



**DOD NON-LETHAL WEAPONS PROGRAM**



# **NON-LETHAL WEAPONS FOR TODAY'S OPERATIONS**



# DoD Non-Lethal Weapons Program

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(Official ISAF Photo)

*“We must balance our pursuit of the enemy with our efforts to minimize loss of innocent civilian life, and with our obligation to protect our troops.”*

— General David H. Petraeus  
Commander, International Security Assistance Force and  
Commander, U.S. Forces Afghanistan  
Tactical Directive, Aug. 1, 2010

# Providing Non-Lethal Weapons for Today's Operations

The Department of Defense Non-Lethal Weapons Program stimulates and coordinates non-lethal weapons requirements of the U.S. Armed Services and allocates resources to help meet these requirements. The Commandant of the U.S. Marine Corps serves as the DoD Non-Lethal Weapons Executive Agent.

Located at Marine Corps Base Quantico, Va., the Joint Non-Lethal Weapons Directorate serves as the DoD Non-Lethal Weapons Program Executive Agent's day-to-day management office.

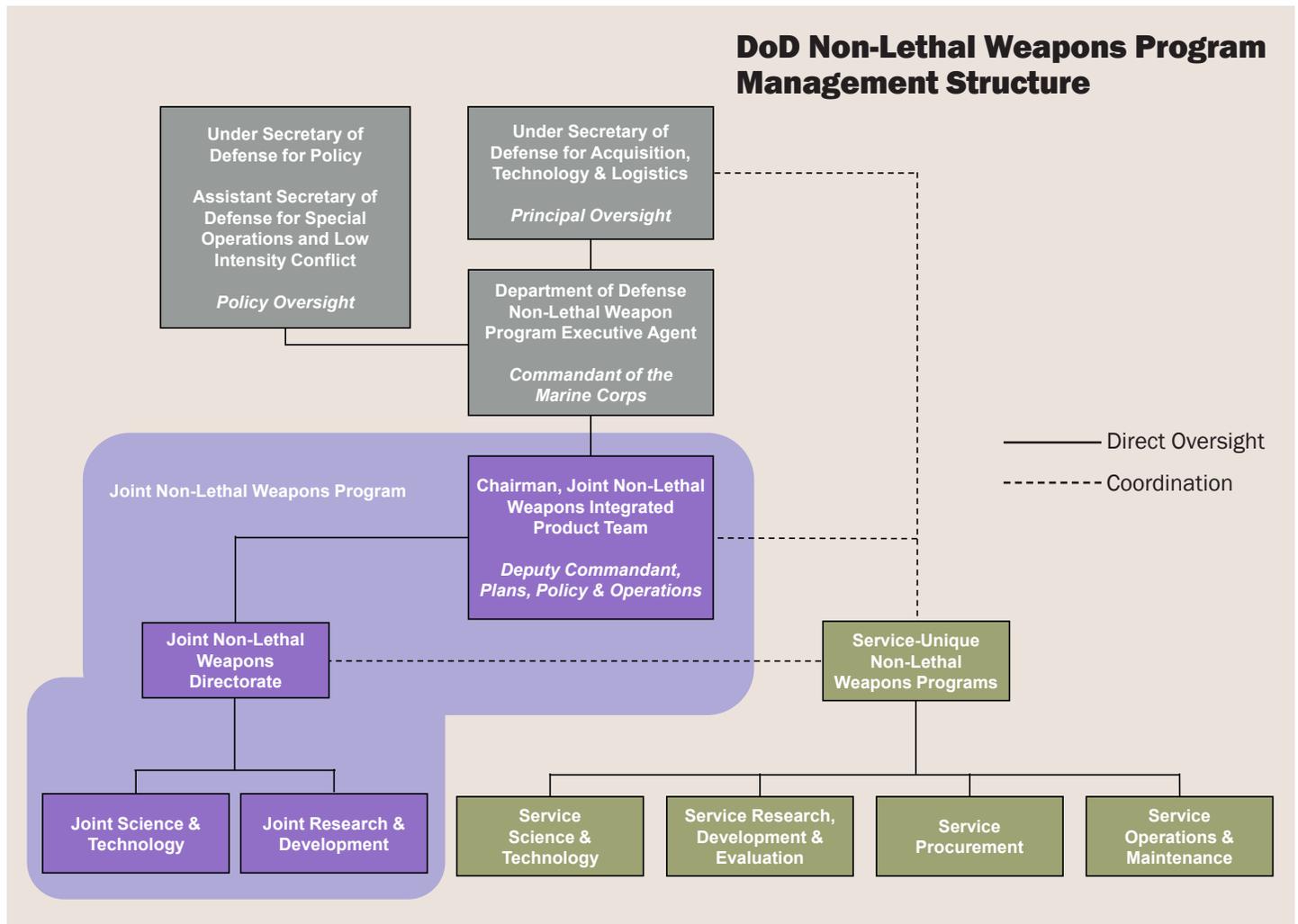
The U.S. Armed Services work with the combatant commanders and the executive agent through a joint process to identify requirements and coordinate the planning, programming and funding of non-lethal weapons research, development and acquisition. Within

the DoD Non-Lethal Weapons Program, the Joint Non-Lethal Weapons Directorate and the Services fund science and technology, research and development, as well as test and evaluation for non-lethal weapons.



**General James F. Amos**  
Commandant of the Marine Corps  
and Executive Agent,  
DoD Non-Lethal Weapons Program

The fiscal year 2010 budget consisted of approximately \$120 million for the Joint Non-Lethal Weapons Program and Service funding. The Joint Non-Lethal Weapons Program funding of \$64 million supported joint efforts. Service funding enabled development, purchase, operation and maintenance of current non-lethal weapons.



# DoD Non-Lethal Weapons Program

## Warfighters Should Have the Best Weapons Available to Them — Lethal & Non-Lethal

**D**emands on our Nation's Armed Forces remain considerable. Operations New Dawn and Enduring Freedom keep our forces actively engaged. America's military will continue to be engaged worldwide in humanitarian assistance, disaster relief, and related contingencies. Challenges such as homeland defense, piracy, and global competition for natural resources will demand our involvement. Volatility, uncertainty, complexity, and ambiguity confront our military, and will for the foreseeable future.

Commanders require a variety of options to ensure mission accomplishment across the full range of military operations. In today's counter insurgency environment, where the enemy exploits civilian casualties to recruit forces and gain support, commanders are required to take the utmost care in avoiding civilian deaths and undesired damage to infrastructure. Commanders need the most capable lethal and non-lethal means available to meet this vital requirement.

Every day, warfighters make split-second decisions to prevent civilian casualties and collateral damage using lethal weapons in non-lethal ways. Non-lethal weapons are available now for use in conducting checkpoint operations, convoys, area security, patrols, and maritime operations. Technology and innovation now offer a greater array of non-lethal weapons for

employment. The Joint Non-lethal Weapons Program is working to increase the fielding of non-lethal weapons, increase non-lethal weapons effects, and extend their range so that our forces have more time to make critical decisions.



Lieutenant General Richard T. Tryon  
Chairman, Joint Integrated Product Team

As the Commanding Officer of the 24th Marine Expeditionary Unit (MEU), I recognized and appreciated the benefits associated with a force trained and equipped to employ non-lethal weapons. Once trained, the MEU Marines proved to be more capable and versatile, postured for success in a variety of scenarios. I intend to leverage this experience in synchronizing the needs of our deployed Joint forces with the activities of our non-lethal weapons developers and acquisitions community. The challenges to our forces continue to mount. It is imperative that our warfighters have the best non-lethal weapons available to support their missions.

As Chairman of the Joint Integrated Product Team, I am interested in your input and recommendations. I encourage you to contact the Directorate staff (Page 2) or the Department of Defense Non-Lethal Weapons Program Central Action Officers listed below.

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*These Service representatives are subject matter experts about non-lethal weapons issues.*



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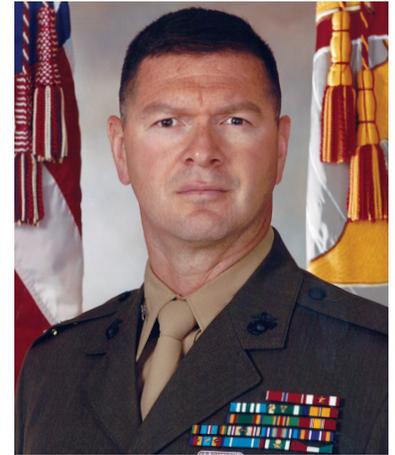
## Options for Complex Environments

The Department of Defense Non-Lethal Weapons Program was established in 1996 in response to a validated requirement to provide U.S. forces with counter-personnel capabilities between “shout and shoot.” Admittedly, these early escalation-of-force capabilities were derived from resources typically associated with military police or security missions and were intended to support a relatively small percentage of U.S. forces conducting humanitarian assistance, disaster relief, peacekeeping or other related operations in which non-lethal weapons could augment existing force protection means.

In the 14 years since the Program’s founding, much has changed in the world and in those environments in which U.S. forces find themselves operating. While maintaining our conventional primacy remains a foremost DoD priority to ensure our national interests and assure friends and allies, a review of current operations being undertaken by our forward deployed forces reflects an unconventional focus. Arguably, at no time since the Program’s founding has the need for non-lethal capabilities — both counter-personnel and counter-materiel — had as much applicability to the multitude of DoD missions being conducted around the world. Whether engaged in stability and reconstruction, counterinsurgency, counterterrorism or anti-piracy operations, U.S. forces will need to be adept at employing de-escalation techniques to complement lethal capabilities.

In 1996, the non-lethal weapons arsenal was composed primarily of law enforcement-related equipment and munitions such as tear gas, riot control equipment and beanbag rounds. The continued and growing focus on the many operations that comprise

irregular warfare requires U.S. forces to satisfy a critical tenet common to irregular warfare operations — protection of the population. Today’s non-lethal weapons inventory includes hailing devices, vehicle arresting equipment, electric stun guns, vehicle-launched grenades and directed energy systems (e.g., optical distracters and prototype millimeter wave active denial) — all proven technologies that provide reversible effects and applicability across the spectrum of irregular operations.



Colonel Tracy J. Tafolla,  
Director, Joint Non-Lethal Weapons Directorate

The applicability of non-lethal weapons to the current fight demands the DoD Non-Lethal Weapons Program’s relentless engagement to put these capabilities in the hands of our troops. We have seen success in fielding both programs of record and Joint Urgent Operational Needs requirements in recent years. During fiscal year 2011, the DoD Non-Lethal Weapons Program will continue to field Joint Urgent Operational Needs; acquire and field systems, including the Vehicle Lightweight Arresting Device, Improved Acoustic Hailing Device and 40mm Non-Lethal Extended Range Marking Munition; and conduct several formal technology demonstrations for vehicle stopping, vessel stopping and Active Denial Technology. Although the DoD Non-Lethal Weapons Program has matured significantly from the days of riot batons and rubber bullets, we must continue fielding proven systems and developing new capabilities to support current and future operational needs in these complex environments.

### DoD Non-Lethal Weapons Program Annual Report 2010 & DoD Non-Lethal Weapons and Capabilities 2011

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# Non-Lethal Weapons Capabilities

Non-lethal weapons are capabilities for today's military forces because they provide additional options between issuing a verbal warning and using lethal force. Non-lethal capabilities do not replace lethal force choices; rather, they increase the force options available to warfighters so they can adapt to mission needs.

## What are non-lethal weapons?

Non-lethal weapons are escalation-of-force options that play an important role across the spectrum of military operations. These choices range from commercially available items, such as beanbag rounds, pepper spray and optical distracters to directed-energy systems that provide non-lethal effects at greater distances.

The Department of Defense defines non-lethal weapons as “weapons that are explicitly designed and

primarily employed so as to incapacitate personnel or materiel, while minimizing fatalities, permanent injury to personnel, and undesired damage to property and the environment. Non-lethal weapons are intended to have reversible effects on personnel and materiel.”

## Why non-lethal capabilities?

Commanders need flexible alternatives, both in time and range, to respond to the challenging and diverse threats our forces face. Patrols, checkpoints, crowd

### Checkpoint Operations



### Crowd Control



control, convoys and vessel stopping are among operations where our forces routinely encounter threats. Non-lethal capabilities enable operational forces to effectively deter potentially dangerous individuals at increased distances, stop suspicious vehicles or vessels, and render enemy assets inoperable with few or no unintended casualties.

Within current irregular warfare environments, non-lethal capabilities may be valuable in enabling warfighters to tailor their responses to complex, threatening situations more precisely and appropriately

when reduction of civilian casualties is essential to mission accomplishment. Non-lethal weapons are especially useful in situations in which our adversaries aim to capitalize on unintended injury or damage. For example, the use of non-lethal weapons in a crowd control situation may limit the increase of violence, whereas use of lethal force could fuel violent, riotous behavior. In addition, use of non-lethal weapons may help avoid destruction of culturally significant structures. Reduction in infrastructure damage may also decrease reconstruction costs.

## Convoy Protection



## Vessel Stopping



# Non-Lethals for Current Operations

Sailors aboard the guided-missile cruiser USS Vella Gulf (CG 72) use an acoustic hailing device to capture suspected pirates.



*“The acoustic hailing device and other non-lethal systems are incredibly important to any commanding officer attempting to gain an understanding of the intent of an approaching skiff ... Anything that extends the battle space by increasing the distance that a ship can execute audible warning options buys the commanding officer precious distance and time.”*

— Captain Mark Genung, U.S. Navy, Chief of Staff, Expeditionary Strike Group Two and former Vella Gulf Commanding Officer

## Vessel Stopping

Two of the most sought after non-lethal capabilities in use today include acoustic hailing devices and optical distracters. (See Pages 10-11). Acoustic hailing devices provide improved communication and warning options. They can also project attention-getting, highly irritating tones that may help deter or modify an individual’s behavior. This capability assists warfighters in determining intent at a safe distance and

potentially deter an individual prior to escalating to lethal force.

Acoustic hailing devices can operate from ships and other vessels, Humvees, trucks and a variety of stationary platforms, including tripods and guard towers. The versatility and transportability of acoustic hailing devices make them a valuable capability for force protection, peacekeeping and humanitarian missions, or other situations where there is a need to communicate at long ranges and determine the intent of individuals or crowds.

## Acoustic Hailing Devices

- ▶ Non-lethal, counter-personnel, long-range warning devices
- ▶ Ground, vehicle or vessel mounted
- ▶ Range: 10-3,000 meters, depending on the device, atmospheric conditions, listener background noise and other environmental factors
- ▶ Produce focused, directional sound beams
- ▶ Potential to project warning tones and intelligible voice commands beyond small-arms range
- ▶ Optional pre-programmed foreign phrase commands
- ▶ Voice or tones generated below Occupational Safety and Health Act hearing limits

## Defeating Piracy

Piracy and smuggling are examples for which non-lethal capabilities provide incapacitating and reversible escalation-of-force options. Such options can help reduce casualties and unintended damage to vessels in maritime environments. The following situation shows how one such non-lethal device, an acoustic hailing device, can successfully help defeat pirates.

The United States Ship Vella Gulf, commanded by Captain Mark Genung, U.S. Navy, was the flagship of the newly created Counter Piracy Task Force operating in the Gulf of Aden. Shortly after assuming flagship duties in the Gulf, the ship intercepted and captured two skiffs that attempted to pirate the Motor Vessel Polaris and Motor Vessel Prem Divya within 24 hours of each other.

Captain Genung and his crew used an acoustic hailing device to direct the actions of the suspected pirates during the most dangerous phases of the capture. (See photo, Page 8). The device significantly increased their ability to warn and gauge the reaction of the threat. It enabled his crew to capture 16 suspected pirates without injury to his Sailors or the pirates.

“I was very pleased by the positive control it gave my teams as our linguist ordered the pirates to surrender and raise their hands,” Captain Genung said.

Master-at-Arms 2nd Class Victor Arroyos, from San Antonio, Texas fires the Navy’s LA-9/P™ on Oct. 16, 2010 aboard the aircraft carrier USS Abraham Lincoln (CVN 72) to familiarize himself with the device. The LA-9/P™ can be used for signaling or as a non-lethal deterrent to any hostile force approaching the ship. The Abraham Lincoln Carrier Strike Group is deployed supporting maritime security operations and theater security cooperation efforts in the U.S. 5th Fleet area of responsibility.



# Non-Lethals for Current Operations



Targeting suspected vehicle with an optical distracter.

## Vehicle Stopping

Checkpoints, entry control points, convoys and patrols are situations where non-lethal devices can effectively stop moving vehicles and provide non-verbal warning signals to individuals. Optical distracters, caltrops, spike strips, M2 Vehicle Lightweight Arresting Device™ nets and Portable Vehicle Arresting Barriers all help the warfighter provide force protection, while giving them enough time and distance to determine a person's intent.

Optical distracters, to include “dazzling lasers,” are non-blinding, hand-held or weapon-, vehicle- or vessel- mounted lasers and white light devices that communicate discrete, non-verbal warning signals to targets. These devices use highly directional optical energy to temporarily overwhelm an adversary's visual sense by emitting a compelling flash and glare effect. Optical distracters can be used at entry control points, checkpoints and for convoy or vessel protection.



**\*LA-9/PTM**  
Visible Range: 300 meters (day) to 4 kilometers (night)



**Glare MOUT®**  
Visible Range: 150 meters (day) to 2 kilometers (night)

*\*Includes a safety control module that shuts off the beam when a target interrupts it at a non eye-safe distance.*



The high-intensity laser light of an optical distracter captures the attention of the targeted vehicle's driver.

## Optical Distracters

- ▶ Non-lethal, counter-personnel devices
- ▶ “Dazzling Lasers” provide non-verbal warning
- ▶ Can be hand-held or weapon-, vehicle- or vessel-mounted
- ▶ Effective range (varies by model): 25-1,000 meters
- ▶ Meet safety standards from the American National Standard Institute
- ▶ Approved and fielded by U.S. Army, U.S. Marine Corps, U.S. Navy and U.S. Air Force

*“Protecting civilian populations is critical to our success in fighting insurgencies... Green lasers have proven safe and effective as a non-lethal tool that sends a strong message without the need to employ deadly force.”*

— U.S. Army Colonel Douglas A. Tamilio  
Project Manager for Soldier Weapons

Caltrops are three-pronged, heavy-gauge steel puncturing spikes that can be thrown on roadways, or linked together and placed across roadways, to cause immediate, irreparable damage to air-filled tires. Spike strips can also cause rapid deflation of tires. These hand emplaced, prefabricated strips of materiel with embedded, hollow steel spikes allow for a controlled deceleration of vehicles. Both caltrop and spike strip devices significantly impede wheeled vehicle progression.

M2 Vehicle Lightweight Arresting Device™ nets are man-portable, expandable, single-use, spiked entanglement nets that can be deployed in less than one minute to puncture and lock-up the front tires of a small vehicle. These devices can stop a 5,500 pound vehicle traveling at 20 mph. The enhanced Vehicle Lightweight Arresting Device with Single Net Solution and Remote Deployment Device will stop a 22,000 pound vehicle traveling at 30 mph.

Portable Vehicle Arresting Barriers are hand-placed, reusable, mechanically activated capturing systems

capable of stopping a 7,500-pound vehicle traveling up to 45 mph within 200 feet. These devices use a vertical net, secured to the ground at both ends, to capture a small vehicle and to force it to a controlled stop, while also confining the occupants inside.



A spike strip helps secure a vehicle checkpoint.



Portable Vehicle Arresting Barriers can effectively stop a vehicle, potentially enabling the capture of the driver.  
General Dynamics Corporation Photos

# Non-Lethals for Current Operations



Conducting humanitarian and disaster relief operations may require non-lethal capabilities to control crowds.

## Crowd Control

Natural disasters and turmoil among groups of people are situations where non-lethal capabilities can effectively control crowds, disperse mobs and temporarily disable combatants. In these situations, our Soldiers, Marines, Sailors, Airmen and Coast Guardsmen must balance between providing humanitarian assistance and maintaining safety, often in chaotic, panic-filled crises. Non-lethal weapons can help defuse potential hostilities by filling the gap between verbal commands and the use of lethal force.

Many Services have tailored variations of non-lethal weapon sets for specific mission needs. While each Service gives different names to their sets and modules, all the sets have similar goals: to deny, move, disable or suppress individuals or to stop, deny access to, disable or divert vehicles or vessels

while having reversible effects. For example, a crowd-control module from a non-lethal weapon set could help our forces maintain order while distributing food and water to desperate earthquake survivors. As a component of the module, a hand-held translation device would help a Service member easily communicate with the group. If the crowd began to converge on a distribution site, the loud noise of an acoustic hailing device could help disperse the throng of people. Riot body shields and batons could help protect the warfighters as they deal with persistent, unruly groups.

*“When people get angry in a crowd, that emotion spreads very rapidly. It’s very important to de-escalate quickly.”*

— Sergeant 1st Class Bryon Foreman, U.S. Army  
354th Military Police Company

Non-lethal tool sets provide warfighters force options and protection when crowd behavior escalates toward violence.



Examples of U.S. Army Non-Lethal Capability Sets: Dismounted module (left), Magnetic Audio Device, an acoustic hailing device, (center) and translation devices (right).  
U.S. Army and Votex International, Inc. Photos

## Non-Lethal Tool Sets

- ▶ Versatile packages of commercial- and government-off-the-shelf mission enhancing non-lethal tools
- ▶ Transportable, weatherproof military containers of non-lethal, counter-personnel and counter-materiel weapons and devices including: protective gear, acoustic hailing devices, translation devices, optical distracters and vehicle-stopping capabilities

## Language Translation Devices

- ▶ Counter-personnel voice-activated language translation systems
- ▶ Translate pre-defined English phrases into foreign languages
- ▶ Hand-held, one-way, multiple language devices
- ▶ Provide optional text display (varies by model)

- ▶ Service customized sets contain modules and sub-modules and have different names:

U.S. Army – Non-Lethal Capability Sets

U.S. Marine Corps – Escalation-of-Force Mission Modules

U.S. Navy – Non-Lethal Capability Sets

U.S. Air Force – Escalation-of-Force Kits

# Non-Lethal Weapons Training for Current Operations

**United States**  
U.S. Air Force Training

**Kosovo**  
U.S. Army Training

**United States**  
Inter-service Non-Lethal Individual Weapons Instructors Course

**United States**  
U.S. Coast Guard Training

**Belize**  
Tradewinds

**Morocco**  
African Lion

**United States**  
U.S. Joint Forces Pre-Deployment to Afghanistan Training

Unified Combatant Commands host and participate in exercises with other nations each year and use of non-lethal weapons in these events has increased. The Department of Defense Non-Lethal Weapons Program sponsored Combatant Command Liaison Officers provide non-lethal weapons expertise during planning and execution of these exercises.

## Combatant Command Liaison Officers for the Non-Lethal Weapons Program



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**Bulgaria**  
Black Sea Rotational Force



**Iraq**  
U.S. Army Training



**Mongolia**  
Non-Lethal Weapons Executive Seminar



*“Leadership, tactics, preparation and training all are important in shaping the challenges facing U.S. forces.”*

— General David H. Petraeus  
Commander, International Security Assistance Force  
and Commander, U.S. Forces Afghanistan



**Pacific Ocean aboard the USS Blue Ridge**  
U.S. Navy Training



**Thailand**  
Cobra Gold



**Philippines**  
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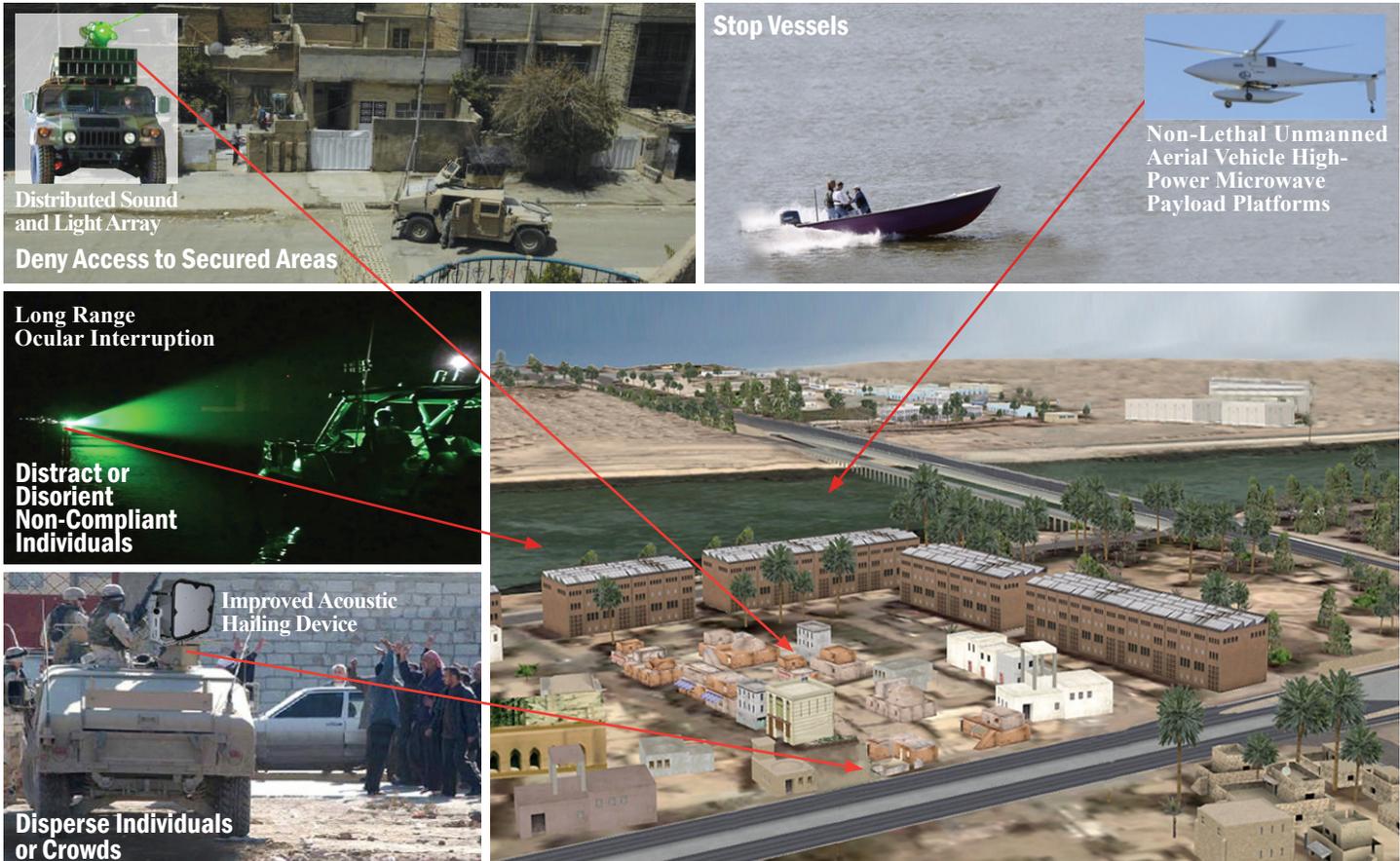
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# Emerging Technologies

## Escalation-of-Force Options Layered Defense



As depicted above, counter-personnel capabilities are designed to target individuals. Counter-materiel equipment primarily affects objects such as vehicles, vessels, structures or weapon systems. The Department of Defense Non-Lethal Weapons Program currently has a number of innovative, counter-personnel and counter-materiel programs under development.

On any given day, at any number of locations, our operating forces face potential threats. As represented above, our men and women in uniform may be required to deny access to secured areas, stop vessels, distract or disorient non-compliant individuals, or disperse individuals or crowds. The DoD Non-Lethal Weapons Program is developing counter-personnel and counter-materiel non-lethal capabilities to meet the needs of Service members, so they can more effectively face these challenges in the future.

The DoD Non-Lethal Weapons Program coordinates efforts among the Services to assist them with the research, development, testing and evaluation of new technologies. Warfighter requirements drive ongoing technology development. Many of the endeavors aim

to improve the characteristics of currently fielded capabilities, such as increasing range or reducing size and weight. Other requirements-driven research seeks to create new and innovative solutions.

In early concept development, requirements for a particular technology are identified and further refined as it transitions to the acquisition process.

Throughout the development of a new system, human effects research identifies a non-lethal capability's risk of significantly injuring a targeted individual and characterizes a technology's effective operating envelope. The desired non-lethal operating envelope is between the threshold for intended or desired effects and the risk of significant injury.

When considering human effects, those who will use a new non-lethal weapon must understand its limitations. For example, an operator needs to know that in extreme cold weather, a rubber impact round is harder due to the temperature, and therefore it is going to have a greater chance of injuring an individual than in a warm environment when the round is softer.

In addition to human effects, other factors include: policy, legal, treaty compliance and strategic communication. These considerations occur from the beginning, at material solution analysis and carry through to the system's fielding. Policy efforts may include developing guidance on the use of an innovative technology. Legal and treaty compliance reviews must be completed prior to production. In addition, strategic communication is needed to educate and create awareness among not only operators, but also the general public.



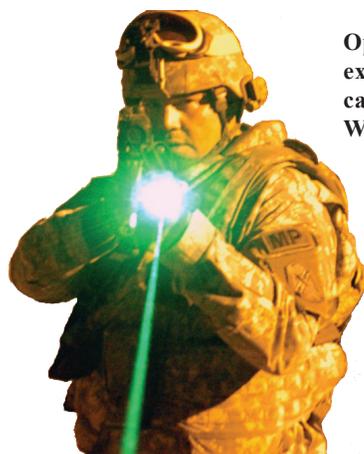
Human Effects ongoing research at the Target Behavioral Response Laboratory in Picatinny Arsenal, N.J., is focusing on the safety and effectiveness of green lasers.

The following pages highlight several, but not all, of the emerging technologies currently in development by the Department of Defense Non-Lethal Weapons Program.

## Non-Lethal Capabilities Under Development or Enhancement

### Counter-Materiel Equipment

- ▶ Vehicle Lightweight Arresting Device Single Net Solution and Remote Deployment Device
- ▶ Pre-emplaced Electric Vehicle Stopper
- ▶ Small Vessel Stopping Entanglement
- ▶ Multi-Frequency Radio-Frequency Vehicle Stopper
- ▶ Pre-emplaced Electric Vehicle Stopper



Optical distracters are an example of a counter-personnel capability the DoD Non-Lethal Weapons Program is enhancing.

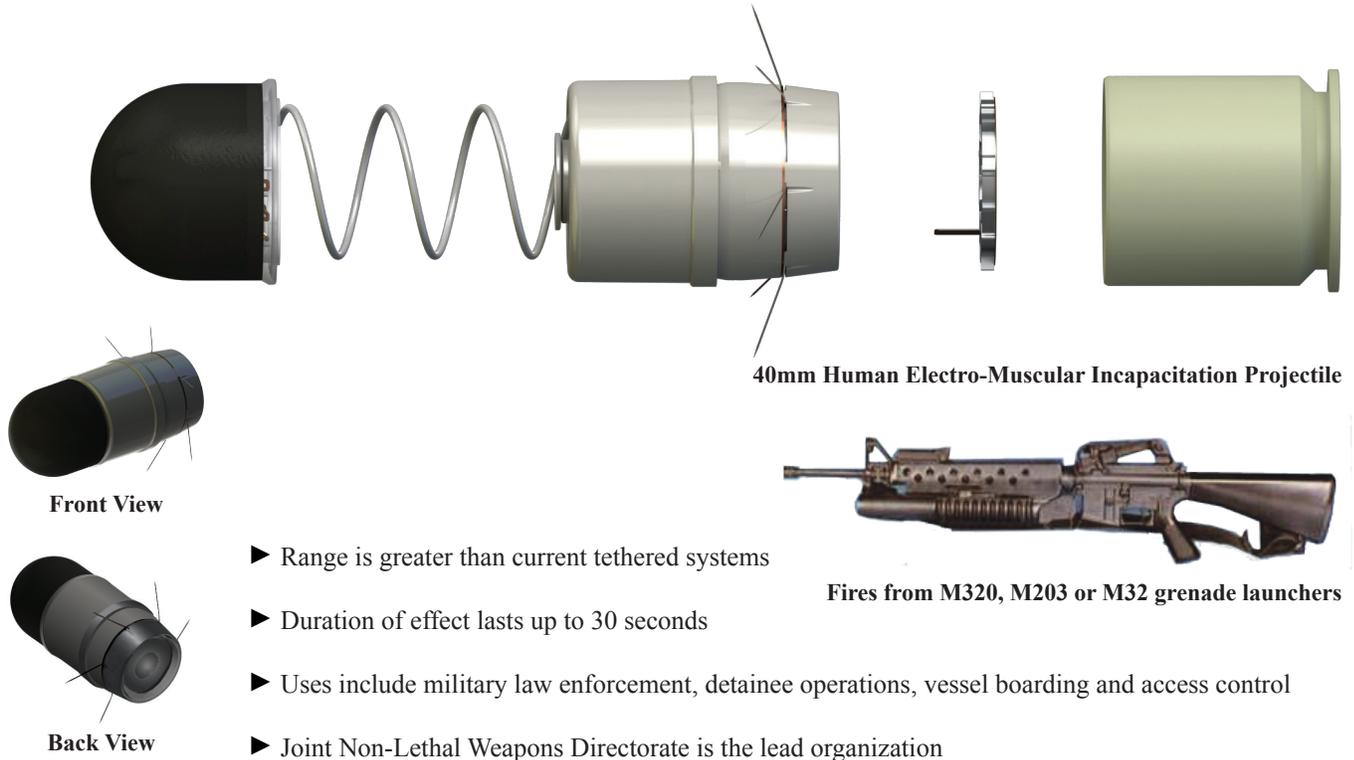
### Counter-Personnel Capabilities

- ▶ Improved Flash Bang Grenade
- ▶ Airburst Non-Lethal Munition
- ▶ Long Range Ocular Interruption
- ▶ Active Denial Technology
- ▶ Improved Acoustic Hailing Device
- ▶ Underwater Engagement
- ▶ MK19 Non-Lethal Munition
- ▶ 40mm Human-Electro-Muscular Incapacitation Projectile
- ▶ Mission Payload Module
- ▶ Non-Lethal Extended Range Marking Munitions
- ▶ Distributed Sound and Light Array

# Emerging Technologies

## 40mm Human Electro-Muscular Incapacitation Projectile

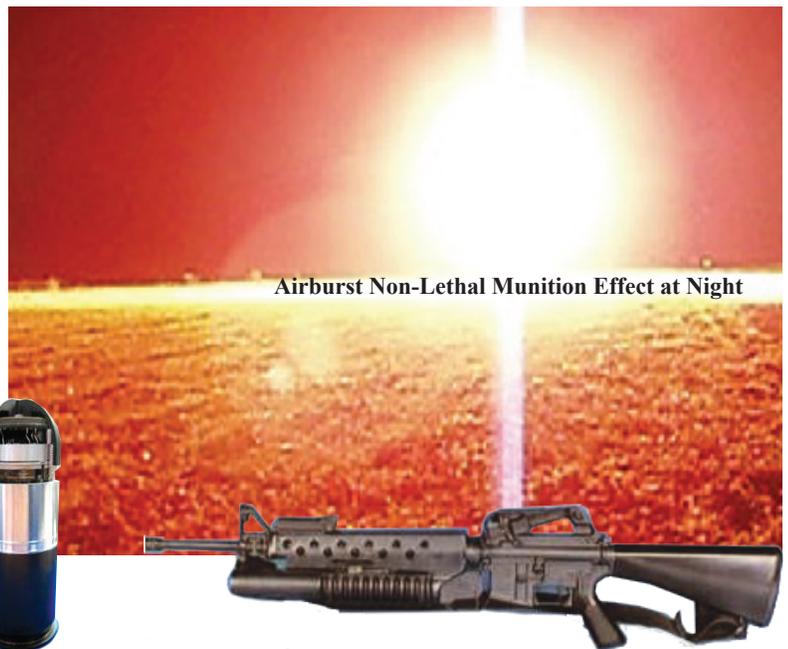
*A 40mm, non-tethered munition that delivers an electro-muscular effect to temporarily disable individuals.*



## Airburst Non-Lethal Munition

*A 40mm, low velocity round that incorporates advanced proximity fuse technology to precisely deliver a multi-sensory, combined light and sound effect by means of a bright flash dazzle, loud bang, pressure blast and heating sensation at extended ranges.*

- ▶ Projectile is designed to significantly increase range well beyond currently fielded systems and to be fully compatible with existing fielded grenade launchers
- ▶ Advanced fusing technology keeps users and non-combatants safer at closer ranges
- ▶ Uses include access control, room clearing and crowd control
- ▶ U.S. Army is the lead Service
- ▶ U.S. Air Force is a supporting Service



# Counter-Personnel



Improved Flash Bang Grenade clears a space

## Improved Flash Bang Grenade

*A safer, more effective, hand-thrown flash-bang grenade with greater light output and duration of flash incapacitation.*

- ▶ Environmental, health and safety compliant payload components
- ▶ Uses include crowd control and room clearing
- ▶ U.S. Special Operations Command is the lead agency
- ▶ U.S. Marine Corps and U.S. Air Force are supporting Services

## Mission Payload Module

*A launching system mounted on a Humvee that creates a combined light and sound effect.*

- ▶ Delivers a high volume of non-lethal munitions
- ▶ Uses include crowd control, area denial, convoy operations and maritime security
- ▶ U.S. Marine Corps is the lead Service
- ▶ U.S. Army and U.S. Navy are supporting Services



## Distributed Sound and Light Array

*Technology demonstrator combines directional high-output sound with bright, white lights and a non-lethal green laser.*

- ▶ High-output sound array conveys specific instructions to target
- ▶ Uses include suppressing drivers of vehicles and vessels
- ▶ Sound and light effects safe for targeted vehicle and vessel occupants



The Distributed Sound and Light Array technology demonstrator and other programs are providing researchers data that will enhance development of future technologies.

# Emerging Technologies

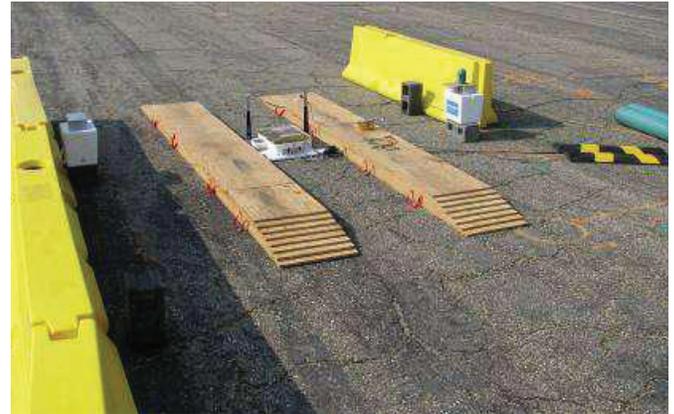
## Pre-emplaced Electric Vehicle Stopper

*A pre-emplaced, non-intrusive device that provides an electrical pulse through deployed contacts to shut down a vehicle's power train electrical circuits or components.*

- ▶ Uses include force protection, access control points, roadblocks and checkpoints to stop vehicles
- ▶ Joint Non-Lethal Weapons Directorate is the lead agency



Tests of the Pre-emplaced Vehicle Stopper help determine the effective parameters for stopping targeted vehicles.



The Pre-emplaced Electric Vehicle Stopper uses high-power radio frequency to disrupt the functioning of a vehicle's engine.

## Vessel-Stopping Entanglement



Vessel before entanglement

*A vessel-stopping propeller, entangling device.*

- ▶ Designed to improve consistent capture of waterborne, propeller-driven craft
- ▶ Uses include harbor security, force protection and vessel pursuit
- ▶ Joint Non-Lethal Weapons Directorate is the lead agency



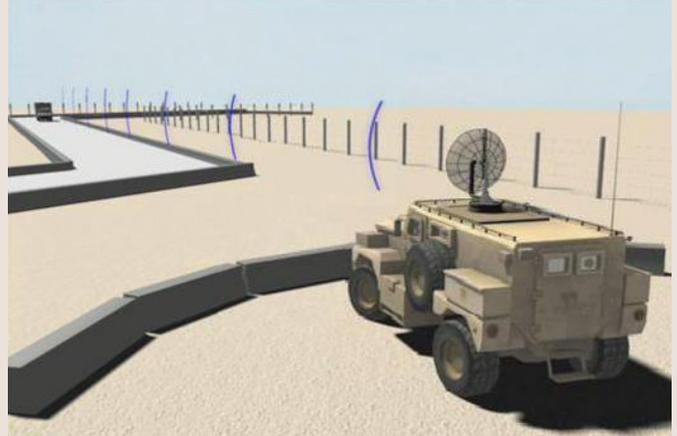
The Vessel-Stopping Entanglement system effectively stops small watercraft by wrapping rope netting around the propellers.

# Counter-Materiel

## Multi-Frequency Radio-Frequency Vehicle Stopper

*A device delivering multiple radio frequencies that interfere with a vehicle's electronics to stop its engine.*

- ▶ A portable system designed to maintain a safe non-lethal keep out zone
- ▶ System design will increase effective vehicle-stopping ranges
- ▶ Uses include force protection, access control points, roadblocks, checkpoints, mounted patrols, convoys and vehicle stopping
- ▶ Joint Non-Lethal Weapons Directorate is the lead agency



Researchers aim to increase the effective stopping range of an oncoming suspect vehicle using multiple radio frequencies.

## Vehicle Lightweight Arresting Device Single Net Solution with Remote Deployment Device

*A pre-emplaced, man-portable net equipped with a barbed spike system and rapid deployment capability.*



Single Net Solution with Remote Deployment Device



The M2 Vehicle Lightweight Arresting Device with Single Net Solution and Remote Deployment Device effectively stops a vehicle by entangling its tire.

- ▶ Three-part system designed to capture larger vehicles than the currently fielded M2 Vehicle Lightweight Arresting Device Nets
- ▶ Single Net Solution's new design captures a vehicle greater than 22,000 pounds traveling at 30 mph within 200 feet
- ▶ Remote Deployed Device is an on-command, electromechanical, spring-loaded system capable of pulling both the Vehicle Lightweight Arresting Device Net and Single Net Solution across a road to capture a wheeled vehicle
- ▶ Uses include checkpoints, entry control points and other restricted areas
- ▶ U.S. Army is the lead Service

# Expanding Outreach



North Atlantic Treaty Organization / Organisation du Traité de l'Atlantique Nord

## NATO / OTAN

*“NATO provides a unique opportunity for member and partner countries to consult and take decisions on security issues at all levels and in a variety of fields to promote stability and guarantee allied defence.”*

— North Atlantic Treaty Organization

### NATO Engagements

For more than a decade, NATO has understood the importance of non-lethal weapons as capabilities that enhance and complement conventional weapons.

NATO continues to take steps to provide its forces with escalation-of-force options for operations around the world. Their progress includes a variety of non-lethal weapon efforts during 2010.



Video conference at NATO HQ with ISAF HQ in Afghanistan. (Official NATO Photo)

### Capabilities-Based Assessment Leading to Solutions

NATO's System Analysis and Studies-078 Task Group, chaired by the Joint Non-Lethal Weapons Director, is conducting a non-lethal weapons capabilities-based assessment. The Task Group will



Headquartered in Brussels, Belgium, NATO is an intergovernmental military alliance that consists of 28 independent member countries, represented above in green.

Albania	Estonia	Latvia	Romania
Belgium	France	Lithuania	Slovakia
Bulgaria	Germany	Luxembourg	Slovenia
Canada	Greece	Netherlands	Spain
Croatia	Hungary	Norway	Turkey
Czech Rep	Iceland	Poland	United Kingdom
Denmark	Italy	Portugal	United States

develop alliance-wide non-lethal weapons requirements, identify capability gaps and assess potential solutions. In February, NATO's two Strategic Commands, Allied Command Operations and Allied Command Transformation, endorsed the Task Group's non-lethal weapons requirement descriptions. This endorsement marks the first time NATO has formally approved non-lethal weapons requirements.

The Task Group also completed a non-lethal weapons capabilities gap analysis. This analysis involved comparing current and programmed non-lethal capabilities against requirements to identify, characterize and prioritize gaps. Work is underway to identify, develop and assess potential materiel and non-materiel solutions to fill these gaps. The Task Group developed a proposed experimentation framework and conducted an experiment at Camp Rena, Norway, to assess the framework, specific technologies and experimentation protocols for non-lethal weapons.

## Operational-Based Initiative

Operations in Afghanistan are driving NATO interest in non-lethal weapons capabilities. A request from the International Security Assistance Force, NATO's command in Afghanistan, resulted in the Defence Against Terrorism-11th initiative on non-lethal capabilities. The initiative is working on plans for an October 2011 technology demonstration in Ottawa, Canada.

Members of the Defence Against Terrorism-11th initiative examined International Security Assistance Force non-lethal weapons needs, developed a catalog of available non-lethal technologies and supported specific technology assessments, including a March 2010 Blunt Impact Trauma Workshop held in Belgium. Detailed planning is now underway for the technology demonstration, which will be held in conjunction with the Department of Defense Non-Lethal Weapons Program Joint Integration Program meeting. The demonstration will bring together multinational representatives from the operational, procurement and system development communities. This demonstration will provide an opportunity to address International Security Assistance Force emerging concepts and needs, as well as a venue for industry to showcase available non-lethal weapons technologies.

## Symposium Advances Non-Lethal Weapon



(Official USMC Photo)



(Official Canadian Forces Photo)

Co-Chairmen of the North American Technology Demonstration: Colonel Tracy J. Tafolla, U.S. DoD Joint Non-Lethal Weapons Director and Colonel Robert A. Elvish, National Defence and Canadian Forces Armaments Sustainment Program Management Director.

The Analytical Support to Defense Transformation Symposium, held April 2010 in Bulgaria, included a presentation from the Joint Non-Lethal Weapons Directorate.

The symposium brought together experts from numerous allied and partner nations to address major changes in the security environment, emerging

adversary concepts and capabilities and implications and opportunities for NATO. Symposium participants included military representatives, defense analysts, strategic planners, force developers and academics who shared information and discussed ideas to pursue transformation in planning, acquisition, concept development, experimentation and operations.

During the Joint Non-Lethal Weapons Directorate presentation, Directorate representatives addressed transformation issues using insights from non-lethal weapons work done over the past decade. The presenters began with a brief overview of non-lethal weapons, including non-lethal weapon contributions in recent and ongoing operations. They concluded the presentation by discussing several analytical approaches used in past and current non-lethal weapon efforts, highlighting transformation insights and opportunities.

## International Impact



NATO Army Armaments Group Topical Group 3 met in January at NATO Headquarters, Brussels, Belgium.

(Unattributed NATO Photo)

More than 25 member nations enable the NATO Army Armaments Group, Topical Group 3 to have the broadest reach of the NATO non-lethal weapons organizations. With a mission to improve NATO's non-lethal capabilities, Topical Group 3 is the forum for exchange of information, standardization of non-lethal materiel and promotion of multilateral and bilateral cooperation. The Group also coordinates all activities related to non-lethal capabilities in the NATO Army Armaments Group and is responsible for non-lethal capabilities across all military operations and operating environments. One immediate result of their efforts was the creation of the NATO Non-Lethal Capabilities Catalogue and Database, which includes more than 200 searchable, easy-to-understand entries from 13 nations and the NATO Underwater Research Center.

# Expanding Outreach

## Industry Engagements



Attendees interact with exhibitors at Eurosatory 2010.  
(Eurosatory 2010 Photo)

*The Department of Defense Non-Lethal Weapons Program increased its engagement with industry during 2010. These engagements provided opportunities to inform industries of the DoD's non-lethal requirements, as well as to learn about defense industry trends and developments. The primary goal of these endeavors was to expedite the procurement and development of highly functional capabilities that meet the needs of our warfighters.*

Throughout the year, Joint Non-Lethal Weapons Program personnel met with foreign and domestic non-lethal capability manufacturers. These visits included exhibitions, presentations and demonstrations, which provided valuable information about currently produced non-lethal capabilities. In addition, manufacturers gained a clearer understanding of the military's non-lethal requirements.

Joint Non-Lethal Weapons Program personnel along with contractors, suppliers, experts and customers from 53 countries attended the Eurosatory exhibition in June at the Villepinte Exhibition Centre

in Paris. Eurosatory, the world's premiere defense exhibition, featured more than 1,300 exhibitors, providing an opportunity for the Directorate to interact with many foreign and U.S. non-lethal capability providers. In addition to connecting with current industry partners, the exhibition enabled networking opportunities with numerous foreign industries and governments. These valuable exchanges enhanced understanding of new and emerging foreign technologies. A NATO-led North American Technology Demonstration, a multi-national, invitation-only event is scheduled for Oct. 25-27, 2011 in Ottawa, Canada.

## Joint Integration Program

The Joint Integration Program provides a joint-Service approach to improving the Service's Non-Lethal Capability Sets and fielded non-lethal weapons capabilities. The program offers the Services an opportunity to exchange lessons learned regarding the use of these non-lethal capabilities in both training and operational environments. The Joint Integration Program conducts semi-annual meetings, one of which includes demonstrations of vendor items that are candidates for fielding or inclusion in Non-Lethal Capability Sets.

The Joint Integration Program hosted an Advanced Planning Brief to Industry, Nov. 2-3, in Las Vegas, Nev. The first day of the event included an exhibition by approximately 80 vendors featuring a wide variety of non-lethal weapons capabilities and related training equipment. The Joint Non-Lethal Weapons Directorate and the military Services provided briefings to industry on emerging non-lethal weapons requirements. The second day of the event included demonstrations by selected companies for government personnel at nearby Nellis Air Force Base.



Lieutenant Colonel Jeffrey P. Bevington, U.S. Army (left), a requirements officer with the Joint Non-Lethal Weapons Directorate Capabilities and Requirements Division, served as a Range Safety Officer and helped supervise the Joint Integration Program demonstrations held at Nellis Air Force Base, Nev. (DoD Photo by Alicia J. Owsiak)

Industry representatives interested in interfacing with the DoD Non-Lethal Weapons Program may contact:

**Joint Non-Lethal Weapons Directorate**  
**Attn: Frank Hubbard, JIP Program Manager**  
**3097 Range Road**  
**Quantico, VA 22134-5100**  
**Phone: 001-1-703-784-2951**  
**E-mail: [james.f.hubbard@usmc.mil](mailto:james.f.hubbard@usmc.mil)**

## INDUSTRY ENGAGEMENTS AT A GLANCE

- ▶ Marine Day Event
- ▶ National Defense Industrial Association, Joint Armaments Conference, Exhibition & Firing Demo
- ▶ Alternative Weapons Summit
- ▶ Special Operations Forces Industry Conference
- ▶ National Small Arms Center & Consortium
- ▶ National Guard Association of the United States Conference & Exhibition
- ▶ Military Vehicles Exhibition & Conference
- ▶ 24th Small Arms & Cannons Symposium
- ▶ Modern Day Marine Military Exhibition
- ▶ Office of Naval Research Naval Science & Technology Partnership Conference
- ▶ Ground Vehicle Systems Engineering & Technology Symposium
- ▶ Battelle Exchange
- ▶ American Rheinmetall Meeting
- ▶ Mock Prison Riots
- ▶ POLICE-TREXPO East Exhibition
- ▶ Combined Tactical Systems Demonstration Day
- ▶ Association of the United States Army Annual Meeting & Exhibition
- ▶ African Aerospace Defence Exhibition
- ▶ Irregular Warfare Conference
- ▶ Eurosatory Exhibition
- ▶ Joint Integration Program Meeting & Industry Day

# Expanding Outreach

## Informing International & National Leaders

### Key Leader Engagements



Senator Ted Kaufman (D-Del) receives a briefing about the Distributed Sound & Light Array from Colonel Tracy J. Tafolla.



First-hand experience: Senator Ted Kaufman volunteered to experience the Distributed Sound and Light Array.

During the past year, the Department of Defense Non-Lethal Weapons Program provided information and demonstrations to a variety of audiences, including the news media, the public, U.S. and foreign militaries and government leadership.

Through participation in various events, the DoD Non-Lethal Weapons Program provided clear and accurate information on non-lethal weapons and how they can support U.S. military operations. Such information gave audiences a better understanding of non-lethal weapons' potential uses; addressed misconceptions about these devices; and helped obtain support of the DoD Non-Lethal Weapons Program's efforts.

### Congressional Interest

Joint Non-Lethal Weapons Directorate staff briefed Senator Edward E. "Ted" Kaufman (D-Del) on Capitol Hill in May, at his request following a visit to Afghanistan. Senator Kaufman's interest in learning more about non-lethal weapons led to more extensive briefings and capability demonstrations at the Naval Surface Warfare Center Dahlgren, Va. in June. Hosted by the Dahlgren Directed Energy Warfare Office, Senator Kaufman received briefings from Directorate

project leaders on current and developing munitions, devices and technologies. Field demonstrations included the Distributed Sound and Light Array, Pre-emplaced Vehicle Stopper and the Multi-Frequency Radio-Frequency Vehicle Stopper.

Senator Kaufman noted the importance of giving troops in the field the right tools to make the right decisions. Non-lethal weapons have an important role in the current operational environment, said Kaufman, adding that it's an environment he believes U.S. armed forces will face over the next several years.

### U.S. Central Command

General David H. Petraeus received a non-lethal weapons briefing from the Joint Non-Lethal Weapons Directorate staff in May as Commander, U.S. Central Command. The briefing focused on non-lethal current and future capabilities.



General David H. Petraeus, former Commander CENTCOM, and current Commander of ISAF and USFOR-A

## Colombian Marine Corps

Brigadier General Luis Gomez Vasquez, Commandant of the Colombian Marine Corps, and his staff visited the Joint Non-Lethal Weapons Directorate in June to learn about the DoD Non-Lethal Weapons Program. The visit was part of the U.S. Marine Corps' Cooperative Visit Program, which seeks to build on the relationships between the U.S. Marine Corps and its equivalents in foreign nations. The briefing gave the officials insights into the important functions non-lethal weapons have in our military efforts.



Brigadier General Luis Gomez Vasquez, Commandant of the Colombian Marine Corps

## Deputy Chief of Staff, HQ ISAF Joint Command Briefed



Major General David C. Garza, Deputy Chief of Staff for Joint Operations, HQ ISAF Joint Command

Major General David C. Garza, Deputy Chief of Staff for Joint Operations in Afghanistan, received a briefing on non-lethal weapons at the Joint Non-Lethal Weapons Directorate offices in July. Major General Garza was most recently Chief of Staff for U.S. Southern Command, based in Miami. The presentation informed Major General

Garza about the DoD Non-Lethal Weapons Program and the valuable role that non-lethal weapons can play in the U.S.'s mission in Afghanistan by reducing civilian casualties and damage to infrastructure.

## Joint Non-Lethal Weapons Directorate Visits Afghanistan

Joint Non-Lethal Weapons Directorate staff members traveled to Afghanistan in June to brief senior leadership of the International Security Assistance Force (ISAF) and U.S. Forces Afghanistan on non-lethal weapons and capabilities. Joint Non-Lethal Weapons Directorate staff also addressed future initiatives to include non-lethal weapons training and strategic communication.

## Fleet Week New York 2010

Members of the Department of Defense Non-Lethal Weapons Program participated in Fleet Week New York, providing both the military and general public information about non-lethal weapons. Thousands of attendees visited the display of some of the currently fielded non-lethal weapons, including optical distracters, blunt impact munitions, combined effects munitions, riot control agents and vehicle-stopping devices. Joint Non-Lethal Weapons Directorate staff also engaged key leadership within New York City's law enforcement, United Nations and U.S. military.



Fleet Week attendees learn about non-lethal weapons, devices and munitions from Joint Non-Lethal Weapons Directorate staff.

***The Department of Defense Non-Lethal Weapons Program provides our operating forces escalation-of-force options, minimizing casualties and collateral damage.***



## **NON-LETHAL WEAPONS FOR TODAY'S OPERATIONS**

**DEPARTMENT OF DEFENSE NON-LETHAL WEAPONS PROGRAM**

**[HTTPS://WWW.JNLWP.USMC.MIL](https://www.jnlwp.usmc.mil)**

