



European Working Group  
Non-Lethal Weapons

## Programme

3<sup>rd</sup> European Symposium on  
Non-Lethal Weapons  
**May 10-12, 2005**

Stadthalle Ettlingen, Germany


# Non-Lethal Options Enhancing Security and Stability



**Fraunhofer**

Institut  
Chemische Technologie

# Programme Committee



The European Working Group on Non-Lethal Weapons (EWG-NLW) serves as the Programme Committee:

Helmut Oppenheim  
Bundesministerium für  
Landesverteidigung, Vienna, A

Stanislav Tecl  
Military Technical Institute of the  
Ground Forces Czech Army,  
Vyskov, CZ

Norbert Eisenreich  
Fraunhofer ICT, Pfinztal, D

Christophe Tamisier  
DGA/SPART/DOEA, Saint Cloud, F


Roberto De Maio  
Segreicerca, Rome, I

Zier Verheij  
TNO Defence, Security and Safety,  
Rijswijk, NL

Victor Selivanov  
Baumann University, Moscow, RUS

Ulf Sundberg  
FOI, Tumba, SE

Martin Hubbard  
DSTL, Sevenoaks, UK



**Chairman of the Symposium**

Klaus-Dieter Thiel  
Fraunhofer ICT,  
Pfinztal, D

# 3<sup>rd</sup> European Symposium on Non-Lethal Weapons

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## Non-Lethal Options Enhancing Security and Stability

Conventional use of force solutions are struggling to manage the ever-changing challenges in military, law enforcement and peacekeeping operations. Hence there is the strong need for the adaptation and development of new use of force options. A potential solution to meet these new threats and challenges is through the use of Non-Lethal Weapons (NLWs). Non-Lethal Weapons provide military and law enforcement personnel with a tool to resolve conflict with a proportionate, lawful, appropriate and necessary use of force. Recent advances in non-lethal weapon technology have made it feasible for the military and law enforcement agencies to operate in situations and scenarios that would be unfeasible with conventional weapons. NLWs provide flexibility to influence many situations favourably with the reduced risk of human fatalities and collateral damage.

However current NLWs provided only limited capabilities and there is an urgent need for Research & Development into new Non-Lethal Technologies.

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## Topics

The 3<sup>rd</sup> European Symposium on Non-Lethal Weapons will act as a forum to review current and future non-lethal weapon technologies, to present new results and to discuss contributions to improve the understanding of the widespread and interdisciplinary phenomena of Non-Lethal Weapons.

The Symposium intends to encourage debate, to share knowledge and to promote international cooperation.

The Symposium will include topics such as:

- current and desired capabilities
- new technologies
- effects
- evaluation of effects
- modelling and simulation
- acceptability and implementation

Prior to the standard lectures of the Symposium, there will be given three presentations by the Chairmen of the virtual working groups on Non-Lethal Weapons.

# General Information

## REGISTRATION

Please return the enclosed registration form. Registration fees (incl. proceedings, coffee breaks, lunch), depending on arrival of the registration form at the ICT:

- Registration up to **April 18:**  
**EURO 900,-** (incl. 16% VAT)
- Registration up to **April 29:**  
**EURO 990,-** (incl. 16% VAT)

Participation cannot be guaranteed for registrations arriving after April 29, 2005.

The fee has to be paid **upon receipt of the invoice** either by

- remittance to the account given on the invoice
- or
- cheque

## CANCELLATION POLICY

**EURO 300.-** will be charged for cancellations after **April 29, 2005**.  
**No-shows** will be charged with **EURO 800,-**.

## ACCOMMODATION

**HORE Hotel Reservation,**  
Weingartener Str. 70,  
76229 Karlsruhe

Phone +49-(0)7 21/ 48 23 56  
Telefax +49-(0)7 21/ 48 26 14  
e-mail: HoreHotelReservation@t-online.de

An application form is enclosed.

## CONFERENCE OFFICE

**Foyer of the Stadthalle Ettlingen.**

Open from  
Tuesday, May 10, 14.00 h till  
Thursday, May 12, 17.30 h

**Phone +49-(0)72 43/101-158**  
**Fax +49-(0)72 43/101-157**

## CHECK IN / WELCOME RECEPTION

Please check in at the conference office on **Tuesday, May 10 between 14.00 and 20.00 h.**

All participants are cordially invited to the **Welcome Reception** on the same day, starting at **18.00 h** in the foyer of the Stadthalle Ettlingen.

## CONFERENCE LANGUAGE

English

## PROCEEDINGS

One copy is included in the registration fee. Additional copies cost **EURO 70,-** (Subscription price during the conference EURO 50,-).

8.30

**Opening & Introduction**

Opening  
K.-D. Thiel  
Fraunhofer ICT, Pfinztal, D

Welcome Address  
H.-G. Witten  
Ministry of Defence, Bonn, D

Key Note Lecture  
J.B. Alexander  
Las Vegas, USA

**Session 1 VIRTUAL WORKING GROUPS**  
**Chairman: H. Oppenheim,**  
**Bundesministerium für Landesverteidigung,**  
**Wien, A**

9.00

V1

**Critical Legal Aspects of Non-Lethal Weapons (NLW)**

F. Krüger-Sprengel  
International Society for Military Law and the  
Law of War, Brussels, B

9.35

V2

**Human Factors and Implications  
of Non-Lethal Options Group**

M. Risling  
Swedish Defence Research Agency (FOI),  
Stockholm, SE

10.10

V3

**Current and Emerging Non-Lethal  
Technologies**

V.V. Selivanov  
Bauman Moscow State Technical University,  
Moscow, RUS

10.45

**Coffee Break**

**Session 2 CURRENT AND DESIRED CAPABILITIES**  
**Chairman: R. de Maio, MOD-SEGREDIFESA,**  
**Rome, I**

11.10

V4

**HPM against Electronic Systems**

M. Jung, G. Wollmann  
Rheinmetall Waffe Munition GmbH, Unterlüß, D

- 11.35 V5 High Environmental Compatibility Cargo Projectile**
- R. Panesi  
O.T.O. Melara S.p.A., La Spezia, I
- 12.00 V6 The Netherlands Non-Lethal Weapons Programme**
- Z. Verheij  
TNO Defence, Security and Safety, Rijswijk, NL
- 12.25 Lunch Break**
- 13.30 Poster Session**
- Session 3 NEW TECHNOLOGIES**  
**Chairman: N. Eisenreich, Fraunhofer ICT, Pfinztal, D**
- 14.00 V7 Liquid Taser**
- J. Bohl  
Diehl BGT Defence, Röthenbach, D
- 14.25 V8 Current Research Activities on Non-Lethal Weapons at the Fraunhofer ICT**
- K.-D. Thiel, N. Eisenreich, J. Neutz, L. Deimling,  
W. Liehmann, S. Zettl  
Fraunhofer ICT, Pfinztal, D
- 14.50 V9 Optical Distraction and Disorientation**
- A. Gibson, R. Ives, G. Perkins, E. Liggins  
QinetiQ, Farnborough, UK
- 15.15 V10 A Concept Proposal from Beretta**
- P. Raffaelli  
Fabbrica d'Armi Pietro Beretta S.p.A., Gardone  
Val Trompia, I
- 15.40 Coffee Break**

**Session 4 EFFECTS**  
**Chairman: U. Sundberg, FOI, SE**

- 16.00 V11 Behavioural and Medical Aspects of Non-Lethal Options in Actual Field Conditions**
- C. Heal  
Los Angeles Sheriff's Department, Monterey Park, USA
- 16.25 V12 Conceptual Models of Psychological and Behavioral Reactions to the Use of Non-Lethal Weapons**
- M.D. Silver  
Anacapa Sciences Inc., Santa Barbara, USA
- 16.50 V13 Physical and Mathematical and Medico-biological Modeling of the Non-Lethal Kinetic Weapons' Functioning and Effects**
- V.I. Khрупkin, V.V. Savostyanov  
State Institute of Medical Officers' Postgraduate Education and Training, Moscow, RUS  
V.V. Selivanov  
Bauman Moscow State Technical University, Moscow, RUS
- 17.15 V14 Effectiveness and Risk during Application of NLW from the Medical Point of View**
- E. David  
University Witten/Herdecke, Witten, D
- 17.40 V15 Medical Information and Future Product Strategies for TASER Technology**
- T. Smith  
TASER International, Scottsdale, USA
- 18.05 V16 Advanced Taser: Neurophysiological Aspects**
- A. Buguet, J.-F. Jacquet  
ETBS, Bourges Cedex, F

**Session 5 EVALUATION OF EFFECTS I**  
**Chairman: V.V. Selivanov, Bauman Moscow State Technical University, Moscow, RUS**

- 8.30 V17 Principles of Modeling of the Scenario of Calmative Application in a Building with Deterred Hostages**
- V.L. Klochikhin, A.A. Lushnikov, V.A. Zagaynov  
Karpov Institute of Physical Chemistry, Moscow, RUS  
A.V. Putilov  
Federal Agency on Atomic Energy, Moscow, RUS  
V.V. Selivanov  
Bauman Moscow State Technical University, Moscow, RUS  
M.A. Zatevakhin  
St. Petersburg State University, St. Petersburg, RUS
- 8.55 V18 Observations on Changes in the Content of Tubulin Protein in Cell Cultures Exposed to High Power Microwave, in vitro**
- M. Risling, M. Sköld, E. Malm, A. Sonden, I. Larsson, M. Angeria  
Swedish Defence Research Agency FOI, Stockholm, SE  
L. Malmgren  
University of Lund, Lund, SE
- 9.20 V19 PSDB Update on UK less Lethal Technologies**
- G. Smith, M. Symons  
Police Scientific Development Branch, St. Albans, UK
- 9.45 V20 NATO Studies on Non-Lethal Weapons (NLWs): Effectiveness, Human Effects and Future Technologies**
- M.R. Murphy  
Air Force Research Laboratory, Brooks City-Base, USA
- 10.10 Coffee Break**



**Session 6 EVALUATION OF EFFECTS II**  
**Chairman: S. Tecl, Military Technical Institute of the Ground Forces Czech Army, Vyskov, CZ**

**10.40 V21 Measurement of Vircator Ultra-Short Solitary Electromagnetic Pulses**

M. Steinbauer, P. Drexler, P. Fiala  
Brno University of Technology, Brno, CZ

**11.05 V22 Methods and Equipment for Assessment of Microwave Radiation Influence on Biological Objects**

V.N. Makukhin  
Center of Scientific Engineering and Social Activities „Trymas“, Moscow, RUS

**11.30 V23 Pharmacological Non-Lethal Weapons**

L. Hess  
Institute for Clinical and Experimental Medicine, Prague, CZ  
J. Schreiberova  
Department of Anesthesiology, Hradec Kralove, CZ  
J. Fusek  
Military Medical Academy J.E.P., Hradec Kralove, CZ

**11.55 Lunch Break**

**Session 7    MODELLING AND SIMULATION**  
**Chairman: M. Hubbard, DSTL, Sevenoaks, UK**

- 13.00        V24        Influence of Physical and Geometrical Parameters on Vortex Rings Generated by a Shock Tube**
- M. Havermann  
ISL, Saint Louis, F  
M. Kainuma, K. Takayama  
Tohoku University Shock Wave Research Center,  
Sendai, JAP
- 13.25        V25        Computer System to Simulate NLW Deployment**
- M.V. Sinitsyn, V.V. Leonov, V.V. Selivanov  
Bauman Moscow State Technical University,  
Moscow, RUS
- 13.50        V26        Developing a Process to Evaluate Non-Lethal Weapons (NLW)**
- C. Pick, A. Groll  
EADS Deutschland GmbH, Friedrichshafen, D
- 14.15        V27        Fluid Dynamic Issues in the Development of a Single Shot Vortex Gun**
- J.A. Edwards  
DSTL Fort Halstead, Sevenoaks, UK  
K. Kontis  
University of Manchester, Manchester, UK
- 14.40                   Coffee Break**

**Session 8 ACCEPTABILITY AND IMPLEMENTATION**  
**Chairman: Z. Verheij, TNO Defence, Security and Safety, Rijswijk, NL**

- 15.00 V28 The International Development of Practitioners' Requirements by the International Law Enforcement Forum**
- C. Ashe  
Northern Ireland Police Fund, Holywood, UK
- 15.25 V29 Preconditions and Capabilities of Development and Deployment of Special Means of Combined Non-Lethal Effect**
- V.N. Baranov, V.V. Lazarev  
Ministry of Internal Affairs, Moscow, RUS  
V.V. Selivanov  
Bauman Moscow State Technical University, Moscow, RUS
- 15.50 V30 Military Use of Chemical Riot Control Agents, a Case for Legal Assessment**
- M. Annati  
Italian Navy, Milano, I
- 16.15 V31 Non-Lethal Options under Current International Law**
- A. Vanheusden  
Ministry of Defence, Brussels, B
- 16.40 V32 Issues for the Control of Non-Lethal Weapons Procurement**
- S. Combes  
MOD, London, UK
- 17.05 Summary
- 17.15 End of the Symposium

# Poster Programme

Posters will be presented during the whole Symposium. A special **Poster Session** will take place on **Wednesday, May 11, 13.30 – 14.00 h**. During this time authors should be present for discussion at their poster boards in the foyer.

- P33**            **Jet Protector Technology**  
J. Thomann  
Piexon AG, Aarwangen, CH
- P34**            **Development of Compact Generators of Microwave and TeraHertz Radiation for the Non-Lethal Technology Stop Car**  
V.G. Baryshevsky, N.A. Belous, A.A. Gurinovich,  
V.A. Evdokimov, A.S. Lobko,  
P.V. Molchanov, V.I. Stolyarsky, B.A. Tarnopolsky,  
V.V. Tikhomirov  
Belarusian State University, Minsk, BY
- P35**            **ISL's Research on Systems with Controlled Effects for Non-Lethal Applications**  
J.-P. Moeglin, M. Havermann et al.  
ISL, Saint Louis, F
- P36**            **Non-Lethal Ammunition**  
R. Körver  
Rheinmetall Waffe Munition GmbH, Oberndorf, D
- P37**            **RF-Weapons for Non-Lethal Interference and Destruction of Communication, Information and Electronic Systems**  
J. Bohl, R. Stark  
Diehl BGT Defence, Röthenbach, D
- P38**            **Acoustic NLW Working in the Audio Range**  
J. Altmann  
Ruhr-Universität, Bochum, D
- P39**            **Development of a Multi Functional Rapid Deployable Barrier**  
N. Eisenreich, J. Neutz, K.-D. Thiel, H. Ebeling, A. König, F. Weller  
Fraunhofer ICT, Pfinztal, D
- P40**            **Aspects of the Directed Stick Radiator (DSR)**  
N. Eisenreich, K.-D. Thiel, A. Herzog, E. Walschburger  
Fraunhofer ICT, Pfinztal, D
- P41**            **Engineering Method to Calculate Vortex Generators Parameters – Physical Capabilities Modeling of Vortex Ring and its Spreading Parameters**  
D. Levin, V. Selivanov  
Bauman Moscow State Technical University, Moscow, RUS

# Poster Programme

- P42**      **Computer Simulation of Critical Behavior of Localized Masses (Crowd)**  
A.V. Kozyrev, V.V. Leonov, V.V. Selivanov  
Bauman Moscow State Technical University, Moscow, RUS
- P43**      **Social Aspects of NLW Deployment**  
N.G. Bagdasaryan, V.V. Leonov, V.V. Selivanov  
Bauman Moscow State Technical University, Moscow, RUS
- P44**      **Issues of Criminalistic Examination of Non-Lethal Weapons**  
V.A. Fedorenko  
Saratov Law Institute of the MVD of Russia, Saratov, RUS
- P45**      **Medical Biological Evaluation of Electroshock Stun Guns Efficiency**  
G.V. Batanov  
State Scientific Center Institute of Biophysics, Moscow, RUS  
M.D. Kontorov  
Group „MARCH“, Moscow, RUS
- P46**      **The New Class of Electroshock Stun Guns**  
M.D. Kontorov  
Group „MARCH“, Moscow, RUS
- P47**      **Self-Contained Sources of Acoustic Waves Using High-Energy Materials Oscillatory Burning Modes**  
G. Sakovich, A. Vorozhtsov, B. Vorozhtsov, S. Bondarchuk, V. Arkhipov  
Institute for Problems of Chemical and Energetic Technologies SB RAS, Tomsk, RUS
- P48**      **The Research of Blast-Acoustic Fields, Generated by a System of Distributed Explosives Charges**  
G. Sakovich, A. Vorozhtsov, B. Vorozhtsov, S. Bondarchuk, E. Maksimenko  
Institute for Problems of Chemical and Energetic Technologies SB RAS, Tomsk, RUS
- P49**      **Modeling the Effect of Acoustic Non-Lethal Weapons**  
G. Fadeev, V. Ermolaeva, A. Nikolaev  
Bauman Moscow State Technical University, Moscow, RUS
- P50**      **Special Pyrotechnic Non-Lethal Means**  
N. Varenykh, G. Bideev, A. Sporykhin  
Scientific Research Institute of Applied Chemistry, Sergiev Posad, RUS

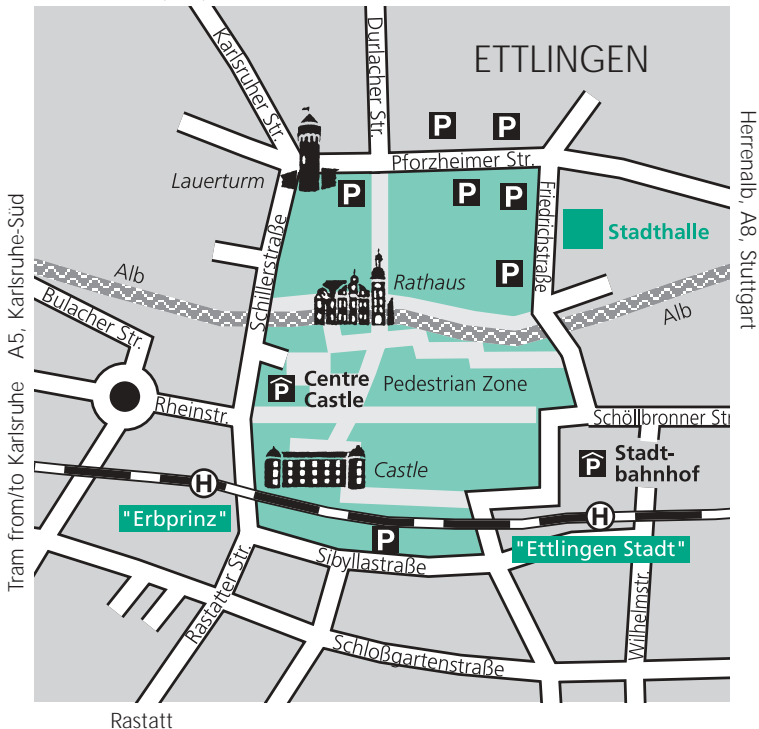
# Poster Programme

- P51 International Less Lethal Weapons Database**  
M. Symons  
Police Scientific Development Branch, St. Albans, UK
- P52 NLW Overview with Particular Reference to Areas of Concern**  
N. Lewer, N. Davison  
University of Bradford, Bradford, UK
- P53 Non-Lethal Weapons for Peacekeeping Operations**  
R. Rahimi, O.H. Arnesen, S. Hoibraten, H. Kippe  
Norwegian Defence Research Establishment, Kjeller, N
- P54 Encyclopedia of Non-Lethal Weapons**  
R.J. Bunker, P.L. Bunker  
California State University, San Bernardino, USA
- P55 Non-State OPFORs and Tactical Laser Devices & Weapons**  
R.J. Bunker  
California State University, San Bernardino, USA
- P56 Diversionary Device History and Revolutionary Advancements**  
M.C. Grubelich, P.W. Cooper  
Sandia National Laboratories, Albuquerque, USA
- P57 Evolution of X-Net™ to TruX-Net: A Heavy Vehicle Arresting System**  
C. Lyddon  
QinetiQ Vehicle Systems, Farnborough, UK
- P58 Non-Lethal...Is it a Reality?**  
D.M. Cole  
Shield Defense Corporation, Newport Beach, USA
- P59 Non-Lethal Weapons Bases on Electro-Hydrodynamical Effect**  
M. Silnikov, S. Kulakov, A. Mikhaylin  
NPO "Special Materials", Sankt-Petersburg, RUS

# Ettlingen City Plan

## How to find the venue

Karlsruhe, A5, Frankfurt Durlach, B 3

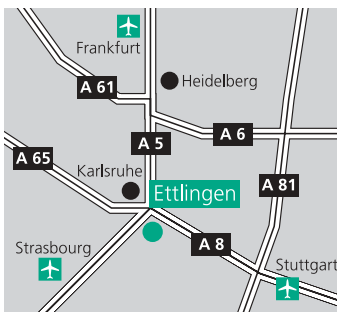


Rastatt

Ettlingen is located in the vicinity of Karlsruhe approx. 120 km south of Frankfurt/Frankfurt International Airport just beside the Autobahn A5.

Other airports are Strasbourg, F (approx. 100 km) and Stuttgart (approx. 90 km)

From the airport you may go by train (approx. 1 hour) to Karlsruhe Hauptbahnhof (Main Station), then take the »Stadtbahn« (tramway) S1 or S11, direction Ettlingen or Ittersbach, and (after approx. 15 min.) get out at »Ettlingen Stadt« (»Stadtbahnhof Ettlingen«). After a short walk (approx. 10 min.) you reach the »Stadthalle Ettlingen« (see map).



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## Points of Contact

### Chairman

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E-Mail: [kdt@ict.fhg.de](mailto:kdt@ict.fhg.de)

### Conference Management / Registration

Manuela Wolff  
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### Exhibition

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## Web site

[www.ict.fhg.de](http://www.ict.fhg.de)  
[www.non-lethal-weapons.com](http://www.non-lethal-weapons.com)



**Fraunhofer** Institut  
Chemische Technologie