Directorate (JNLWD)

Joint Armaments Forum
Unconventional & Emerging Armaments Program
14 May 14
Phoenix Convention Center Phoenix, AZ

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Non-Lethal Weapons - Historical Backdrop
Minimizing Civilian Casualties

Pre-NLW Program Response

DoD NLW Program
1996-Present

- During Operation United Shield (Somalia), General Zinni pioneered use of NLW for short-of-lethal engagements
- FY96 NDAA directed DoD to centralize responsibility for NLW; USD/AT&L designated CMC as Executive Agent
- Current inventory includes legacy NLW and dazzling lasers, vehicle arresting devices, electric stun guns, grenade launchers, advanced flash-bang and sting ball grenades, and warning and marking munitions. Low Tech NLWs from Law Enforcement.
- Next-Generation NLWs will be non-lethal mostly non-kinetic (directed energy) weapons which offer a generational leap-ahead in range, duration, and scalability of effects and volumes of fire.

Current Program Capabilities

What Are Non-Lethal Weapons?

DoD Definition: *"Weapons, devices, and munitions that are explicitly designed and primarily employed to incapacitate targeted personnel or materiel immediately, while minimizing fatalities, permanent injury to personnel, and undesired damage to property in the target area or environment. NLW are intended to have reversible effects on personnel and materiel."* (DoDD 3000.03E, *DoD Executive Agent for Non-Lethal Weapons (NLW), and NLW Policy*)

- Provide short-of-lethal options in a variety of mission applications to support an escalation of force (force application) capability to minimize civilian casualties with low collateral damage and also support force protection missions
- Afford warfighters response capabilities between "shouting" and "shooting"
- "NLW may be used in conjunction with lethal weapon systems to enhance their effectiveness and efficiency in military operations…"

Representative Mission Applications

- Humanitarian Assistance/Disaster Relief
- Vehicle/Vessel Stopping to include Counter Piracy
- Clearing Structures/Facilities
- Check-Point/Convoy Security
- Crowd Control
- Irregular warfare (counterinsurgency & asymmetric)
- Forward Operational Bases/Area Security
- Maritime Stability Operations
- Defense Support to Civil Authorities
- Detainee Operations
- Freedom of Fire - Freedom of Maneuver
- Deny/Move/Suppress/Disable

Why Non-Lethal Weapons?

- Non-lethals incapacitate materiel and personnel and provide reversible effects across the spectrum of conflict to:
  - Enable immediate, precise, and proportionate force application in a myriad of scenarios for which lethal response may not be appropriate
    - When employed in concert provide an escalation of force capability
    - Support force application with an escalation of force capability to enable freedom of fire and freedom of maneuver, mounted and dis-mounted
    - Supports non-lethal counter-personnel missions to move, deny, suppress, and disable personnel at range
    - Supports non-lethal counter-materiel mission to stop and disable vehicles and vessels at range
  - Facilitate force protection and CIVCAS reduction by allowing warfighters to safely determine intent, incapacitate suspect individuals, disable/stop vehicles and vessels, and deny areas
  - Deny enemy use of facilities/infrastructure without damage and US-borne reconstruction
  - Demonstrate our intent to protect civilians to local populace, allies/partners, and international audiences
- Relevant across the range of military operations, available at minimal cost, and supportive of US strategic goals

How: JNLWP Key Contract Venues
FY15 JNLWP BAA Technology Challenges

1. Non-Lethal Advanced Materials and Non-Lethal Payloads to Hail/Warn, Move, Deny Area, Suppress, and Temporarily Disable Individuals at ranges > 100meters
    1. Carbon Nanotube Acoustics
    2. Non-Irritating Malodorants
2. High Power Microwave Technologies for Counter-Material Missions
3. Compact Active Denial Technologies
4. Clear-a-Space Technologies
5. Human Electro-Muscular Incapacitation Technologies
    1. 100 meter 40mm wireless HEMI munition (disable point target)
    2. Nanosecond electrical impulse (disable point target)
    3. Disable multiple targets – open and confined
6. Directed Energy and Non-Directed Energy-based Technologies for Vehicle/Vessel Stopping & other Counter-Material Targets
7. Non-Lethal Laser Induced Plasma Effects for long range (> 100meter) NL Counter-Personnel and Counter-Material Missions (long range hail and warn, long range suppression via multi-flashbang effects, and thermal discomfort)
8. Compact Non-Lethal Non-Pyrotechnic Flash-Bang Technologies
9. Compact Advanced Multi-Bang Flash-bang Technologies
10. Advanced Non-Lethal Technologies that Move/Suppress/Deny/Disable through Combined NL Effects on Individuals and Crowds
11. Compact Hail and Warn Technologies with long range (0-1500m) two-way communications
12. Compact, Low Cost Non-Lethal “Push-Back” – “Repel” Technologies
13. Human Effects and NLW Weapon Effectiveness Studies, Risk Assessments, and Evaluations
14. Other Next-Generation Non-Lethal Technologies

JNLWP
Research & Technology Development IDIQ

- JNLWP intends to reinitiate pursuit of an Indefinite Delivery – Indefinite Quantity (IDIQ) Multiple Award Contract (MAC) contracting approach
- Advance the technology readiness and state of knowledge in ten functional areas:
  1) HEMI
  2) Nanosecond electrical pulses
  3) ADT
  4) Human effects
  5) Blunt impact technologies
  6) Directed energy weapons – RF/HPM
  7) Laser technology
  8) Vehicle/vessel stopping technology
  9) New/advanced materials, payloads and payload delivery systems
  10) Independent Technical Reviews

http://jnlwp.defense.gov

- Notional timeline:
  - Draft Request for Proposals (RFP) – 1st Quarter FY15
  - Request for Proposals – 2nd Quarter FY15
  - Contract Award(s) – 3rd Quarter FY15

Check JNLWP website and FedBizOps routinely for updates

Informational and planning purposes only. Does not bind the Government to contract for any supply or service. Official requirements and instructions would be provided in a final released Request for Proposal (RFP).

Current and Emerging Non-Lethal Capabilities (Counter-Personnel)

What we have now

Sting Ball Grenades/Munitions

Dazzling Lasers

12 Gauge/40mm Point & Area Warning Munitions

Electro-Muscular Incapacitation Devices

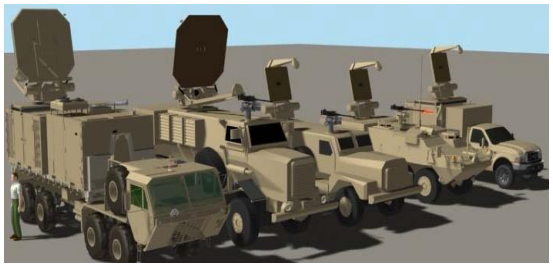
Where we are going

Extended Range and Duration of Effects

Untethered "TASER-like" Munitions

Improved "Flash Bang" Effects

Long Range Hail and Warn



Improved Active Denial Systems

Counter-Personnel

(Active Denial System)

:Unclassified and RELEASED: September 12, 2013

130912-M-LX723-001

Active Denial System Undergoes Demonstration

The Active Denial System had its first demonstration of power aboard an Army vessel at Joint Base Langley-Eustis September 12, 2013.

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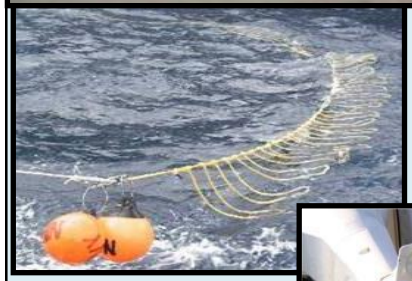
Current and Emerging Non-Lethal Capabilities (Counter-Materiel)

What we have now

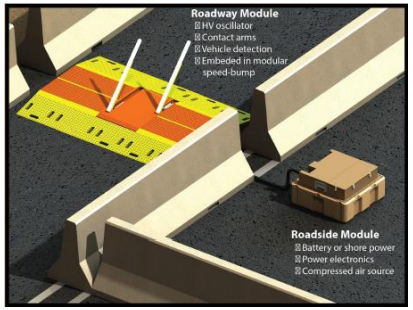
Spike Strips

Vehicle / Vessel Entanglement Nets



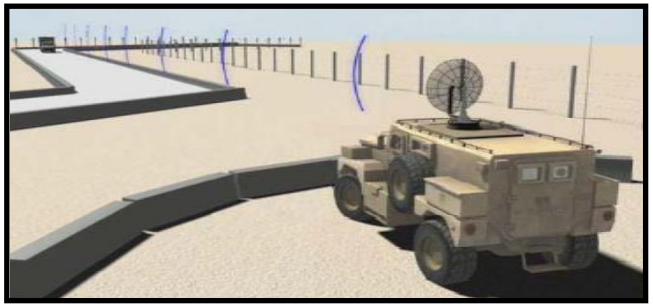
Where we are going

Remotely Deployed Entangling Nets



Electrical Vehicle Stopper (Multi-Use)

Directed Energy Vehicle / Vessel Stopping



Counter-Personnel

(Long Range Hail/Warn, Suppress, Move, or Deny)

- **Distributed Sound & Light Array (DSLA)**
  - Long range hail, warn and suppress
  - Laser warning: 3-m spot -1200m (day) 2000m (night)
  - Acoustics: Intelligible voice delivered to complex spaces = >400m (land); 2000m (sea)
  - Potential force multiplier in perimeter security, entry control operations and area denial
- **Mini-DSLA**
  - Has commensurate acoustic and laser system performance with legacy DSLA systems in a smaller (~1/2 size), lighter and marinized package

Distributed Sound & Light Array (DSLA)

Mini-DSLA

THOR

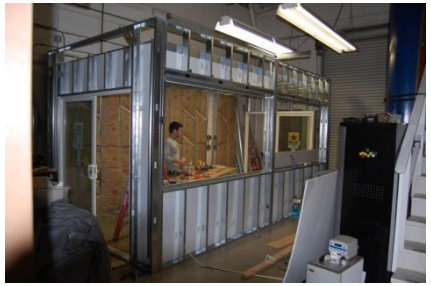
DSLA

Counter-Personnel
(Suppress, Move, or Deny)

- **Research and Development (pre-Milestone "A" – S&T)**
  - Next Generation Active Denial Technology
    - Compact ADT (40-100 kW electropermagnet gyrotrons)
    - GaN Solid State ADT Arrays
  - Laser Induced Plasma Effects (LIPE)
  - Carbon Nanotube Acoustic Sources
  - Non-Irritating Malodorants (SBIRs/BAA topic)
  - Human Surrogate Test Target
  - Compact Prime Power Systems for ADT/RFVS
  - Compact RF Antenna Systems for ADT/RFVS

Next Generation ADT

Non-Irritating Non-Lethal Malodorants



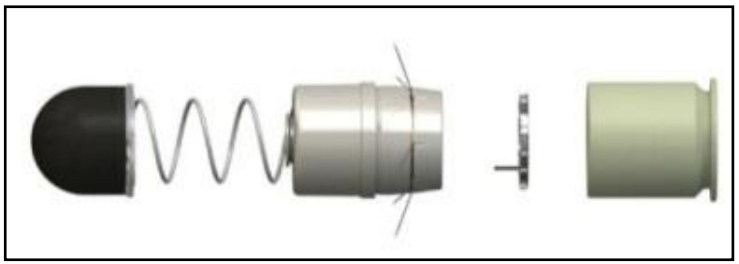
High Power Carbon Nanotube Driver

Non-Lethal Laser Induced Plasma Effects

Counter-Personnel (Disable)

Disable: To render ineffective or unable to perform

- **Human Electro Muscular Incapacitation "HEMI"**
  - **Extended Range and Duration HEMI**
    - » Development of a delivery system for HEMI technology (200+ meter long range precision targeting via a 40/50mm munition)
    - » Conducting human effects studies to increase wireless operational ranges and longer durations of effect
  - **Simultaneous Engagement HEMI**
    - » Feasibility assessment for disabling two to seven targets in open and confined spaces



HEMI

HEMI Test Target

- **Nanosecond Electrical Pulses**
  - Novel electrical waveform

Counter-Vehicle (cont.)

- **“Fieldable” Demonstrator; Available in Limited Quantities**
  - **Pre-emplaced Electric Vehicle Stopper (PEVS)**
    - Halts vehicles by disabling engines through disruption of engine control electronics
    - Low cost per use/multiple use
- **Future Requirements Development**
  - **“Stop Vehicles” Materiel Solution Analysis**
    - Marine Corps led, Joint NLW Program funded effort (Requirements identification & refinement, Analysis of Alternatives, Life Cycle Cost Estimate, Draft CONOPS, Draft Capability Development Document)
- **Science and Technology**
  - **Radio Frequency (RF) – High Power Microwave (HPM) Non-Lethal DEW Technologies**
    - RF Vehicle Stopper halts vehicles by disabling engines through disruption of engine control electronics
    - Intended to stop a wide range of vehicles and outboard vessel engines at ranges greater than the JNLE CM ICD threshold requirements
    - Waveform optimization (Short Pulse/Low Duty) and component technology studies ongoing to reduce systems size and weight

Pre-emplaced Electric Vehicle Stopper

Stop Vehicles Materiel Solution Analysis

Radio Frequency Vehicle Stopper

Counter-Vessel (cont.)

- **Unmanned Undersea Vehicle (UUV) for Maritime NLW Payload Delivery**
  - UUV to deploy several possible non-lethal vessel stopping payloads
- **Radio Frequency (RF) Vessel Stopper**
  - Stops vessels by disrupting critical engine control electronics
  - Three conceptual designs developed – one for Capital Asset Protection and two for Pursuit and Intercept / Counter Piracy
  - Waveform optimization (Short Pulse/Low Duty) and component technology studies ongoing to reduce systems size and weight
- **Coordination with USN for RF/HPM payload integrated onboard an unmanned surface vessel for experimentation**

RF Vessel Stopping

Joint Armaments Conference

Questions