Non-Lethal Defense "VI" Symposium

“Non-Lethal Weapon Options in the Global Fight Against Terrorism”

Reston, VA

14-16 March 2005

Table of Contents

Monday, 14 March 2005

Welcome, by Colonel John Alexander, USA (Ret)

Current and Desired Capabilities Forum

- Army Non-Lethal Requirements, Brigadier General Coker, USA, TRADOC
- Successful Non-Lethal Illegal Alien Interdiction Case, Rear Admiral Kunkle, USCG, Non Lethal IPT Member

Luncheon Keynote Speaker, by Lieutenant General Jan Huly, USMC, Deputy Commandant for Plans, Policies and Operations

Tuesday, 15 March 2005

Non-Lethal Acceptability Challenges: Standards, Human Effects, Testing, and Training Forum

- Lieutenant Colonel Mark Wrobel, USAF JNLWD
- Mr. Larry Bickford, US Army Aberdeen Proving Ground

Speaker: Behavioral and Medical Outcomes of Nonlethal Weapons Use, Commander Charles "Sid" Heal, Los Angeles County Sheriff's Office

Speaker: A Course of Instruction at the Military War Colleges, Lieutenant Colonel Ron Madrid, USAMS (Ret), Marine Corps Research University, Penn State University

Non-Lethal Academic Initiatives Forum

- Non-Lethal Weapons - Academic Initiatives at Penn State, Lieutenant Colonel Ed Hughes, USA (Ret), Penn State University
- Non-lethal Technology Innovation Center (NTIC) University of New Hampshire, Dr. Glen Schwery, University of New Hampshire

The View from Overseas Forum - Various Topics

- Dr. Martin Hubbard, United Kingdom
- Dr. Marten Risling, Sweden
- Mr. Frederico Aguiar, Brazil

Wednesday, 16 March 2005

Homeland Security/Homeland Defense Forum:

- Less-Lethal Program, Mr. Joe Ceconi, Department of Justice
Non-Lethal Defense VI
Non-Lethal Weapon Options in the Global Fight Against Terrorism

REVISED AGENDA

Hyatt Regency Reston
Reston, Virginia

March 14-16, 2005

Sponsored by NDIA and The Joint Non-Lethal Weapons Directorate
Co-Hosted by:

The National Institute of Justice
Department of the Army
Department of the Navy

Department of the Air Force
Oak Ridge National Laboratory
Sandia National Laboratory
Theme: Non-Lethal Weapon Options in the Global Fight Against Terrorism

Monday, March 14, 2005

7:00 a.m. Continental Breakfast and Registration

8:00 a.m. Welcome
Colonel John Alexander, USA (Ret)

8:30 a.m. Speaker: Master Sergeant (P) Jonathan Godwin, USA

9:15 a.m. Break

9:30 a.m. JNLWP Overview
Colonel Dave Karcher, JNLWD

10:00 a.m Current and Desired Capabilities Forum
Major General Lott, USMC, Deputy MCCDC
Brigadier General Coker, USA, TRADOC
Rear Admiral Kunkle, USCG, Non-Lethal IPT Member
Captain Bruns, USN, USSOCOM
Moderator: Colonel Koster, USA, Project Manager for Close Combat Systems

12:15 p.m. Informal Luncheon

1:45 p.m. Keynote Speaker:
Lieutenant General Jan Huly, USMC, Deputy Commandant for Plans, Policies and Operations

2:30 p.m. Break

2:45 p.m. “From the Front,” Current Operations Forum
Colonel GI Wilson, USMC
Master Sergeant (P) Jonathan Godwin, USA

5:30 p.m. Reception in Display Room

6:00 p.m. - Dinner
8:00 p.m. Speaker: Mr. Terry Pudas, Director, Office of Force Transformation
Tuesday, March 15, 2005

7:00 a.m. Continental Breakfast
8:00 a.m. **Keynote Speaker:** Ms. Sue Payton, Deputy DDR&E
9:00 a.m. Break
9:15 a.m. **Non-Lethal Acceptability Challenges: Standards, Human Effects, Testing, and Training Forum**
   Lieutenant Colonel Mark Wrobel, USAF, JNLWD
   Dr. Mary Williams, JNLWD
   Lieutenant Colonel Jonathan Drummond, USAF, AFRL
   Dr. John Kenny, Penn State University
   Mr. Larry Bickford, US Army Aberdeen Proving Ground
   **Moderator:** Ms. Susan Levine, JNLWD
11:00 a.m. Break
11:15 a.m. **Speaker:** Commander Charles “Sid” Heal, Los Angeles County Sheriff’s Office
12:00 p.m. Luncheon
1:30 p.m. **Speaker:** Lieutenant Colonel Ron Madrid, USMC (Ret), Marine Corps Research University, Penn State
2:15 p.m. **Non-Lethal Academic Initiatives Forum - Panel Discussion**
   Mr. David Koplow, Georgetown University Law School
   Lieutenant Colonel Ed Hughes, USA (Ret), Penn State University
   Dr. Glen Schwery, University of New Hampshire
3:30 p.m. Break
3:45 p.m. **The View From Overseas Forum Various Topics - Panel Discussion**
   Dr. Martin Hubbard, United Kingdom
   Mr. Pascal Paulissen, Netherlands
   Dr. Marten Risling, Sweden
   Mr. Frederico Aguiar, Brazil
5:00 p.m. Adjourn

Wednesday, March 16, 2005

7:00 a.m. Continental Breakfast
8:00 a.m. **Homeland Security/Homeland Defense Forum**
   Mr. John Blair, M2 Technologies
   Mr. Joe Cecconi, DOJ
   Lieutenant Colonel Jim Duncan, USMC, Office of the Judge Advocate General Code 10, International and Operational Law Division
9:45 a.m. Break
10:00 a.m. **Speaker:** Mr. Thomas Kuster, Deputy Assistant Secretary of Defense for Homeland Defense
11:00 a.m. **Closing Remarks**
   Colonel John Alexander, USA (Ret)
11:15 a.m. Adjourn
National Defense Industrial Association (NDIA)
Non-Lethal Defense “VI” SYMPOSIUM FRAMEWORK

Theme: Non-Lethal Weapon Options in the Global Fight Against Terrorism

Monday, March 14, 2005

7:00 a.m. Continental Breakfast and Registration

8:00 a.m. **Welcome**
Colonel John Alexander, USA (Ret)

8:20 a.m. **Speaker:** Sergeant Major Jonathan Godwin, USA

9:00 a.m. Break

9:15 a.m. **JL WP Overview**
Colonel Dave Karcher, JNWP

10:00 a.m **Current and Desired Capabilities Forum**
Major General Lott, USMC, Deputy MCCDC
Brigadier General Coker, USA, TRADOC
Rear Admiral Kunkle, USCG, Non-Lethal IPT Member
Colonel Koster, USA, US Army Non-Lethal Weapon Acquisition Manager

12:00 p.m. Displays Manned

12:15 p.m. Informal Luncheon

1:45 p.m. **Keynote Speaker:**
Lieutenant General Jan Huly, USMC, Deputy Commandant for Plans, Policies and Operations

2:30 p.m. Break

2:45 p.m. **“From the Front,” Current Operations Forum**
Colonel GI Wilson, USA
Sergeant Major Godwin, USA
INIWIC Instructor

5:30 p.m. Reception in Display Room

6:00 p.m. **Dinner**

8:00 p.m. **Speaker:** Mr. Terry Pudas, Office of Force Transformation (Invited)
Tuesday, March 15, 2005

7:00 a.m. Continental Breakfast

8:00 a.m **Keynote Speaker:** Ms. Sue Payton, Deputy DDR&E

9:00 a.m. Break

9:15 a.m. **Non-Lethal Acceptability Challenges: Standards, Human Effects, Testing, and Training Forum**
Lieutenant Colonel Mark Wrobel, USAF, JNLWD
Captain Joe Rockemann, USMC, INIWIC
Lieutenant Colonel Jonathan Drummond, USAF, AFRL
Dr. John Kenny, Penn State University

11:00 a.m. Break

11:15 a.m. **Speaker:** Commander Charles “Sid” Heal, Los Angeles County Sheriff’s Office

12:00 p.m. Luncheon

1:30 p.m. **Non-Lethal Acceptability Challenges: Legal, ROE, and Public Affairs Forum**
Ms. Susan Levine
Mr. Blasé Levin, KSU

3:15 p.m. Break

3:30 p.m. **The View From Overseas Forum Various Topics**
Panel:
Dr. Martin Hubbard, United Kingdom
Mr. Pascal Paulissen, Netherlands
Dr. Marten Risling, Sweden
Mr. Frederico Aguiar, Brazil

5:00 p.m. Adjourn

Wednesday, March 16, 2005

7:00 a.m. Continental Breakfast

8:00 a.m. **Non-Lethal Academic Initiatives Forum**
Presentations/Panel Discussion; Moderator –
Mr. David Koplow, Georgetown Law School
Mr. Ed Hughes, Penn State University
Dr. Glenn Shwaery, University of New Hampshire

9:30 a.m. Break

9:45 a.m. **Homeland Security/Homeland Defense Forum**
Mr. John Blair, M2 Technologies
Mr. Joe Cecconi, DOJ

11:30 a.m. Closing Remarks

11:45 a.m. Adjourn
**Non-Lethal Defense VI Symposium**

**Call for Displays**

**Display**
Increase your company’s or organization’s exposure at the premier Non-Lethal Defense VI Symposium by participating in this displaying opportunity. **Displaying ($1,000)** will provide you the opportunity to exhibit your company products in a designated display ballroom of the Hyatt Regency where receptions, breakfast and coffee breaks will take place. Displays must conform to the guidelines set forth below. Additionally, your company’s name will be included in the on-site brochure. For more information, please contact Simone Baldwin at (703) 247-2596 or via e-mail at sbaldwin@ndia.org.

**Display Selection Ground Rules**

1. All written applications must be received by 2 PM, Monday, March 7, 2005.
2. If more than ten applications are received, a lottery will be conducted to determine the ten (10) sponsors for this year’s Non-Lethal VI Symposium.
3. Sponsors will be notified by e-mail no later than March 8, 2005.
4. Those applicants who were not drawn will be notified and will be kept on a waiting list should a winning sponsor withdraw.
5. No one company will be allowed more than one sponsorship, except in the case where less than ten (10) companies respond by 2 PM, Monday, March 7, 2005.

**Display Guidelines**

All displays must be of the simple table-top/pop-up style standards. Space per display shall be 8' X 2 1/2'. Minimal hardware is to be utilized (computer systems for demonstration purposes are OK). No formal decorating company is involved. Companies should bring their own pop-up display panels and plan to do their own set-up. Standard 2.5 X 8ft. draped folding table and two chairs will be provided with each display space. **Standard power outlet is available upon request.** No other props or set-ups (pipe & drape, plants, etc.) are being utilized. Displays are to be set up by 12:00pm on Monday, March 14, 2005 and should remain in place until after the morning break on Wednesday, March 16, 2005. The cost for the opportunity to display is, $1,000.00.

Displays will be available to attendees during the Monday evening reception, all breakfast and noon meals, and during all coffee breaks.

**Hotel Information**

A block of rooms has been reserved at The Hyatt Regency Reston, 1800 Presidents Street., Reston, VA 20190. Call 703-709-1234 to make reservations. The room rates are $189 single for industry attendees and prevailing government per diem rate for government attendees. The per diem rate is available ONLY to active duty military or civilian government employees. Identification will be required at check-in; a retired military ID is NOT acceptable. Reservations must be made on or before **Friday, February 25, 2005**. Rooms may be sold out before **Friday, February 25, 2005**. After that date, reservations will be accepted on a space available basis. Attendees are responsible for making their own hotel reservations. **Be sure to mention that you are with the Non-Lethal Defense VI Group in order to receive the group rate.**
Non-Lethal Defense VI Symposium
“Non-Lethal Weapon Options in the Global Fight Against Terrorism”
Event # 5420 Registration for Displays

Name ________________________________________________________________
Title _________________________________________________________________________
Company Name ___________________________________________________________________
Division/Dept. __________________________________________________________________
Address _______________________________________________________________________
City/State/Zip ___________________________________________________________________
Phone ______________________ Fax ___________________ E-mail ___________________________

Display/Exhibits Requirements:
All displays must be of the simple table-top/pop-up style standards. Space per display shall not exceed 8 ft. wide by 2.5 ft. deep. Minimal hardware to be utilized (computer systems for demonstrations are OK). No formal decorating company is involved. Companies must bring their own displays and plan to do their own set-up. Standard 2.5 x 8 ft. draped folding tables and chair will be provided for each display space. No other props or setups (pipe & drape, plants, etc.) will be utilized.

Display Hours:
Displays are to be set-up by 12:00 PM on Monday, March 14, 2005 and should remain in place until after the morning break on Wednesday, March 16, 2005. Displays must be removed by 4:00 PM on Wednesday, March 16, 2005.

Cost: Displays includes one complimentary registration and electrical hook-up: $1,000.00

Display Rules & Regulations
1. If NDIA should be prevented from holding the conference for any reason beyond NDIA’s control (such as, but not limited to, damage to the building, riots, strikes, acts of government, or acts of God) or if a displayer cannot occupy the assigned display space due to reasons beyond NDIA’s control, then NDIA has the right to cancel the conference or any part thereof, with no further liability to the displayer other than a refund of display space fee, less a proportionate share of the conference cost incurred.
2. Neither the management of the host facility nor NDIA shall be liable for the damages, loss or destruction to the displays by reason of fire, theft, accident or other destructive causes. Displayers shall lease space at his sole risk. Neither the management of the host facility, NDIA nor any of their agents, servants or employees will be accountable or liable for accidents to displayers, their agents or employees.
3. The displayer shall be liable to the host facility and/or NDIA for any damage to the building and/or the furniture and fixtures contained therein which shall occur through acts or omissions of the displayer.
4. Displayer assumes the entire responsibility and hereby agrees to protect, indemnify, defend and hold harmless NDIA, the host facility, their officers, employees, and agents against all claims, losses and damages to persons and property, governmental charges or fines, and attorney’s fees arising out of or caused by displayers installation, removal, maintenance, occupancy or use of the display premises or any part thereof, including any outside display areas.
5. Displayer acknowledges that NDIA does not maintain and is not responsible for obtaining insurance covering displayer’s property. Displayers are advised to obtain business interruption and property damage and loss insurance to cover such occurrences.

Send this form with payment for display to:
Simone L. Baldwin, National Defense Industrial Association, 2111 Wilson Boulevard, Suite 400
Arlington, VA 22201-3061, Phone: (703) 247-2596, Fax: (703) 522-1885, E-mail: sbaldwin@ndia.org
Deadline for sign-up is March 7, 2005, (make checks payable to NDIA - Event # 5420)

☐ Check (payable to NDIA - Event # 5420)
☐ Visa ☐ Diner’s Club ☐ Mastercard ☐ Amex

Credit Card # __________________________ Exp. Date __________

Authorized Signature __________________________________________
Conference Registration:
Payment must be made at the time of registration. Please complete the attached form and mail your fee, payable to: The National Defense Industrial Association (NDIA), Event #5420, 2111 Wilson Boulevard, Suite 400, Arlington, VA 22201-3061. Faxed registrations are also acceptable. Please include your credit card number (Diners Club, Visa, MasterCard, American Express), name, card expiration date, and signature on the registration form and fax to NDIA at (703) 522-4656. Registration may not be done over the phone or via email.

The registration fees for The Technical Information Division Symposium are as follows:

**Regular Registration Fees:**

| Industry NDIA Member | $650 |
| Industry Non-Member** | $700 |
| Gov't/Allied Govt/Academia | $500 |

**The Non-Member fees include a one-year individual membership to NDIA.**

The conference fee includes attendance at all sessions, coffee breaks, Friday's lunch, and administrative costs. The Government/Allied Govt/Academia Fees apply Only to Active Military and Civil Service personnel with government identification cards and employees of academic institutions.

Register for this conference at [http://register.ndia.org/interview/register.ndia?-brochure-5420](http://register.ndia.org/interview/register.ndia?-brochure-5420). You will receive an e-mailed confirmation after you use the CONFIRM button on the web page. You can also put yourself on a mailing list for future brochures at the same site. When registering on-line, please review your information and then "submit" and "confirm" your entry. On-line registration will end at close of business, eastern standard time, on Wednesday, March 9, 2005. Please register on-site after that date.

Cancellation Policy and Refunds:
Registrants who cannot attend the conference must provide written notification of cancellation to Simone Baldwin, sbaldwin@ndia.org. A $150 cancellation fee will be applied to cancellations received on/before March 2, 2005. Beginning March 3, 2005, no refunds will be given for any cancellations. Refunds of any kind will be processed AFTER the conclusion of the conference. Substitutions are welcomed and must be submitted in writing via email to Simone Baldwin, sbaldwin@ndia.org, by 5pm EST on Wednesday, March 9, 2005. Badges are non-transferable. This refund policy applies to all attendees regardless of their method of registration or reason for cancellation.

Forms of Payment:
NDIA accepts Diners Club, MasterCard, Visa, American Express, Traveler's Checks, Cash, and Government Purchase Orders (DD1556 only). NDIA does not accept purchase orders from non-government entities, and they will not be invoiced for payment. Your credit card will be billed when received. NDIA does not issue refunds for the sole purpose of switching forms of payment; please be sure you are registering with the correct form of payment. A fee may be applied to those wishing to switch forms of payment.

Foreign Payment:
Registration fees may be paid by credit card, U.S. Government Purchase Orders/1556, Check, or Electronic Transfer, checks must be drawn on U.S. banks in U.S. ($) dollars. NDIA does not accept purchase orders from foreign governments and will not invoice them for payment. If paying by electronic transfer, the total amount received by NDIA must be calculated as follows: ($Registration Fee + any incurred Bank, wiring, and/or Conversion fees). Please include the name of the attendee and event# in the bank transfer information.

Attendance Roster:
An attendance roster will be distributed at the conference. Your registration form and payment must be received by: March 9, 2005 to be included in the roster. An updated roster will NOT be printed after the conference.

Hotel Information:
A block of rooms has been reserved at The Hyatt Regency Reston, 1800 Presidents Street., Reston, VA 20190. Call 703-709-1234 to make reservations. The room rates are $189 single for industry attendees and $169 single for government attendees. The per diem rate is available ONLY to active duty military or civilian government employees. Identification will be required at check-in; a retired military ID is NOT acceptable. Reservations must be made on or before Friday, February 25, 2005. Rooms may be sold out before Friday, February 25, 2005. After that date, reservations will be accepted on a space available basis. Attendees are responsible for making their own hotel reservations. Be sure to mention that you are with the Non-Lethal Defense VI Group in order to receive the group rate.

Attire:
Appropriate dress for the conference is business or equivalent military duty uniform.

National Defense Magazine:
Advertise in National Defense and increase your company's exposure at this conference! National Defense will be distributed to the attendees of this conference and all of NDIA's other conferences. For more information, contact Dino Pignotti at phone (703) 247-2541; fax (703) 522-4602, email dpignotti@ndia.org.

[www.defensejobs.com](http://www.defensejobs.com)
The Defense Industry's leading employment website; find a job, post a job listing, post a resume, and search resumes. For more information please contact info@defensejobs.com or (703) 247-9461. Please visit [www.defensejobs.com](http://www.defensejobs.com)

Inquiries:
For questions regarding attendee participation at this conference, contact Simone L. Baldwin at (703) 247-2596 or via e-mail, sbaldwin@ndia.org.

NDIA supports the American's with Disabilities Act of 1990:
Attendees with special needs (to include special dietary needs) should call (703) 522-1820 prior to March 9, 2005.
Payment Options
- Check (payable to NDIA)
- Cash
- Government PO/Training Form #
- VISA
- MasterCard
- American Express
- Diners Club

If paying by credit card, you may return by fax to (703) 522-4656.

Credit Card Number

Exp. Date

Signature

Questions?
Contact: Ms. Simone L. Baldwin, Meeting Planner
(703) 247-2596 email: sbaldwin@ndia.org

Mail to:
NDIA, Event #5420
2111 Wilson Boulevard, Suite 400
Arlington, VA 22201

Fax to:
(703) 522-4656
Non-Lethal Defense VI
Event #5420
March 14-16, 2005
Hyatt Regency Reston
Reston, Virginia
NON-LETHAL WEAPONS:
NO ROAD TO HELL

John B. Alexander, Ph.D.
Senior Fellow
Joint Special Operations University

NON-LETHAL DEFENSE VI
Reston, Virginia
14 March 2005

FUTURE WAR:
NLW in 21st Century Warfare
St. Martin’s Press, 1999

WINNING THE WAR
St. Martin’s Press
July 2003

Contact: Email: Nonlethal2@aol.com, (702) 804-5575
SEVEN DEADLY SINS OF NON-LETHAL WEAPONS

- NLWs make it easier to initiate war
- NLWs will start a new arms race
- NLWs may be used as instruments of torture
- NLWs will result in some deaths and serious injuries
- NLWs used as a precursor and easier to kill opponents
- NLWs will be used to suppress lawful dissent
- NLWs do not have sufficient data to support their use
SEVEN DEADLY SINS OF NON-LETHAL WEAPONS

- **NLWs make it easier to initiate war**
- NLWs will start a new arms race
- NLWs may be used as instruments of torture
- NLWs will result in some deaths and serious injuries
- NLWs used as a precursor and easier to kill opponents
- NLWs will be used to suppress lawful dissent
- NLWs do not have sufficient data to support their use
A DECADE OF CONFLICT

AFGHANISTAN
SEVEN DEADLY SINS OF NON-LETHAL WEAPONS

- NLWs make it easier to initiate war
- NLWs will start a new arms race
- NLWs may be used as instruments of torture
- NLWs will result in some deaths and serious injuries
- NLWs used as a precursor and easier to kill opponents
- NLWs will be used to suppress lawful dissent
- NLWs do not have sufficient data to support their use
WHAT NEW ARMS RACE???

WORLD NLW $50M/Yr

$9B

$4B ea/ $22B Life Cycle

WAR $5B/Mo

$250M ea

10 Tanks = all NLWs

Non-Lethal Weapons are 0.012% of US DOD Budget
SEVEN DEADLY SINS OF NON-LETHAL WEAPONS

- NLWs make it easier to initiate war
- NLWs will start a new arms race
- *NLWs may be used as instruments of torture*
- NLWs will result in some deaths and serious injuries
- NLWs used as a precursor and easier to kill opponents
- NLWs will be used to suppress lawful dissent
- NLWs do not have sufficient data to support their use
NLWS AND TORTURE

Monk with torture devices used by Chinese

Victoria with instruments of torture

TORTURE IS AN ISSUE OF HUMAN INTENT- NOT DEVICES
Maximum pain is aim of new US weapon
19:00 02 March 2005
Exclusive from New Scientist Print Edition
David Hambling

“It could be used for torture…” John Wood, University College London

“I am deeply concerned about the ethical aspects…” Andrew Rice

“Pain researchers are furious…” David Hambling
SEVEN DEADLY SINS OF NON-LETHAL WEAPONS

- NLWs make it easier to initiate war
- NLWs will start a new arms race
- NLWs may be used as instruments of torture
- **NLWs will result in some deaths and serious injuries**
- NLWs used as a precursor and easier to kill opponents
- NLWs will be used to suppress lawful dissent
- NLWs do not have sufficient data to support their use
NLW DEATHS AND INJURIES

More than 110 deaths of children under 6

17 deaths with 125,000 rounds fired
Probability of fatality 0.00014

Compared to what????

THE ISSUE IS TRAINING AND SUPERVISION
10mm Black Talon
TASER AS TARGET

- 94 DEATHS FROM TASER??
- ONLY 6 AUTOPSIES FIND TASER A CONTRIBUTING FACTOR
- NO INDEPENDENT RESEARCH - WHAT ABOUT THE AUTOPSIES
- HOW MANY IN-CUSTODY DEATHS WITHOUT TASER?
- WHAT IS THE TIMING OF NEWS ARTICLES?
- INDUSTRIAL ESPIONAGE/SABOTAGE
- NO NEWS STORY EVER DIES – EVEN WHEN DISPROVED
IS THERE AN AGENDA???

Amnesty International
Calls For Taser Suspension

EPIDEMIC
ERGOFUSION

REMEMBER
DEEP THROAT
SEVEN DEADLY SINS OF NON-LETHAL WEAPONS

- NLWs make it easier to initiate war
- NLWs will start a new arms race
- NLWs may be used as instruments of torture
- NLWs will result in some deaths and serious injuries
- *NLWs used as a precursor and easier to kill opponents*
- NLWs will be used to suppress lawful dissent
- NLWs do not have sufficient data to support their use
NAILING A FOOT TO THE FLOOR

MOSCOW THEATER

A MATTER OF CHOICE
INCAPACITATING AGENTS

WHAT YOU DID READ:
- NERVE GAS KILLED RUSSIAN HOSTAGES (UPI)
- DEADLY END TO MOSCOW SIEGE SHOWS DANGERS OF INCAPACITATING CHEMICALS (AP)
- CONCERN ARISES OVER TYPE OF GAS USED BY MOSCOW (WASH POST)
- USE OF GAS RISKS OTHERS FOLLOWING SUIT (SF CHRONICLE)

WHAT YOU SHOULD HAVE READ:
HUNDREDS SAVED BY USE OF INCAPACITATING AGENT

WOULD YOU SET TODAY’S SPEED LIMITS BASED ON AUTOMOBILE TECHNOLOGY OF 1900???
SEVEN DEADLY SINS OF NON-LETHAL WEAPONS

- NLWs make it easier to initiate war
- NLWs will start a new arms race
- NLWs may be used as instruments of torture
- NLWs will result in some deaths and serious injuries
- NLWs used as a precursor and easier to kill opponents
- *NLWs will be used to suppress lawful dissent*
- NLWs do not have sufficient data to support their use
SEVEN DEADLY SINS OF NON-LETHAL WEAPONS

- NLWs make it easier to initiate war
•- NLWs will start a new arms race
•- NLWs may be used as instruments of torture
•- NLWs will result in some deaths and serious injuries
•- NLWs used as a precursor and easier to kill opponents
•- NLWs will be used to suppress lawful dissent
•- NLWs do not have sufficient data to support their use
HOW GOOD IS GOOD ENOUGH?

- Effectiveness (Skin Pain)
- Permanent Injury (Eye Trauma)
- Serious Injury

Dose

- Non-Lethality Index (Startle)

Risk of Injury (%)
BUT WHAT ABOUT PEOPLE WHO:

• HAVE PACEMAKERS?
• EXTREME HEART CONDITIONS?
• ARE ASTHMATIC?
• ARE VERY OLD?
• ARE BLIND, DEAF MIDGETS WITH PARKINSON’S?

“Life is tough; it’s tougher when you’re stupid.”
John Wayne as SGT John Stryker
Sands of Iwo Jima
PERCEPTION

THE PROBLEM OF DIFFERING WORLD VIEWS

AIN’T IT AWFUL???
THE WORLD AS SEEN BY PHILOSOPHICAL GROUPS
THE WORLD AS IT IS
RECONSIDERATION OF ISSUES

- WHAT PROBLEM ARE YOU SOLVING?
- COMPLAINTS BASED ON EMOTION VS. FACTS
- BLAME TECHNOLOGY FOR HUMAN PROBLEMS
- CHEMICAL & BIOLOGICAL AGENTS HAVE PEACEFUL PURPOSES
- MORE OPTIONS ARE PREFERABLE TO LESS
- THE RESULTS ARE IN: NLWS ARE NOT A ROAD TO HELL

THE PRIMARY QUESTION SHOULD BE:

COMPARED TO WHAT?
“There are two things that are infinite…..the universe and human stupidity. And I’m not sure about the former.”
COMING SOON TO A COMMUNITY NEAR YOU

NLWS: NOW MORE THAN EVER
NOW IT’S YOUR KIDS IN THE SCHOOL: WHAT WEAPONS DO YOU WANT POLICE TO USE??
Effectiveness

Dose Response – Endpoints
- Effective Concentrations
- Health Effects
- Routes of Entry

Physical Characteristics – e.g. particle size, yield

Variables – Environmental
- Motivation

Modeling and Simulation
Routes of Entry

- **Inhalation** – Lower respiratory (1-5 microns)
  - Upper respiratory (1-100 microns)
- **Eye effects** – large and small particles, liquid
- **Cutaneous** – skin effects, large particles, liquid
Solvents and Propellants
(examples)

**Solvents**
- 1,4 Dioxane
- 1,1,1, trichloroethane
- Isopropyl alcohol
- Methyl isobutyl ketone
- Methylene Chloride
- Trichloroethylene
- Ethanol
- Soy oil
- Propylene glycol
- Water

**Propellants**
- Dymel Blend
- Iso-butane
- Nitrogen
- Carbon dioxide
NL Modeling/Simulation

- Computer simulations predict the effects from the dispersion of NL chemical devices
- Analysis (e.g., Monte Carlo simulation) provides assessment of NL system feasibility
National Institute of Justice
Office of Science and Technology
Research and Technology Development Division
NDIA - NLD VI
March 16, 2005

Joe Cecconi
Senior Program Manager
202-305-7959
ceccconij@ojp.usdoj.gov
Mission of NIJ

- The R&D arm of the Department of Justice

- Has no operational mission

- Two major areas of responsibility
  - Behavioral research
    Office of Research and Evaluation (ORE)
  - Physical science research
    Office of Science and Technology (OS&T)
    - Support Approximately 18,000 LE agencies
    - Support Approximately 3,000 Correctional agencies
    - Support Civilian Agencies w/o formal LL programs
    - Support first responders
OFFICE OF SCIENCE & TECHNOLOGY

Less-Lethal Program

Less Lethal Theory

“Compliance”

Typical

desirable

less energy

more combative or keep coming

Danger to suspect & prisoners

May return

Danger to user & prisoners

Danger to suspect & prisoners
THE “TWO” TYPES OF LL DEVICES

Primary Focus:
• Devices which “incapacitate”
  Items you have no choice
  Suspect is immobilized
  “Involuntary” compliance

Secondary Focus:
• Devices which “provide an edge”
  Items that distract, dissuade, deter, etc.
  “Voluntary”/smart compliance
Less-Lethal Program

- Blunt Trauma
- Electrical
- Chemical (Pepper)
- Light/Laser
- Nets
- Acoustic
- Pursuit Management
- Modeling and Evaluation
Less-Lethal for Homeland Security

LL in Aircraft

LL in Airports

State & Local folks protect your airports
Get new LL devices to airports for review:
TAPAM, Xnet, PADS, MDS, etc.

LL in Quarantine scenarios
# Less-Lethal DOD vs. LEC Requests

<table>
<thead>
<tr>
<th>Typical DOD</th>
<th>Typical LE</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Range</strong></td>
<td><strong>Cost</strong></td>
</tr>
<tr>
<td>100 to 5000 ft.</td>
<td>$750 or less</td>
</tr>
<tr>
<td><strong>Size/Weight</strong></td>
<td><strong>Operations</strong></td>
</tr>
<tr>
<td>Vehicle mount or smaller</td>
<td>Separate L &amp; LL</td>
</tr>
<tr>
<td><strong>Cost</strong></td>
<td><strong>Operations</strong></td>
</tr>
<tr>
<td>Tolerate higher costs</td>
<td>Each agency</td>
</tr>
</tbody>
</table>

**Less-Lethal Program**

**Typical DOD**

- Range: 100 to 5000 ft.
- Size/Weight: Vehicle mount or smaller
- Cost: Tolerate higher costs
- Operations: Combine Lethal with NL

**Typical LE**

- Range: 0 to 100 ft.
- Size/Weight: Person portable
- Cost: $750 or less
- Operations: Separate L & LL

**Central purchasing**
OFFICE OF SCIENCE & TECHNOLOGY

Less-Lethal Program
What about Directed Energy Devices?

Consider the following prototype characteristics:

- **Min. Range**: 50 feet [w/ranging]
- **Energy**: Intense heat [<1 sec]
- **Effected Area**: 28 sq in [3” dia]
- **Number of shots**: 12 [magazine]
- **Size**: Shotgun
- **Intensity**: Adjustable
- **Safety Consideration**: Eye Safe
“Force on Target”/ enabling technology - eye safety:

Measure range/position using the red eye effect:

Has the potential to aid in aiming & improving safety

A place to avoid
A reference from which to aim around
A place to aim at
Discriminate between animal or man
The “Electronic Safety” on a weapon
Less-Lethal Program

New Pilot Programs:

Directed Energy:
Mapping current flow through body [TASER]
RF based LL Device [weapon]
Optical based LL Device [weapon]
Electronic Flashbang [short duration laser/fiber amp]
Smart Dazzler and Associated concept
Miniaturized Sticky Shocker – funding cut
New Pilot Programs:

Blunt Trauma:
RAP development
RAP Independent testing

LL Databases/Information:
LL database – mine existing, find new
Mine LASD database for TASER use
Prospective LL database - Wakeforest
ILEF conference & Prague
Less-Lethal Program

New Requests/Solicitation 06:

Human Effects:
RF/Optical – short pulse application
   Is reflex response via arch possible, Targeting simplified
Human susceptibility – new exploits for LL

Device Development:
Eye detector development

LL Databases/Information:
LL db – mine existing & collect at scene - NHTSA model
   – detailed analysis [lawyers, med, scientist, LEC, etc]
Can Training facilities be used to obtain LL data
Less-Lethal Program

Find Us on the Web:

• National Institute of Justice (NIJ)
  Home Page: <www.ojp.usdoj.gov/nij>

• Justice Technology Information Network (JUSTNET)
  Home Page: <www.nlectc.org>

• Justice Information Center (National Criminal Justice Reference Service)
  Home Page: <www.ncjrs.org>
Other LL sites on the Web:

- Pennsylvania State University
  Home Page [INLDT]: <www.nldt.org>

- Joint Non-Lethal Weapons Directorate (JNLWD)
  Home Page: <www.jnlwd.usmc.mil>

- University of New Hampshire
  Home Page [NTIC]: <www.unh.edu/ntic>
QUESTIONS ??
Army Non-lethal Requirements

14 March 2005
Immediate Needs

• Extended weapons range (small arms distance) that delivers intended effect is the Army’s most pressing gap

• Protecting convoys has emerged as a major requirement

• Stopping vehicles remains a major challenge to forces (at static sites, from convoys, etc)
Non Lethal Munitions Effective Ranges

The range gap is 3.5X the current capability (Goal is beyond small arms range)
Extended Range Initiatives

• Extended Range Blunt Impact Capabilities
  – Airburst Nonlethal Munitions (ANLM) (Army CDD in progress)
  – Others (FN303, MASS, 12 ga, 40mm)

• Directed Energy Weapons (DEW) (Signature to Joint CDD)
  • Static ADS
  • Portable ADS (PADS)

• Acoustic Capabilities (Starting Army CDD)
Behavioral and Medical Outcomes of Nonlethal Weapons Use
**Supervisor's Report on Use of Force**

<table>
<thead>
<tr>
<th>Method</th>
<th>Used By (E# or S#)</th>
<th>Used Against (E# or S#)</th>
<th>Method (Code)</th>
<th>Type of Injury (Code)</th>
<th>Body Part (Code)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(AW) Arwen</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(BC) Baton: (Control)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(BI) Baton: (Impact)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(BF) Bodily Fluids</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(CN) Canine</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(CR) Carotid Restraint</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(CH) Choke Hold</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(CT) Control Holds: (Control Techniques)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(TT) Control Holds: (Team Takedown)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(TD) Control Holds: (Takedown)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(CE) Chemical</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(OC) Chemical Agents (OC Spray)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(TG) Chemical Agents (Tear Gas)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(EX) Explosives</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Type of Injury**

- (AB) Abrasion
- (BR) Bruise
- (BU) Burn
- (CP) Complaint of Pain
- (CO) Concussion
- (DH) Death
- (DI) Dislocation
- (DB) Dog Bite
- (FR) Fractures
- (GS) Gunshot
- (HB) Human Bite
- (LC) Lacerations
- (ND) Nerve Damage
- (OD) Organ Damage
- (PA) Paralysis
- (PW) Puncture Wound
- (SD) Soft Tissue Damage
- (ST) Sprain/Twists
- (UN) Unconscious
- (RM) Refused Med Treatment

**Body Part Injured**

- (AD) Abdomen
- (AK) Ankle
- (AR) Arm
- (BK) Back
- (BT) Buttocks
- (CH) Chest
- (EL) Elbow
- (FA) Face
- (FE) Feet
- (FI) Fingers
- (GE) Genitals
- (GR) Groin
- (HD) Hands
- (HE) Head
- (HI) Hip
- (IN) Internal
- (KN) Knees
- (LE) Leg
- (NK) Neck
- (NO) Nose
- (SH) Shoulder
- (WR) Wrist

**FORCE APPLIED**

<table>
<thead>
<tr>
<th>Used By (E# or S#)</th>
<th>Used Against (E# or S#)</th>
<th>Method (Code)</th>
<th>Type of Injury (Code)</th>
<th>Body Part (Code)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*(Only One Code Per Block)*

**LASD Force Data**
Study Objectives

• All LASD force data 1995-2004
  • N > 21,000
• Weapons, range, clothing, environment, injuries, countermeasures, effects on “target,” estimate of effectiveness, etc.
• Most comprehensive study of its kind
• Identify trends (study covers a decade)
• A work in progress!
  • Final report due about April 2005
Suspect Info

- Weighed an average of 173 pounds (78 kilograms)
- 4% were armed with firearms
- 24% had a criminal history
- 5% had a mental health history
- 23% were under the influence of drugs and/or alcohol
  - 71% of these were at least alcohol
  - 21% were using stimulants relevant for TASER death hypotheses
LASD NLW weapon use by year, 1995-2003
(as % change from 1995)
Types of Force Used

- Riot Control Agents 1%
- Canine 2%
- Stingball 5%
- Stunbag 2%
- Taser 4%
- 37mm 2%
- Baton 3%
- OC (Pepper Spray) 81%

N = 15,573
Strike Sites—TASER & ARWEN

- TASER:
  - Head: 19%
  - Torso: 33%
  - Arms: 25%
  - Legs: 5%

- ARWEN:
  - Head: 14%
  - Torso: 51%
  - Arms: 25%
  - Legs: 4%
Questions?
(or notification of availability of report)

Commander Sid Heal

Los Angeles Sheriff’s Department
4700 Ramona Ave.
Monterey Park, CA 91754

323-526-5466  CSHHeal@lasd.org
"If the crowd doesn’t stop, then we’re going to deploy private Jackson’s Malodourous Socks!"
Non-Lethal Weapons - Academic Initiatives at Penn State

LTC Ed Hughes (USA-Ret)
Institute for Non-Lethal Defense Technologies
Applied Research Laboratory
The Pennsylvania State University

16 December 2004
Penn State Activities

- Research & Development
- Testing & Evaluation
- Education & Training
Common Thread of Training

- John Alexander: “The issue on deaths [with non-lethals] is training.”

- MSG Godwin: [As we introduce] these systems, they need to be easily trained.”

- Col Karcher: talked about the importance of INIWIC.

- MG Lott asked why Soldiers and Marines would choose a non-lethal option and concluded “training and experience.”

- CAPT Merritt said that operators were the most credible spokespersons for non-lethals and that trained and educated soldiers are a crucial part of the public affairs effort.
Penn State NL Education and Training Activities

- Joint Professional Military Education (Ron Madrid);
- Distributed Training;
- Mobile/Resident Training Support;
- Proposed Training and Education Work.
Penn State NL Education and Training Activities

- Joint Professional Military Education (Ron Madrid);
- Distributed Training;
- Mobile/Resident Training Support;
- Proposed Training and Education Work.
The Future of NL Education and Training

- “Training” versus “Education”
- Need to systemically address the NL training challenges (more prolific; sustain standards)
- Need to fill the NL training gap by addressing short term needs with a view to the long term “vision”
- Establish a NLW Master Gunner program
- Ensure COTS systems come with training support packages reviewed by INIWIC for utility
- Services need to invest seriously in INIWIC
Non-Lethal Weapons in the Global War on Terrorism

Getting it Right”

Lt Gen Jan C. Huly, USMC

Chairman, DoD Joint Non-Lethal Weapons Program
World Wide Capabilities
World Wide Deployments

- US Forces are deployed worldwide in the Global War on Terrorism
- What Current Challenges do we face?
World Wide Environments
US FORCES DEPLOYED GLOBALLY

**Army**
- Bosnia, Croatia and Hungary: 1,000 soldiers
- Kosovo / Macedonia: 2,500 soldiers
- Sinai: 680 soldiers
- Saudi Arabia & Bahrain: 200 soldiers

**Iraq and Kuwait**
- About 160,000 troops

**Army NG & Res**
- Prepare to deploy to IRAQ

**Army**
- Guantanamo Bay, Cuba: About 1,700 soldiers
- Sinai: 680 soldiers

**Air Force**
- Kyrgyzstan

**Coast Guard**
- Counter Narcotics & Smugglers, Port & Harbor Security

**Navy**
- EMORY S. LAND, Gulf of Guinea
- HARRY S. TRUMAN, BOHOMME RICHARD & ESSEX, Persian Gulf
- THEODORE ROOSEVELT, Atlantic Ocean
- CARL VINSON & KITTY HAWK, Pacific Ocean

**Marine Corps**
- Georgia GTEP
- Djibouti: 1,400 U.S. Troops
- Georgia

**Coast Guard**
- Counter Narcotics & Smugglers, Port & Harbor Security

**Marine Corps**
- Persian Gulf
- Georgia
- Detachment MCSF Europe aboard EMORY S. LAND

**Army**
- Bosnia, Croatia and Hungary: 1,000 soldiers
- Kosovo / Macedonia: 2,500 soldiers
- Sinai: 680 soldiers
- Saudi Arabia & Bahrain: 200 soldiers

**Navy**
- EMORY S. LAND: Gulf of Guinea
- HARRY S. TRUMAN, BOHOMME RICHARD & ESSEX, Persian Gulf
- THEODORE ROOSEVELT, Atlantic Ocean
- CARL VINSON & KITTY HAWK, Pacific Ocean

**Coast Guard**
- Counter Narcotics & Smugglers, Port & Harbor Security

**Air Force**
- Kyrgyzstan

**Coast Guard**
- Law Enforcement DET for Maritime Exclusion zones, Counter Smugglers, Port & Harbor Narcotics & Training teams

**Navy**
- EMORY S. LAND: Gulf of Guinea
- HARRY S. TRUMAN, BOHOMME RICHARD & ESSEX, Persian Gulf
- THEODORE ROOSEVELT, Atlantic Ocean
- CARL VINSON & KITTY HAWK, Pacific Ocean
Today’s Realty

Complex Environments
Non-Traditional Threats

Unclear Enemy
Challenging Situations
Three Block War

Intense Combat: Company and Platoon Attacks Inside 9 story Building

Peacekeeping Peace Enforcement

Humanitarian Assistance
Today’s NL Mission Set

- We are performing a multitude of missions and tasks
  - USAF providing security for ground convoy operations
  - Tankers are performing security / policing missions
- We are performing a variety of mission task against an asymmetric threat; often simultaneously.
  - Combat operations against insurgents
  - Law Enforcement missions with host nation officials
  - Peacekeeping operations
  - Humanitarian missions
How can Non-lethal weapons help mitigate these challenges?

- Deny Critical areas
- Stopping vehicles / vessels
- Separating terrorists from the innocent population
- Secure personnel / equipment
- Vehicle-borne Improvised Explosive Devices
Non-Lethal Weapons

- New Tools to Help The Warfighter
- *Compliments, Not Replaces Lethal Weapons*
- More Options Between the Bullet and the Bullhorn
Non-Lethal Weapons: *Today*

- Basic, “Low Tech” Capabilities
- Generally used by Military Police / Security Forces
- Principally used for crowds, detainee ops, checkpoints
NLW Use in Iraq

"I had requested the NLW off the ships in Kuwait and took it with us into Iraq. NLW was worth its weight in gold. One night they were coming through holes in the walls and looting the quartermaster's buildings inside our perimeter. ... The H&S Co CO ran over to me and asked if we had NLW. Within 10 minutes we were able to clear about a 1,000 people. We used a variety of rounds. We later employed them from time to time when the circumstances dictated during stabilization operations."
Fielded Non-Lethal “Capability Sets”

**Non-Lethal Munitions**
- 12 Gauge Point & Area Rounds
- 40mm Point & Area Rounds (M203 & M79)
- Flash Bang Grenades (MK-141 & MK-84)
- Stingball Grenades (Handthrown or SG Launched)
- 66mm Smoke Grenades (CS, SB & FB This Year)
- Modular Crowd Control Munition

**Other Items**
- 12 Gauge Shotguns / Modular Accessory Shotgun System
- FN-303 Under-barrel Tactical Paintball System
- Individual, Mid-Size & Squad Riot Control Agent (CS, OC, CR & CN) Dispensers
- Caltrops / Stinger Spike Strips
- Portable Vehicle Arresting Barrier
- Tasers (M26 & X26)
- Riot Control Baton
- Long Range Acoustics Device
- Vehicle Lightweight Arresting Device (VLAD)

**Support Equipment**

**Force Protection Equipment Training Items**
Urgently Fielded Items

• What Non-lethal weapons have we urgently fielded?
  • VLAD (vehicle lightweight arresting device)
  • FN303 Non-lethal launcher
  • M/X-26 Tasers

• How do they help address these challenges?
The Future of NLWs
“Desired Effects”

NLWs Today: Close-in, Low Tech
(NL effects only 50-200 feet)

NLWs Tomorrow: Longer range, More Effective (NL effects @ > small arms range)
Non-Lethal Weapons: *Tomorrow*

- Longer Range, “Higher Tech”
- Integrated among all forces
- Used for disabling vehicles, denying area to personnel, crowds, stopping vessels, determining intent
What do we Need from NLW

**Speed of Light Closure**
- Near-real time effects upon trigger pull from 1 to 10’s of km
- Impossible to outmaneuver
- Rapid retargeting

**Precision Engagement**
- Select the target and the aimpoint
- Minimum collateral damage

**Controlled Effects**
- Scalable effects from deny to destroy: *counter-material*
- *Non-lethal human applications*

**Logistics Advantages**
- Low cost per shot
- Deep magazine without shelf-life or stockpile issues
We need Capabilities to stop Vehicles

We must be able to stop vehicles at a safe distance to determine if they are friend or foe…
We need Capabilities to Deny Area to Personnel

We have limited capabilities to deny personnel to Coalition controlled areas

Most NLW/C effective ranges have extremely limited stand-off distance
We need Capabilities to Protect and Separate Tourist from Terrorist
How Industry Can Help

• Review your ideas, concepts, and technological breakthroughs through a non-lethal weapons filter

• Ask yourself:
  – How can I stop a vehicle without destroying it?
  – How can I stop a vessel without sinking it?
  – How can I keep personnel away from a building without shooting them?
  – How can I get personnel out of a building without entering it?
  – How can I do these things at maximum standoff range with minimum risk to others and our troops?
United States Coast Guard

Non-Lethal Defense VI Symposium

RADM David Kunkel
Director of Operations Capability
Successful Non-Lethal Illegal Alien Interdiction Case

MK10 Surface Launched Running Gear Entanglement System (RGES)

27 ft Coast Guard Response Boat
Successful Non-Lethal Illegal Alien Interdiction Case

35 ft Cigarette with 38 illegal aliens on board
Successful Non-Lethal Illegal Alien Interdiction Case

Port outboard entangled
Successful Non-Lethal Illegal Alien Interdiction Case
Desired Capabilities

• Stopping non-compliant vessels
  – Need a lighter more portable system
  – Need a air deployable system
• Anti-Swimmer – underwater devices to interdict swimmers and divers
• Clear Spaces – need a non-sparking flash-bang grenade type device
• Anti-personnel – need to control or take down a person within a maritime environment
Non-Lethal Weapons: Technologies, Concepts and Strategies

A Course of Instruction at the Military War Colleges

Presented by:
LtCol Ron Madrid, USMC (Ret)
Associate Director and Program Manager
Marine Corps Research University, Penn State
Outline

- Course Genesis
- Course Composition
- Venues
- Student Scenarios
Course Genesis

- The course was created in 1998 after the formation of the Institute for Non-Lethal Defense Technologies at Penn State.

- The course was created and is taught by Penn State and offered for presentation at various DoD military colleges.

- The purpose of the course is to expose field commanders and staff officers to the capabilities and limitations of non-lethal weapons across the spectrum of conflict.
Course Composition

- The course is 24-30 hours of instruction depending on the academic venue.

- It is composed of both classified and unclassified lectures by subject matter experts and is currently only open to U.S. students.

- DoD and industry subject matter experts provide lectures on non-lethal technologies and/or the implications of their use.
Course Overview

- The course covers:
  - the history of the non-lethal weapons program
  - current military uses of NL weapons
  - threat non-lethal weapons
  - current/future DoD non-lethal weapons programs
  - the status of non-lethal technology development
Course Overview

- The course also covers the implications of non-lethal weapons use.
  - political implications
  - rules of engagement
  - public perception – awareness
  - ethical considerations
  - legal implications
  - impact on policy, strategy and doctrine
  - support to Homeland Defense
Resources

- Future War: Non-Lethal Weapons in 21st Century Warfare by Col John Alexander, USA (Ret)

- Studies and Assessments of Non-Lethal Technologies by Independent Research Organizations

- Military Journal Papers

- Press Articles
Non-Lethal Course Venues

- National Defense University
  - First non-lethal class conducted in 1999.
  - Two classes held in 2004.
  - Total of 48 students have taken the course.
Non-Lethal Course Venues

- Marine Corps Command & Staff College
  - Five courses conducted since 2000.
  - Total of 74 students have taken the course.
Non-Lethal Course Venues

- Army War College
  - First course conducted in 2004.
  - Total of 22 students have taken the course.
2005-2006 Non-Lethal Course Venues

- April – June 2005
- April – June 2006
- Sept – Nov 2005
- Jan – Mar 2006
- Jan – Mar 2006
- AY 2005 – 2006
- Aug – Oct 2005
- Spring 2006
2005-2006 Venues In-Work

- AY 2005 – 2006

Command & General Staff College
Fort Leavenworth, Kansas
Students

- Majors/LtCdrs – LtCol/CDR - Colonel/Captain
- Representation from all combat and supporting arms.
- GS-14/GS-15s from OSD and the military services.
- 90% of the students start the course as skeptics.
- 99% of the students leave the course as advocates.
Student Non-Lethal Scenarios

- Course final exam.

- Student teams are tasked to develop a scenario based on historical, current or future events.

- Scenario must integrate non-lethal technologies and show how their use would impact mission accomplishment.

- Student teams present their scenarios to a flag level panel of subject matter experts from the military and federal/state agencies.
Student Non-Lethal Scenarios

- 1975 Evacuation of Saigon Embassy
- Maritime Interdiction
  - Piracy in SE Asia
  - Enforcing UN Sanctions Against Iraq
- Embassy Protection – Crowd Control
  - South America
  - Middle East
- Humanitarian Operations
  - LZ Protection – Food Distribution Point
  - Earthquake Relief
Student Non-Lethal Scenarios

- Humanitarian Operations
  - Convoy Protection
- Non-Combatant Evacuation Operations
- I MEF Security of Iraqi Elections
- 2001 Presidential Inauguration
- Port Security
  - Long Beach
  - San Francisco
- Athens Olympics
- USS Cole
Student Non-Lethal Scenarios

- Special Operation Forces – Snatch/Grab in Afghanistan
- Aircraft Hijacking
  - 1985 TWA Flt 847
  - Prevention
- Hostages
  - 29 May 04 takeover of Saudi Arabian housing compound
- 1970 Kent State
- 1863 New York Draft Riots
- Vehicle Checkpoint
  - Humanitarian Operations
  - An Najaf, April 2003
NON-LETHAL WEAPONS

Col Bill Wetzelberger, USMC
COL Charles Tennison, USA
LTC Steph Twitty, USA
LtCol Mike Belding, USMC

TASK FORCE 3-15 INFANTRY
CIVILIAN VAN INCIDENT
ALONG HIGHWAY 9, AN NAJAF
SCENARIO

- Task Force 3-15 Infantry located in blocking positions along HWY 9 vicinity of An Najaf in order to prevent enemy forces from flanking Task Force 4-64 AR from the north.
- Heavy fighting along HWY 9 between TF 3-15 IN and Iraqi soldiers in civilian cars / technical trucks
- Two US Soldiers killed the day prior by suicide bomber at a checkpoint
- Guidance to company commander:
  - Three blocking positions established with B/3-15 IN.
  - Prevent enemy forces from using HWY 9 to envelope main effort
  - Establish three-tier check point with concertina wire and Bradley Fighting Vehicles (BFV)
- Fire Warning shot over Car hood/ 2nd shot radiator/3rd to kill
Van and car moving SE at approx 80 miles an hour. Both vehicles blow thru 1st tier of CP, 2nd tier fires warning shot and radiator shot. 3rd tier fires final shot to kill after vehicles proceed thru concertina wire manned by soldiers.
WHAT HAPPENED?

Two US Soldiers located in dug-in fighting positions along south side of the road attempt to halt van by waving it down.

Two Bradley Fighting Vehicles (BFV) positioned north and south of the road as 2nd tier CP fire warning and radiator shots to disable van. Van proceeds through Concertina wire strung across road.

Two BFVs positioned north and south of the road engage to destroy the van.
NON-LETHAL WEAPONS
(Recommended Devices)

• To prevent vehicle from breaking through check points
  - Vehicle Lightweight Arresting Device (British version)
  - Caltrops / Road Spikes
  - Portable Barriers / Portable Vehicle Arresting Barrier

• Provides protection against suicide bombers

• Can be used to slow, block, or maze vehicles
  - Hasco / Jersey Barriers

• Long Range Acoustic Device:
  - Notify civilians of obstacles and to halt vehicle

OPERATIONAL AND STRATEGIC LEVEL IMPACT:
• WINS HEARTS AND MINDS OF THE IRAQI PEOPLE
• PREVENT WORLD OUTCRY / MEDIA ATTENTION
Vehicle Lightweight Arresting Device

- **Description**
  - Road spikes in mesh blanket
  - Entangles wheels/axles

- **Advantages**
  - Small / light weight
  - Portable / rapidly deployable
  - Reusable / low cost
  - *Easier to handle than caltrops*

- **Disadvantages**
  - Loss of control of vehicle (swerving to avoid blanket)
  - *Time to detangle -- Unavailable for immediate follow-up attack*
Caltrops

- **Description**
  - 4-prong iron spike (*deflates tires*)
  - Always lands in upright position when scattered
  - Hollow—which punctures self-sealing tires

- **Advantages**
  - Small / Light weight
  - Rapidly Deployable
  - Reusable / Low Cost

- **Disadvantages**
  - *Laceration risk (to handler)*
  - Time / distance to stop vehicle
  - Loss of control of vehicle (particularly if only one tire is blown)
    - Vehicle may crash into some other barrier, injure pedestrians/occupants
  - *Need a large quantity to cover wide area*

“Scatterjacks”
Road Spikes

- **Description**
  - Flexible or rigid rows of spikes *(deflates tires)*
  - Can also place under a vehicle being searched

- **Advantages**
  - Small / light weight
  - Portable / rapidly deployable
  - Reusable / low cost
  - *Easier to handle than caltrops*

- **Disadvantages**
  - Stability during successive attacks
  - Time / distance to stop vehicle
  - Loss of control of vehicle *(swerving to avoid spikes)*
    - Vehicle may crash into another barrier, injure pedestrians/occupants
Portable Barriers / Jersey Barriers

- **Description**
  - Manual / automatic pop-up road blocks

- **Advantages**
  - Stopping Power
  - Remote control activation
  - Selective targeting

- **Disadvantages**
  - Generally permanent
  - Expensive
  - Requires dedicated prime mover

- **Description**
  - Concrete/Plastic road blocks
    - Used to stop (or slow) vehicle

- **Advantages**
  - Stopping power
  - Can be filled with water, sand, or other materials
  - Reusable – relatively low cost

- **Disadvantages**
  - Heavy - difficult to move
  - Target indiscriminate

*RisingKerbs*
Portable Vehicle Arresting Barrier

- **Description**
  - Highly effective vehicle stopping “net”

- **Advantages**
  - Stopping Power
  - Allows normal traffic flow
  - *Selective targeting*

- **Disadvantages**
  - Time to set up
  - Not easily transported
High Intensity Directional Acoustics

- Modes of operation:
  - Broadcast sound files for warnings
  - High pitched, 150 decibel, narrow-beam tone for crowd control
- Easily transportable and employable
- Requires energy source (generator)
- Long Range Acoustic Device (LRAD)
  » Limited fielding in Iraq
## Technologies Assessment

<table>
<thead>
<tr>
<th></th>
<th>Effect on Target</th>
<th>Selective Targeting</th>
<th>Portability</th>
<th>Range</th>
<th>Cleanup</th>
<th>Maturity</th>
<th>Synergy</th>
<th>Cost</th>
<th>Robustness</th>
<th>Legal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caltrops</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Road Spikes</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Jersey Barriers</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Portable Barriers</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Portable Vehicle Arresting Barrier</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>Vehicle Lightweight Arresting Device</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
<tr>
<td>High Intensity Directional Acoustics</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
<td>☐</td>
</tr>
</tbody>
</table>

*When target confined to limited area** ** All need to be backed up with lethal force

○ = Favorable   ☀ = Unknown   ● = Problematic
WHAT COULD HAVE HAPPENED

Two Bradley Fighting Vehicles (BFV) positioned north and south sides of the road as 2nd tier.

Two BFVs Positioned north and south sides of the road as 3rd tier.

Direction of travel of van

- Long Range Acoustic Device
  - to notify van to halt
- Hasco Barriers
- Jersey Barriers
  - to slow vehicles

- Vehicle Arresting Device
- Portable barrier
- CALTROPS
- Road Spikes
  - To stop vehicle

- Hasco Barriers
- Jersey Barriers
  - to slow vehicles
- Vehicle Arresting Device
- CALTROPS
  - To stop vehicles

Meters

0  50  75
PLANNING CONSIDERATIONS

• Intel:
  • When fighting in vicinity of non combatant civilians, non lethal weapons should be considered
  • Civilian actions must be war-gamed as part of the overall ground plan
  • HWY 9 was the only major highway in vicinity of AN Najaf.

• Logistics:
  • Consider impact on load plan and availability of transportation
  • Must have a plan to transport desired non-lethal weapons in theater
    - limited transportation assets at battalion level

• Legal:
  • ROE

• Public Acceptance:
  • Must be ready to explain your actions to civilians
  • Maintain public support by reducing civilian casualties
Summary

- The non-lethal course has been very well received by the students.

- The course has been a means to expose the future leaders of DoD on the advantages and limitations of non-lethal technologies.

- The student scenarios have provided a forum between today’s federal and state agencies to discuss non-lethal technologies within an academic environment.
Non-Lethal Acceptability Challenges: Standards, Human Effects, Testing, and Training Forum

Lieutenant Colonel Mark Wrobel, USAF, JNLWD  
Dr. Mary Williams, JNLWD  
Lieutenant Colonel Jonathan Drummond, USAF, AFRL  
Dr. John Kenny, Penn State University  
Mr. Larry Bickford, US Army Aberdeen Proving Ground

Moderator: Ms. Susan Levine, JNLWD

Non-Lethal Defense VI Hyatt Regency, Reston  
14-16 March 2005
Non-Lethal Academic Initiatives Forum – Panel Discussion

Mr. David Koplow, Georgetown University Law School
Lieutenant Colonel Ed Hughes, USA (Ret), Penn State University
Dr. Glenn Shwaery, University of New Hampshire

Non-Lethal Defense VI Hyatt Regency, Reston
14-16 March 2005
The View From Overseas Forum Various Topics – Panel Discussion

Dr. Martin Hubbard, United Kingdom
Mr. Pascal Paulissen, Netherlands
Dr. Marten Risling, Sweden
Mr. Frederico Aguiar, Brazil

Non-Lethal Defense VI Hyatt Regency, Reston
14-16 March 2005
Swedish background

- Located at Baltic Sea
- Long history of war against Russia
- Charles XII tried to invade Russia (1709)
- Small population – many emigrated to USA
- Soviet invasion was the main treat during Cold War
Swedish armed forces today

- Invasion not considered a realistic threat
- Decreased budget
- Budget tied up by large investments → non-proportional reduction in military personnel
- International missions more and more important
Swedish international UN missions

- Several during cold war: Korea, Gaza, Congo, Lebanon, Cyprus
- During recent years: Bosnia, Kosovo, Desert storm, Afghanistan, Congo
- A need for NLW has been recognized
Users of NLW in Sweden

- Police
  - Tasers, since 2004
  - Impact weapons - special teams
  - OC, some departments

- Military
  - No systems in use
NLW research at FOI – Swedish Defence Research Agency

- High Power Microwaves
  - Systems
  - Protection
  - Bioeffects

- Impact weapons
  - Systems
  - Bioeffects of blunt trauma
Nervous System

No acute change in structure
No change in blood-brain barrier function
Long term effects unknown

Fig. 2. Micrographs showing sections through the hippocampus of a sham exposed (A) and a rat exposed to HPM for 60s. The sections were hybridized with an oligonucleotide probe complementary to alk 5 (transforming growth factor receptor I). Note that the intensity of the labeling and the configuration of the hippocampus is virtually the same in the two sections. The scale bar represents 0.5 mm.
Tubulin

- Filaments – cytoskeleton
- Of importance for cell structure and division
- Dynamic turnover
VEGF

Vascular Endothelial Growth Factor

Regulates growth and survival of vascular cells and many nerve cells

Induction of VEGF protein

C6 Glioma cells
Exposed for 18000 pulses of HPM at 22 KV/m

Control

Acute

1 day
The number of pulses that are needed for effects on tubulin and VEGF are much higher than realistic use of HPM.
Examples of collaboration

- European Working Group – NLW
- Cepa (microwaves)
- NATO (HFM 073)
Non-lethal Technology Innovation Center (NTIC)
University of New Hampshire
Durham, NH

Sponsored by a grant from the Joint Non-lethal Weapons Directorate

www.unh.edu/ntic
To advance the non-lethal capabilities in peacekeeping, conventional warfare, national security, policing, disaster relief, humanitarian assistance, and noncombatant evacuation operations, NTIC has a mission to provide the U.S. military and law enforcement agencies with access to the nation’s best research professionals.
NTIC Mission Statement

To effect the next generation of non-lethal capabilities by identifying and promoting the development of innovative concepts, materials, and technologies.

We serve as an academic outreach program for non-lethal S&T research.
Activities

• Innovative Research and Survey Grants
• Non-lethal Technology and Academic Research (NTAR) Symposium
• Technical Working Groups
Innovative Research Project Grants

Interdisciplinary 1-2 year projects that emphasize innovative NLW applications involving new materials/methods or novel uses of existing materials and technologies.

Exploration Survey or Review Grants

Non-renewable grants often serve as feasibility studies or reviews of existing technologies. Certain sociological or behavioral studies are considered.
Recently funded projects

• Electromagnetic properties of LIP
• Shockwave Characterization and Enhancement with Femtosecond Laser Irradiation
• Neuromuscular Disruption with Ultrashort Pulses
• Electromagnetic and thermal effect of directed energies on biological material
• Behavioral and medical outcomes of NLW
• Assessing the universality of crowd conflict parameters
IRP Grant Program

There is a strong commitment to support the research programs of U.S. academic institutions. Student participation is highly encouraged. The center strives not only to promote and facilitate the development of the next generation of NLW and capabilities, but to develop the next generation of NLW researchers. Industry is encouraged to partner with academia if applying to the grant program.
Driving Issues for Academia

- Multiple Levels of Intellectual Effort
  PI, (Post)Graduate, Undergraduate Students
- Job Training/Practical Application for Students
- Publish or Perish, especially for non-tenured faculty
- Presentation at symposia/conferences
- Intellectual Property Issues
Driving Issues for Academia (cont).

- Political/public acceptance - University letter of support
- Agency support regarding press inquiries; “I don’t have anything interesting to convey.”
Search Services

- Keyword searches facilitate locating worldwide expertise and grant funding opportunities.
- Varied subscription requirements based on user – Corporation, University, Individual.
- Search by Areas of Expertise, Member Institution, Geography, Researcher Name.
- Ease of use – Keywords arranged by discipline (Agriculture, Arts, Education, Engineering, Law, etc)
Search Services (cont.)

- InfoEd International, Inc (www.infoed.org)
  - SPINPlus, funding opportunities and CV database service – contains SPIN, GENIUS, SMARTS – automated alert system matches investigators with grant and contract announcements based on User Profiles. Univ > industry > government. No indiv.

- Grants.gov (www.grants.gov) comprehensive database to search and apply for competitive grant opportunities from ALL Federal agencies.
Search Services (cont.)

• Community of Science ([www.cos.com](http://www.cos.com))
  – Find funding with [COS Funding Opportunities](http://www.cos.com)
  – Identify experts and collaborators with [COS Expertise](http://www.cos.com)
  – Promote your research with a [COS Profile](http://www.cos.com)

• The Foundation Center ([www.Fdncenter.org](http://www.Fdncenter.org))
  – Individual subscription based search database for philanthropy – scholarships, grants, awards.
Search Services (cont.)

- Society of Research Administrators: SRA International
  [www.srainternational.org/newweb/grantsweb/index.cfm](http://www.srainternational.org/newweb/grantsweb/index.cfm)
  Site for Office of Research admin with reference information for education, US and International government. (i.e. FAR, ejournals, grant forms, etc)
The U.S. Department of Defense
Joint Non-Lethal Weapons Program

NDIA – Non-Lethal Acceptability Challenges: Standards, Human Effects, Testing and Training Forum
15 March 2005

Lt Col Mark C Wrobel
Health Effects Officer
(703) 784-5715 x230
Wrobelmc@jnlwd.usmc.mil
Objective: Provide quality effects data to support Warfighter confidence in NL technologies

- Limited Data/Experience
- Limited Resources
- No standards
- New Parameter Space
  - Requirements across broad realm of technologies
  - Assessment of both effects and effectiveness
  - Quantifying target behavior response
  - Accounting for variations in populations
  - Addressing sensitive populations vs intended targets
Both the “effect” and “effectiveness” must be clearly understood…
JNLWP Human Effects Process

- Risk characterizations
- Tools for stimuli-response
- Manage human effects database and research

**HECOE**
A team of DoD experts providing a “one stop shop” for NLW human effects information

**HERB**
A Joint Service board of medical officers providing independent review of human effects

**HEAP**
A non-governmental, blue-ribbon panel providing independent assessments

**NLW PMs**
Objective identification of risks
Milestone Decision Package
Independent reviews

**MDA**
Milestone Decisions

Human Effects Risk Characterization Framework
Effects Based NLW Development

Family of NLW Human Effects Models

Operational requirement
- Deter
- Distract
- Dissuade
- Disorient
- Distress
- Render Incapable
- Incapacitate

Types and levels of Non-Lethal Stimuli that achieve desired effects, safely

Physiological, Psychological, Behavioral Correlate ( Desired Human Effects )
Biomedical Research Compliance

- **Animal Use compliance with Title 7 U.S.C Section 21131, Title 9 CFR Parts 1-4, DoD Directive 3216.1, and implementing service regulations**
  - American Association for the Accreditation of Laboratory Animal Care
  - Institutional Animal Care and Use Committees
  - NIH Pub 86-23, Guide for Care and Use of Lab Animals
  - Annual reporting requirements to OSD

- **Human Research compliance w/ Title 10 U.S.C. Section 980, Title 32 CFR Part 219, DoD Directive 3216.2, and implementing service regulations**
  - Stipulates compliance with DHHS Reg “Protection of Human Subjects”, Title 45 CFR Part 46
  - Requirements for Institutional Review Board, Assurance of Compliance
  - Requirement for informed consent
  - Requirement to protect rights and welfare of subjects
  - Occupational standards often used as benchmarks (ANSI, OSHA)
Wrap-up

• Understanding the human effects of Non-Lethal Technologies is fundamental to their development

• Research to characterize effects and effectiveness is challenging and only starting in many areas

• The JNLWP has developed processes to facilitate understanding these effects

• Efforts continue to address policy issues associated with NL standards and training with NLs

• Working to formalize processes in DoD requirements generation and acquisition frameworks