

Directed Energy Systems 2012



PREPARING DIRECTED ENERGY FOR THE BATTLEFIELD

HOTEL VIER JAHRESZEITEN KEMPINSKI, MUNICH, GERMANY

PRE-CONFERENCE WORKSHOPS: 21ST FEBRUARY

MAIN CONFERENCE: 22ND & 23RD FEBRUARY



DIRECTED ENERGY SYSTEMS 2012 WILL ENABLE YOU TO:

- ▶ Gain updates on the latest programme developments from the major US organisations driving the directed energy sector, including the **Air Force Research Laboratory, Air Combat Centre, Office of Naval Research and DARPA**
- ▶ Asses the current work being carried out by European MoDs into DES systems
- ▶ Learn about on-going research from leading R&D bodies in areas such as **pulse power, meta-materials, non-lethal weapons, fiber lasers and more**
- ▶ Move beyond mere technical development and learn about the development of **military TTPs** and **concept of operations** for the **practical use of Directed Energy Systems**
- ▶ For the first time at the event, hear about the work of major prime industry companies such as **Boeing**
- ▶ **Network** face-to-face with military and industry contacts in an intimate environment that crowded trade shows cannot deliver

HEAR FROM SENIOR EXPERTS INCLUDING:

- Colonel Joseph Skaja**, Chief of Electronic Warfare, Information Operations and Directed Energy Division, Air Combat Command, **US Air Force**
- Dr Kirk Hackett**, Directed Energy Directorate, **US Air Force Research Laboratory**
- Major General George Harrison (ret'd)**, Director, Strategic Initiatives, **Georgia Technology Research Institute**
- Rear Admiral Massimo Annati (ret'd)**, Deputy-Director, **European Working Group on Non-Lethal Weapons**
- Mr. Mitchell Howell**, Deputy Director for Rapid Acquisition and Technology, **JIEDDO**
- Mike Rinn**, Vice President and Programme Manager, Directed Energy Systems, **Boeing**

PRE-CONFERENCE WORKSHOPS: 21ST FEBRUARY 2012

FACING THE HIGH-POWER MICROWAVE CHALLENGE

Led by **Dr Lionel Merlat**, French-German Research Institute – ISL

DEVELOPING THE NEXT GENERATION OF NON-LETHAL WEAPONS

Led by **Dr Mike Cathcart**, Remote Sensors Group, Georgia Technology Research Institute

“Directed Energy Systems is excellent, much more technical content than expected!”

Jacques Dubois, Defence R&D Canada, Valcartier

“Good job. Directed Energy Systems is very valuable”

Dr John Swegle, Senior Advisory Scientist, Savannah River National Laboratory USA

“Directed Energy Systems is very informative”

Captain Massimo Annati, Italian Navy and Deputy-Director of the European Working Group on Non-Lethal Weapons

Media Partners



PRE CONFERENCE WORKSHOPS: 21ST FEBRUARY 2012

WORKSHOP 1

FACING THE HIGH-POWER MICROWAVE CHALLENGE

There is an increasingly wide-range of ways of applying high-powered microwave technology in the defence sector, with systems being put to use in spheres, such as area protection and countering IEDs, as well as civil applications like vehicle stopping.

Non-lethal capabilities and action range are clearly of importance but dirty weapons emerging from the diversion of domestic microwave technologies are of primary concern in overseas theatres and mass transportation facilities or financial centres. Legal and ethical issues are also to be considered together with society's acceptance of the use of electromagnetic radiations. This workshop aims to review recent advances on high-power microwaves technologies for defence and security, specifically:

- Narrow-band up to ultra-wideband sources, tubes, pulse forming lines, antennas, etc.
- High-voltage power supply and energy storage / transformation chain, including batteries for mobile systems
- Specific metrology
- Embedded/portable systems
- Dedicated proving ground facilities
- Biological effects
- Military and civil doctrine.

This will be your chance to learn from one of Europe's most respected R&D groups. In a market traditionally seen to be led by the United States this is an opportunity to learn about the work currently being conducted by academia, governmental agencies and industries, and help to identify technology requirements and growth areas within the European HPM sector.

The workshop will be led by **Dr Lionel Merlat**, Senior Scientist, French-German Research Institute - ISL

WORKSHOP 2

DEVELOPING THE NEXT GENERATION OF NON-LETHAL WEAPONS

NLWs are an area of high interest currently and there is no doubt that this interest and the amount of developmental time and monies put into them is set to grow. Indeed, they are increasingly seen as a more morally acceptable use of directed energy systems and as a tactically useful force escalation option, a mid-way point before the use of traditional kinetic weapons.

The Georgia Technology Research Institute is a world renowned establishment with one of the most highly respected teams working on directed energy systems in the world. This workshop will address the development requirements, capabilities and tactical applications of directed energy NLWs. Well known systems such as ADS and Dazzlers will be discussed, as well as investigating the current cutting edge of NLW development.

Attending this workshop will enable you to gain a clear insight into the current capabilities and applications of NLWs, their use on global operations and current and future areas of development.

The workshop will be led by **Dr Mike Cathcart**, Remote Sensors Group, **Georgia Technology Research Institute**



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For more information on the conference programme and speaking opportunities, contact Alex Grant: defence@iqpc.co.uk

Visit the Directed Energy Systems Media Centre now to listen to and read the latest developments in the Directed Energy industry www.directedenergysystemsevent.com/Event.aspx?id=639820

P.S. please do contact us if you would like to contribute content.

DAY ONE AGENDA: 22ND FEBRUARY 2012

08.30 COFFEE AND REGISTRATION

09.00 CHAIRMAN'S WELCOME AND INTRODUCTORY COMMENTS

09.10 KEYNOTE: US AIR FORCE AIR COMBAT COMMAND: INTRODUCING THE DIRECTED ENERGY ENABLING POLICY

The US Air Force Air Combat Command is responsible for the combat enablement of the directed energy systems projects currently in development across the Air Force.

- Introducing the role and work of the ACC
- Studying the work in liaising with other DES Air Force development agencies
- Detailing the "Directed Energy Enabling Concept", the first step on the road to creating TTPs for directed energy systems

Colonel Joseph Skaja, Chief of Electronic Warfare, Information Operations and Directed Energy Division, Air Combat Command, **US Air Force**

09.50 KEYNOTE: UNITED STATES OFFICE OF NAVAL RESEARCH (ONR): LEADING THE DEVELOPMENT OF DIRECTED ENERGY SYSTEMS

The ONR has for a number of years been one of the keys agencies in the US driving the development of directed energy systems.

- Introducing the current structure of the ONR directed energy research team
- Updates on the current programmes in development by the ONR:
 - Free Electron Laser
 - Maritime Laser Demonstrator
- Looking forwards: analysing the likely timeline for achieving operational capability

Quentin Soulier, Programme Manager, **Office of Naval Research**

10.30 NETWORKING COFFEE BREAK

11.00 KEYNOTE: UNITED STATES AIR FORCE RESEARCH LABORATORY DIRECTED ENERGY DIRECTORATE

The US Air Force Research Laboratory is the R&D section of the US Air Force. It has been heavily involved in the development of directed energy systems since the early 90s.

- Introducing the Directed Energy directorate, the structure and personnel involved
- Detail of the status and lessons learned from non-lethal research projects including:
 - Dazzler
 - PHaSR
- Detail of the status and lessons learned from laser projects including:
 - COIL
 - YAL-1A
- Detail of the status and lessons learned from microwave projects including:
 - Active Denial System
 - CHAMP
- Discussing the future plans and development of DES from an AFRL perspective

Dr Kirk Hackett, Directed Energy Directorate, **US Air Force Research Laboratory**

11.40 UPDATE ON THE WORK OF THE HIGH ENERGY LASER JOINT TECHNOLOGY OFFICE (HEL JTO)

The HEL JTO was established in 2000 with the aim of developing and executing a comprehensive investment strategy for HEL science and technology that would underpin weapons development. The JTO is currently sponsoring 80 programs across industry, academia, and government agencies

- Outline of current projects and research efforts undertaken by HEL JTO
- Trends and developments within military HEL applications
- Operational considerations and the next steps for battlefield use of HEL

Mark Neice, Director HEL JTO, **US DoD**

12.20 NETWORKING LUNCH

13.30 JIEDDO – APPLYING DIRECTED ENERGY TO THE IMPROVISED EXPLOSIVE DEVICE PROBLEM

- Introduction to JIEDDO
- Introduction to C-IED CONOPS - i.e. how DE is used in C-IED Applications
- Coalition partner implications and info sharing relating to these technologies
- Enduring C-IED threat and requirements
- Directed energy capability gap and where JIEDDO needs help from industry and coalition partners

Mr. Mitchell Howell, Deputy Director for Rapid Acquisition and Technology, **JIEDDO**

14.10 A LASER GUN TO CLOSE CAPABILITY GAPS IN GROUND BASED AIR DEFENCE

- GBAD's Requirement for a HE Laser Shooter
- Lasers for C-RAM?
- Integration of HE Lasers in GBAD Systems
- Rules of Engagement with Laser Shooters
- Roadmap of the Rheinmetall Laser

Vice President, Marketing and Product Management, **Rheinmetall Air Defence AG**

14.50 ONE YEAR ON: PROGRESS IN ANALYSING THE PHYSICS OF LASER INTERACTION IN MILITARY AND HOMELAND SECURITY APPLICATIONS

- Linear and non-linear energy coupling
- Analysing countermeasures against optronical components and suggesting the military
- Laser effects on ammunitions

Dr. Ruediger Schmitt, Senior Scientist, Laser Applications, French German Research Institute, **ISL**

15.30 NETWORKING COFFEE BREAK

16.00 SPECIAL SOLID-STATE LASERS FOR PROTECTION OF AIRBORNE PLATFORMS BY JAMMING AND DAMAGE

The French-German Research Institute (ISL) was formed in 1958 with the aim of providing research, scientific study and pre-development in the armament domain.

- Introducing threat description according to jamming and damage lasers
 - Comparison of well known "classical" military lasers with small scale solid-state lasers and their adaptation to airborne platforms for operational use
 - Discussing different concepts of solid-state laser in the 2um range for jamming and damage treated by ISL
 - Looking forwards, project timelines and ultimate goals
- Dr. Michael H Von Salisch**, Senior Scientist, Special Laser Applications, French German Research Institute, **ISL**

16.40 BOEING MK 38 TACTICAL LASER SYSTEM PROGRAMME OVERVIEW

The use of high energy lasers on naval platforms has been one of the major research and development focuses of the military and industry partnerships focusing on directed energy system development.

- Overview of project so far
- Difficulties surrounding platform integration
- Overcoming heat and power generation issues
- Building on the initial test results, applications for future projects

Mike Rinn, Vice President and Program Manager Directed Energy Systems, **Boeing**

17.20 CHAIRMAN'S COMMENTS

17.40 CLOSE OF DAY ONE

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DAY TWO AGENDA: 23RD FEBRUARY 2012

08.30 COFFEE AND REGISTRATION

09.00 CHAIRMAN'S WELCOME AND INTRODUCTORY COMMENTS

09.10 HIGH POWER MICROWAVE (HPM) SUSCEPTIBILITY OF ELECTRONIC SYSTEMS

The Fraunhofer Institute for Technological Trend Analysis is part of the Fraunhofer Society, a research organisation consisting of 60 institutes spread throughout Germany. The Technical Trend Analysis Institute has strong experience in conducting electromagnetic research and experiments for state and industry bodies.

- Introducing the nature of the HPM threat
- Detailing and analysing the HPM susceptibility of electronic systems
- Examples of test results and their real world applications
- HPM detection and protection measures: learning to defend against the HPM threat

Dr. Michael Suhrke, Head of Business Unit Electromagnetic Effects & Threats, **Fraunhofer Institute for Technological Trend Analysis INT**

09.50 ENERGY GENERATION FOR DIRECTED ENERGY SYSTEMS

The University of Loughborough School of Electronic, Electrical and Systems Engineering and leaders into the research of pulsed power generation. This is a key technical development area as for many years the high power demands of directed energy systems have prevented them from being operationally practical.

- Introduction to the pulsed power research areas
- Discussion of the current status of research and goals of the project
- Feedback from the University of Loughborough Pulsed Power Symposium
- Opinion on the way ahead for achieving practical energy generation for military directed energy requirements

Dr Ivor Smith, Professor of Electrical Power Engineering, **University of Loughborough**

10.30 NETWORKING COFFEE BREAK

11.00 DISCUSSION PANEL: HOW CAN DIRECTED ENERGY SYSTEMS BE MOVED FROM THE ACADEMIC DRAWING BOARD TO AN OPERATIONAL REALITY?

DISCUSSION PANEL

- Bridging the technical divide:
 - Power requirements and processing
 - Achievement of operational durability
 - Increase of capabilities to meet operational demands
- Developing the concept of operation
- Overcoming the public and private negativity on the use of directed energy systems

11.40 DARPA: DEVELOPING THE HIGH ENERGY LIQUID LASER AREA DEFENCE SYSTEM (HELLADS)

DARPA are the technical development agency of the US DoD. DARPA are currently working on a number of high energy laser projects, the most significant of which is HELLADS.

- Design concepts and aims of the HELLADS project
- Studying the benefits of industry partnership
- Analysis of the testing phase
- Future development milestones

Dr Richard Bagnell, Programme Manager, **DARPA**

12.20 NETWORKING LUNCH

13.30 THE EUROPEAN WORKING GROUP ON NON-LETHAL WEAPONS

The EWG NLW is the leading working group in Europe promoting the development of non-lethal weapons. Directed energy systems are an important component area.

- Introduction to the work of the EWG NLW
- Discussion of the significant projects under development such as DESTO (Direct Energy STopper)
- Update on the progress specific nations such as Italy have had in producing directed energy non-lethal weapons

Rear Admiral Massimo Annati (ret'd), Deputy Director, **European Working Group on Non-Lethal Weapons**

14.10 GEORGIA TECHNOLOGY RESEARCH INSTITUTE (GTRI): HELPING TO LEAD THE WAY IN TECHNICAL DEVELOPMENT

GTRI are an internationally renowned centre for technical research and development.

- DES systems and capabilities
- Test and evaluation needs for DEW Systems
- Existing test range capabilities
- Shortfalls in test & evaluation capabilities
- DES test & evaluation systems development
- Updates on major DES projects currently underway

Major General George Harrison/Dr Michael Cathcart, Remote Sensors Group, **Georgia Technology Research Institute**

14.50 NETWORKING COFFEE BREAK

15.20 OPERATIONAL CONSIDERATIONS FOR NON-LETHAL ANTI-PERSONNEL DIRECTED ENERGY WEAPONS

- Technological issues regarding DE NLWs
- Focus: The Active Denial System (ADS)
- Considering scenarios for ADS use
- The implications of ADS deployment under real world conditions

- The wider perspective of DE NLWs

Dr. Sjef Orbons, Senior Research Scientist, **Netherlands Defence Academy**

16.00 DRDC - ZAPLIGHT PROJECT, USING LASERS AS AN IMPROVED EXPLOSIVE DEVICE COUNTERMEASURE

IEDs are clearly one of the major issues faced by militaries in recent times. DRDC in Canada have looked to develop a solution to this problem through the development of their Zaplight project.

- Introduction to Femtosecond laser technology, the basis of Zaplight
- Discussion of the operational effects of Zaplight, how it is able to defeat IEDs
- Update on current status of development
- View of how this technology could be adapted and applied in future

Senior Representative (TBC), Electro-Optic Warfare Section, **DRDC Valcartier**

For additional information, or if you would like to participate in Directed Energy Systems 2012, please contact:

16.40 CHAIRMAN'S COMMENTS

16.50 CLOSE OF DAY TWO

Don't forget to sign up to the workshops and register for Directed Energy Systems 2012 at www.directedenergysystemsevent.com

An Apology:

Earlier editions of the Directed Energy Systems brochure incorrectly associated MBDA UK Limited with a programme, ADS, with which they have no involvement whatsoever.

Defence IQ bears sole responsibility for this error and would like to apologise for any offence caused.

Directed Energy Systems 2012

Hotel Vier Jahreszeiten Kempinski, Munich, Germany

Pre-conference Workshops: 21st February

Main Conference: 22nd & 23rd February

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