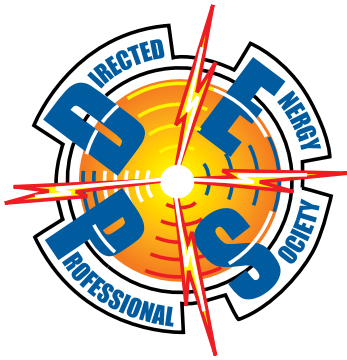


**Seventeenth Annual
Directed Energy
Symposium
Technical Program**



**DE Operations and
the Warfighter**

**2 - 5 March 2015
Anaheim, California**

Symposium Information

Locations of Symposium Events

Most symposium sessions will be held at the Hyatt Regency Orange County in rooms identified in the program. Classified sessions will be held at an offsite location to be disclosed upon arrival.

Buses

Bus transportation will be provided from the hotel to the classified sessions. Buses to the classified facility begin transporting at 0700 Tuesday and run until 30 minutes after the end of the final daily session. Morning buses will leave at 0700 Tuesday and Wednesday and run continually approximately every 30 minutes. No writing materials, computers, or bags will be allowed on the bus. You may bring cell phones and leave them outside of the sessions, but the area will not be secured. Badges and IDs will need to be visible at all times while in the conference area, on the bus, and at the classified facility.

Breakfasts

Breakfast snacks will be served Tues - Thurs at the Hyatt starting at 0630. Speakers are encouraged to eat breakfast with their session chairs on the day of their presentation. Look for table tents to designate your session's breakfast table.

Lunches and Breaks

Lunch will be served Tuesday and Wednesday at the Hyatt. Limited coffee and snacks will be available during breaks will be available Monday - Thursday.

Directed Energy Education Workshop

The DE Education Workshop is a separate event from the Symposium, scheduled for Thursday, 5 March, at the hotel. Any Symposium registrant may attend the Workshop at no additional charge, however a separate registration will need to be completed.

SECURITY NOTE:

Letters listed in this agenda after presentation titles indicate distribution statements as follows:

- A - information is public release
- C - information is limited to U.S. citizens who are **employees of the U.S. Federal Government or its contractors**
- D - information is limited to U.S. citizens who are **employees of the U.S. Department of Defense or U.S. citizens working on DOD contracts**

SHORT COURSES

Short Courses will be held throughout the week in the Hyatt Hotel Grand Ballroom D. They will run at the same time as technical sessions. The following courses will be offered:

TUESDAY MORNING

Introduction to High Power Microwaves

Instructor: Mark Rader, Naval Research Laboratory

TUESDAY AFTERNOON

High Power Microwave Test and Evaluation

Instructor: Jeffrey Schleher, TRMC

WEDNESDAY MORNING

Introduction to High Energy Lasers

Instructor: John Wachs, Schafer Corporation

WEDNESDAY AFTERNOON

Tri-Service Lethality Part 1: Testing and Equipment

Instructors: See www.deps.org for complete list

THURSDAY MORNING

Tri-Service Lethality Part 2: Modeling and Simulation Tools/Techniques

Instructor: See www.deps.org for complete list

Upcoming 2015 Directed Energy Professional Society Events

DE2DC

13 - 17 April 2015 - Washington DC

US-UK DE Workshop

15 - 19 June 2015 - Swindon, UK

Systems Symposium

15 - 18 September 2015 - Norfolk, VA

MONDAY AFTERNOON

Plenary Session (Open)

Hyatt, Grand Ballroom E

- 1000 **Registration Opens at the Hyatt**
- 1400 **Welcome**
- 1405 **Call to Order, Administrative Remarks**
RADM Nevin Carr, USN (ret),
Symposium Co-Chairman
- 1415 **Keynote - Mr. Earl Wyatt; Deputy Assistant Secretary of Defense for Emerging Capabilities**
- 1500 **LG Ellen Pawlikowski; Military Deputy, Office of the Secretary of the Air Force for Acquisition**
- 1530 **Break**
- 1600 **Directed Energy: Increasing Surface Warfare Lethality & Flexible Deterrence**
Admiral James Kilby; Commander, Naval Weapons Surface Development Center
- 1630 **Operational Applications and Considerations for Directed Energy**
Col Greg Dewitt; Director, Fires Capability Development & Integration Directorate, Ft Sill OK
- 1700 **DEPS Status and Recognitions**
Dr Jim Horkovich, DEPS Vice President
- 1730 **Evening Reception and Poster Session**
Sponsored by:
Raytheon

MONDAY EVENING

Open Poster Session

Chair: *Ms. Cynnamon Spain, DEPS*
Hyatt, Grand Ballroom E

HEL Enhancements to Brawler, A Key DoD Air-to-Air Engagement Model, Used by the Acquisition Community (A)

Bob Ackerman, NAVAIR

Application of Time-Gated Fourier Transform to Extract Statistical and Deterministic Properties of Electromagnetic Cavities (A)

Bisrat Addissie, University of Maryland

Interferometric Determination of a Diode Pumped Alkali Laser (DPAL) Temperature Profile (A)

Noah Blach, USAF Academy

Satellite-Derived Atmospheric Profiles of Cn2 (A)

Kegan Buchhop, AFIT

The Effect of Incidence Angle on Laser Drilling of Structural Material (A)

Patrick Dods, United States Naval Academy

Increasing Thermal Modal Instabilities Threshold Through Engineered Pump Scheme (A)

Zeinab Sanjabi Eznaveh, University of Central Florida

Upgrade and Integration of AAPT into Falcon-10 for AAOL-T (A)

Riley Hampton, AFIT

Pressure Broadening and Pressure Shifts of Rubidium Alkali With Argon Buffer Gases (A)

Kevin Lapp, AFIT

Alkali-Noble Gas Atomic Lasers with Effective Quantum Efficiencies Above 100% (A)

Andrey Mironov, University of Illinois

High Energy Laser Integration on Submarines - Material Characterization of Maritime Effects on Aperture Element (A)

Clayton Petty, US Naval Academy

Evaluation of Atmospheric Refractive Index Gradient Variations from Time-Lapse Imagery (A)

Zachary Pollock, AFIT

MONDAY EVENING

Open Poster Session (continued)

The Directed Energy Test Science and Technology Non-Intrusive HPM Sensor Program (A)

Jeffrey Schleher, American Systems

Validation of Lidar Aerosol Classification: Marine Aerosols over WPAFB (A)

Sam Wamsley, AFIT

Radiation Effects on EO Detector Lifetime (A)

Joel Williams, Colorado State University

Limited Distribution Session

Chair: *Ms. Cynnamon Spain, DEPS*

Hyatt, Grand Ballroom B

UAS Fuel Bladder Test Results (F)

Steven Baird, Space and Missile Defense Command

HEL Beam Diagnostics Results using “Thermal Plates” (D)

Steven Baird, Space and Missile Defense Command

IED Detection and Pre-Detonation with CW Magnetic Fields (D)

James Camp, NSWC Dahlgren Division

IED Pre-Detonation with Pulsed Magnetic Fields (D)

James Camp, NSWC Dahlgren Division

Compact, High Voltage Solid-State Switch Development at AFRL (C)

Al Lerma, Leidos

IED Pre-Detonation with Pulsed Magnetic Fields (D)

Kevin Lawson, Booz Allen Hamilton, Inc.

The Directed Energy Test Science and Technology Test Source Program (C)

Jeffrey Schleher, American Systems

Directed Energy Test and Evaluation: Supporting T&E of HEL Weapon Systems in a Variety of Engagement Scenarios (D)

Edward Trzcienski, AEGIS Technologies Group, Inc.

TUESDAY MORNING

Optical Coatings (Limited/Open)

Chair: *Mr. Al Ogloza*, Naval Postgraduate School
Hyatt, Grand Ballroom E

0700 **Breakfast Snacks and Registration at Hyatt**

Session is Limited Distribution

0800 **AR Nano-Textures For kW-Class Fiber Lasers (D)**

Douglas Hobbs, TelAztec LLC

Session is now Open

0830 **Design of Low-Loss High Energy Laser Mirrors (A)**

Drew Schiltz, Colorado State University

0900 **Interference Coatings for 1.6-2 μm Lasers (A)**

Carmen Menoni, Colorado State University

0930 **Break**

1000 **Environmental Testing and Evaluation of Antireflective Surface Structures on Silica Windows for High Energy Laser Systems (A)**

Lynda Busse, Naval Research Laboratory

1030 **CW Laser Particle Induced Damage and Conditioning (A)**

Andrew Brown, University of Minnesota

1100 **CW Laser Damage of High Reflectivity DBR Coated Optics (A)**

Kyle Olson, University of Minnesota

1130 **Impact of the Maritime Environment on HEL Optical Coatings (A)**

Andres Lozano, Naval Surface Warfare Center

1200 **Lunch at Hyatt Royal Ballroom**

1245 **Luncheon Speaker**

Capt Michael Ziv, USN, NAVSEA PMS 405

TUESDAY MORNING

Novel Fiber Lasers and Technology I (Limited/Open)

Chair: *Mr. Don Seeley*, Joint Technology Office
Hyatt, Grand Ballroom B

0700 **Breakfast Snacks and Registration at Hyatt**

Session is Limited Distribution

0800 **Multi-kilowatt All-Fiber Coherent Combiner and Switch (D)**

Gregory Goodno, Northrop Grumman
Aerospace Systems

Session is now Open

0830 **Design and Characterization of Fiber Laser Array with Near 100% Throughput and Diffraction Limited Spot Combination Exceeding 70% (A)**

Leonid Beresnev, Army Research Laboratory

0900 **High-Aspect-Ratio-Core Fiber for Multi-kW Fiber Lasers (A)**

John Marciante, University of Rochester

0930 **Break**

Novel Fiber Lasers and Technology II (Open)

Chair: *Dr. Jack Stater*, Schafer Corporation

1000 **Double-Clad Raman Fiber Laser Cladding-Pumped by Laser Diodes (A)**

Mark Dubinskiy, US Army Research Laboratory

1130 **High-Power All-Solid Photonic Bandgap Fiber Lasers (A)**

Liang Dong, Clemson University

1100 **Double Clad Single Crystal Fiber for High Power Lasers (A)**

Brandon Shaw, Naval Research Laboratory

1130 **Er Nanoparticle Doped Fibers for Resonantly-Pumped High Energy Laser Applications (A)**

Edward Friebele, Naval Research Laboratory

1200 **Lunch at Hyatt Royal Ballroom**

1245 **Luncheon Speaker**

Capt Michael Ziv, USN, NAVSEA PMS 405

TUESDAY MORNING

QRC / LaWS (Limited)

Chair: *Mr. Ron Flatley*, Naval Surface Warfare Center Hyatt, Grand Ballroom F

- 0700 **Breakfast Snacks and Registration at Hyatt**
- 0800 **Invited Talk: The AN/SEQ-3(XN-1)Laser Weapon System: Viewpoint from the USS PONCE Captain During Initial Deployment (D)**
CAPT Dale Maxey, US Navy
- 0830 **The AN/SEQ-3(XN-1) High Energy Lasers and Optical System (D)**
Jake Sames, Penn State Electro-Optics Center
- 0900 **The AN/SEQ-3(XN-1) Laser Weapon System Safety (D)**
Gunendran Sivapragasam, Naval Surface Warfare Center
- 0930 **Break**
- 1000 **The AN/SEQ-3(XN-1) Beam Control System - Design and Lessons Learned (D)**
Robert Pawlak, Naval Surface Warfare Center
- 1030 **AN/SEQ-3(XN-1) Laser Weapon System Active Imaging and Sensors Systems (F)**
David Newton, Naval Surface Warfare Center
- 1100 **In-Service Engineering Agent (ISEA) Perspective on an HEL PoR (F)**
Jason Bickford, Naval Surface Warfare Center
- 1200 **Lunch at Hyatt Royal Ballroom**
- 1245 **Luncheon Speaker**
Capt Michael Ziv, USN, NAVSEA PMS 405

TUESDAY MORNING

HPM Sources (Secret)

Chair: *Mr. W. Mark Henderson*, Naval Air Warfare Center

Offsite Location

- 0700 **Breakfast Snacks and Registration at Hyatt Buses to Offsite Location Begin**
- 0800 **Compact Mobile Counter Electronics Concept (C)**
- 0830 **Novel Pulse Forming Lines for High Power Microwave Systems (F)**
- 0900 **600 MW Solid State HPRF Source (F)**
- 0930 **Break**

HPM Systems & Technology (Secret)

Chair: *Mr. Jeff Alexander*, Sandia National Laboratories

- 1000 **Advanced High-Longevity GaAs Photoconductive Semiconductor Switches (C)**
- 1030 **Compensating for the Effects of Band Limited Analysis in ATHENA Models (C)**
- 1100 **Electronic Battle Damage Assessment for EA (C)**

Human Effects (Limited)

Chair: *Mr. Matt McQuage*, Naval Surface Warfare Center

- 1130 **Fundamental Mechanism(s) Underlying Nanosecond Electric Pulse Bioeffects (C)**
- 1200 **Lunch at Hyatt Royal Ballroom**
- 1245 **Luncheon Speaker**
Capt Michael Ziv, USN, NAVSEA PMS 405

TUESDAY AFTERNOON

Beam Propagation & Wavefront Control (Limited/Open)

Chair: *Dr. Steve Fiorino*, Air Force Institute of Technology

Hyatt, Grand Ballroom B

Session is Limited Distribution

1330 **Development of a Standard Maritime Cn2 Model using Satellite Measurements (C)**

Steven Fiorino, Air Force Institute of Technology

Session is now Open

1400 **Absorption and Scattering of an HEL Beam by Atmospheric Aerosols (A)**

Richard Fischer, Naval Research Laboratory

1430 **A Novel Approach to Augmenting SRI Wavefront Measurements with Hartmann Gradient Measurements in Strong Turbulence (A)**

Michael Steinbock, Air Force Institute of Technology

1500 Break

1530 **Adaptive Optics Control for Strong Turbulence Using Iterative Wavefront Reconstruction (A)**

Jae Jun Kim, Naval Postgraduate School

1600 **Development of a Maritime Atmospheric Propagation Test Range (A)**

Seth Bourn, Naval Surface Warfare Center

TUESDAY AFTERNOON

Laser Design I (Limited)

Chair: *Dr. Brian Strickland*, Space and Missile Defense Command

Hyatt, Grand Ballroom F

1330 **Performance of a Beam-Combined HEL System (C)**

Daniel Miller, MIT Lincoln Laboratory

DE Systems & Programs (Limited)

Chair: *Dr. J. Thomas Schriempf*, Naval Sea Systems Command

1400 **Solid State Laser Technical Maturation Program (D)**

Peter Morrison, Office of Naval Research

1430 **Ground Based Air Defense Directed Energy Status (D)**

Dale Geiger, NAVSEA

1500 Break

1530 **DE Research Project Update at Defence R&D Canada (D)**

Dominik Pudo, Defence R&D Canada

1600 **The High Energy SBC Fiber Laser Demonstrator Update (D)**

C. Denton Marrs, Naval Air Warfare Center

1630 **High Energy Laser Mobile Demonstrator (HEL MD) Update (C)**

Michelle Kincer, Space and Missile Defense Command

TUESDAY AFTERNOON

Policy and Safety I (Limited/Open)

Chair: *Dr. Steven Fiorino*, Air Force Institute of Technology

Hyatt, Grand Ballroom E

Session is Limited Distribution

1330 **The Joint Laser Deconfliction Safety System (JLDSS) for Military Platforms (D)**
Melissa Olson, Naval Surface Warfare Center

1400 **Development of a Deconfliction Plan for AFIT's Model Validation Lidar (C)**
Steven Fiorino, Air Force Institute of Technology /ENP

Session is Now Open

1430 **Electromagnetic Safety Standards Setting: Transitioning Research to Force Health Protection (A)**
Stephanie Miller, Air Force Research Laboratory

1500 Break

1530 **Biological Effects of Laser Exposure (A)**
Semih Kumru, 711 HPW/RHDO

Tactical Application and Policy Issues for Deployed Lasers (Open)

Chair: *Mr. David Sullins*, Directed Energy Warfare Office

1600 **Joint Fiber Laser Mission Employment (J-FLaME) (A)**
Scott Boyd, Naval Surface Warfare Center

1630 **Future Roles of Directed Energy Weapons to Counter Anti-Access/Area-Denial Strategies (A)**
Dave Kiel, NAVSEA

TUESDAY AFTERNOON

HPM Effects (Secret)

Chair: *Mr. Matt McQuage*, Naval Surface Warfare Center

Offsite Location

1330 **Effects of High Power Microwave Exposure on Trained and Motivated Rats (F)**

1400 **Susceptibility of Radio-Controlled (RC) Improvised Explosive Device (IED)-Related Devices (C)**

1430 **IED Pre-Detonation with Pulsed Magnetic Fields (D)**

1500 Break

1530 **Neutralization of Commercial UAS with HPM (C)**

1600 **Short Pulse Counter Electronics Vulnerability Analysis at NSWCDD (C)**

1630 **Short Pulse Counter Vehicle Vulnerability Analysis at NSWCDD (C)**

1730 **High-Power Electro-Magnetic and Non-Kinetic Counter Electronic Assessment and Modeling (C)**

HPM Modeling (Secret)

Chair: *Mr. W. Mark Henderson*, NAWC China Lake

1730 **Size, Weight, and Power (SWaP) System Modeling Tool (C)**

WEDNESDAY MORNING

Thermal Management (Limited)

Chair: *Ms. Kenya McLin*, Space and Missile
Defense Command

Hyatt, Grand Ballroom B

0700 **Breakfast Snacks and Registration**

0800 **Two-Phase Pumped Cooling for Directed
Energy Weapon Applications (D)**

Tapan Desai, Advanced Cooling
Technologies, Inc.

0830 **Solid-Vapor Sorption Based Thermal
Management Technology for Compact and
Light HEL Systems (C)**

Kaveh Khalili, Rocky Research

0900 **Operation of an Integrated 400kW Electrical
Power System and a 240kW Thermal
Management System with an Emulated SS
HEL Weapon (C)**

Chuck Oberly, UES Inc

0930 **Break**

1000 **Thermal Energy Storage Device
Optimization for a High Energy Fiber
Laser Thermal Management System (A)**

Christian Rodriguez, Mainstream
Engineering Corporation

New Developments in Beam Control Systems and Technology (Limited)

Chair: *Mr. Jorge Beraun*, Air Force Research Lab

1030 **High-Power Adaptive DE System (HADES) (C)**

Dan Marker, Air Force Research Laboratory

New Developments in Atmospheric Measurement Systems (Limited)

Chair: *Dr. Stephen Hammel*, SPAWAR Systems Center

1100 **Compact LIDAR for Continuous Monitoring
of Atmospheric Extinction (C)**

Steven Davis, Physical Sciences Inc.

1130 **Measurements of Optical Turbulence using
an Instrumented Micro Air Vehicle (C)**

Steven Davis, Physical Sciences Inc.

1200 **Lunch at Hyatt Royal Ballroom
Sponsored by: Booz Allen Hamilton**

1245 **Luncheon Speaker**

14 *Mr. Dave DeYoung*, Boeing

WEDNESDAY MORNING

Acquisition, Tracking and Jitter Control (Limited)

Chair: *Dr. Jim Lasche*, Air Force Research
Laboratory/RD

Hyatt, Grand Ballroom E

0700 **Breakfast Snacks and Registration**

0800 **Speckle Noise Mitigation in Coherent Laser
Illuminated Images for High Speed Tracking
Algorithms (C)**

David Dayton, Applied Technology Associates

0830 **Modeled and Measured Polychromatic
Illumination Speckle Effects from Sloped
Surfaces for Tactical Tracking (C)**

Noah Van Zandt, Air Force Institute of
Technology

0900 **Improvements to Tracking Reliability on
AFIT Active Pointer/Tracker (AAPT)
Performance for AAOL Flights (C)**

Matthew Krizo, Air Force Institute of
Technology

0930 **Break**

HPM Sources (Open)

Chair: *Mr. W. Mark Henderson*, Naval Air
Warfare Center

1000 **Nonlinear Metamaterials for High Power
Short Pulse Generation (A)**

Walter Wall, Naval Research Laboratory

1030 **Advances in Low-Profile Leaky-Wave
Conformable Antennas for HPM
Applications (A)**

Robert Koslover, SARA, Inc

1100 **Passive Microwave Pulse Compression via
Time-Reversal in a Compact Reverberation
Cavity (A)**

Victor Mendez, Naval Research Laboratory

Counter HPM Technology (Open)

Chair: *Dr. Lew DeSandre*, Naval Postgraduate School

1130 **Nonlinear Metamaterial Response to Plane
Wave Radiation (A)**

Phillip Meyerhofer, Naval Research
Laboratory

1200 **Lunch at Hyatt Royal Ballroom**

WEDNESDAY MORNING

HEL Testing (Limited/Open)

Chair: *Ms. Michelle Kincer*, Space and Missile
Defense Command

Hyatt, Grand Ballroom F

0700 **Breakfast Snacks and Registration at Hyatt**

Session is Limited Distribution

0800 **Run Time and Beam Quality Testing for
the Raytheon RELI Program (D)**

David Mordaunt, Raytheon Space and
Airborne Systems

Session is now Open

0830 **Distance Support In-Service Engineering for
the High Energy Laser (A)**

Matthew Sheehan, Naval Postgraduate School

Laser Design II (Limited/Open)

Chair: *Dr. Brian Strickland*, Space and Missile
Defense Command

Session is Limited Distribution

0900 **Narrow Line Width Fiber Laser Power
Scaling for Beam Combined Directed
Energy Systems (D)**

Eric Honea, Lockheed Martin Laser and
Sensor Systems

0930 Break

1000 **Pump Considerations for High Power Laser
Systems (D)**

Christopher Rista, Barber-Nichols Inc.

Session is now Open

1030 **Large Mode Area, All-Solid Photonic
Bandgap Fiber with Resonant Cladding
Cores (A)**

Guancheng Gu, Clemson University

1100 **Erbium-Doped GaN Grown by Hydride Vapor
Phase Epitaxy as a Gain Medium for
Solid-State High Energy Lasers (A)**

Zhenyu Sun, Texas Tech University

1200 **Lunch at Hyatt Royal Ballroom
Sponsored by: Booz Allen Hamilton**

1245 Luncheon Speaker

Mr. Dave DeYoung, Boeing

WEDNESDAY MORNING

DE Systems & Programs (Secret)

Chair: *Dr. J. Thomas Schriempf*, Naval Sea Systems
Command

Offsite Location

0700 **Breakfast Snacks and Registration at Hyatt
Buses to Offsite Location Begin**

0800 **Air Force Plans for Aircraft Self-Defense
Laser Flight Demos for Emerging Threats (D)**

0830 **High Energy Laser for Future Air Dominance
(HEL-FAD) (C)**

0900 **The High Energy Liquid Laser Area Defense
System (HELLADS) (D)**

0930 Break

1000 **High Repetition Rate Directed Energy
Systems (C)**

1030 **Maritime Improvised Explosive Device
Investigation (MIEDI) for Non-Lethal Vessel
Stopping Applications (F)**

QRC / LaWS (Secret)

Chair: *Mr. Ron Flatley*, Naval Surface Warfare Center

1100 **AN/SEQ-3(XN-1) Laser Weapon Console (F)**

1130 **Test and Evaluation of the AN/SEQ-3(XN-1)
Laser Weapon System (F)**

1200 **Lunch at Hyatt Royal Ballroom**

Sponsored by: Booz Allen Hamilton

1245 Luncheon Speaker

Mr. Dave DeYoung, Boeing

Industry Panel

Hyatt, Grand Ballroom B

1330 **Moderator:** *Mr. Mark Neice*, DEPS

Panel:

Mr. Jeff Barchers, Nutronics

Dr. Jim Davis, General Atomics

Mr. Mark Pedrazzi, BAE Systems

Mr. Bob Praus, MZA

Dr. Glenn Tyler, the Optical Science Co

Invited Talk (Open)

1430 **Better Buying Power**

Dr. Bill Decker, Defense Acquisition University

1500 Break

Policy and Safety II (Limited)

Chair: *Ms. LeAnn Brasure*, Schafer Corporation

1530 **High Power Microwave Effects Testing Standardization (C)**

Grady Patterson, TechFlow, Inc

1600 **A Consistent Risk Based Approach for DEW RDT&E, Training/Exercises and Operations (C)**

Kelly Hammett, Air Force Research Laboratory

1630 **HEL JTO Laser Deconfliction Program**

LeAnn Brasure, Schafer Corporation

Optically-Pumped Alkali and Rare Gas Lasers (Limited/Open)

Chair: *Dr. Harro Ackermann*, Joint Technology Office
Hyatt, Grand Ballroom F

Session is Limited Distribution

1330 **Characterization of a Diode Pumped Alkali Laser with a Flowing Gain Medium (C)**

Greg Pitz, Air Force Research Laboratory

1400 **Pressure Broadening and Pressure Shifts of Rubidium (Rb) Alkali with Argon (Ar) Buffer Gases (C)**

Kevin Lapp, Perdue University

Session is now Open

1430 **Hydrocarbon Free Potassium DPAL with Flowing Gain Medium (A)**

Boris Zhdanov, US Air Force Academy

1500 Break

1530 **Two-Photon Excitation of Alkali Metal Vapors - Kinetics and Spectroscopy (A)**

Glen Perram, Air Force Institute of Technology

1600 **Optically Pumped Microplasma Rare Gas Laser (A)**

Steven Davis, Physical Sciences Inc.

1630 **Alkali-Noble Gas Atomic Lasers with Effective Quantum Efficiencies Above 100% (A)**

Andrey Evgenievich Mironov, University of Illinois

WEDNESDAY AFTERNOON

HPM Systems & Technology (Limited)

Chair: *Mr. Jeff Alexander*, Sandia National Laboratories

Hyatt, Grand Ballroom E

- 1330 **Recent Millimeter Wave Research: Pulsed Effects (C)**
Jeff Whitmore, Air Force Research Laboratory
- 1400 **Advancements in the Multi-Frequency Recirculating Planar Magnetron (A)**
Geoffrey Greening, University of Michigan

Counter HEL Technology (Limited)

Chair: *Dr. Lew DeSandre*, Naval Postgraduate School

- 1430 **High Power Self-Limiting Antenna for Counter HPM Applications (D)**
Walter Wall, Naval Research Laboratory
- 1500 Break
- 1530 **Nonlinear Optical Bulk Nano-Composites for C-DEW Applications (C)**
Tony Ting, Naval Research Laboratory
- 1600 **Calculation of Laser Scattering from Aerosols Undergoing Vaporization (C)**
Joseph Penano, Naval Research Laboratory
- 1630 **Organic and Ceramic Polymers as Hosts for NLO Nanoparticles in CDEW Composites (C)**
Duane Simonson, RSI, Inc.
- 1700 **Detection and Location of Thermal Gradients in Structures Using Embedded Optical Fiber Bragg Grating Sensors (A)**
Gavyn Gonzales, US Naval Academy

WEDNESDAY AFTERNOON

Tactical Application and Policy Issues for Deployed Lasers (Secret)

Chair: *Mr. David Sullins*, Naval Surface Warfare Center

Offsite Location

- 1330 **Solid State Laser Simulation Experiment (SIMEX) 14-1 (C)**
- 1400 **Laser TACBUL / Ops Demo (C)**
- 1430 **A Day in the Life of LaWS Aboard USS PONCE (C)**
- 1500 Break
- 1530 **DEW Policy Challenges: A SOF Perspectives**

HEL Modeling & Simulation (Secret)

Chair: *Mr. Jeff Williams*, Sandia National Laboratories

- 1600 **Kinetic and Directed Energy Weapons Working Together: An Example of Campaign Analysis**
- 1630 **Laser Weapon System Performance Estimate for a Fighter Class Aircraft (D)**
- 1700 **Required HEL Effective Range to Self-Protect Against Strategic SAM (D)**

THURSDAY MORNING

HEL Material Effects (Limited)

Chair: *Mr. Robert Roybal*, Air Force Research Laboratory

Hyatt, Grand Ballroom E

0700 **Breakfast Snacks and Registration at Hyatt**

0800 **Combined HEL and kHz Laser Filament Material Interactions (C)**

Mike Helle, Naval Research Laboratory

0830 **UAS Fuel Bladder Test Results (F)**

Steven Baird, Space and Missile Defense Command

0900 **Ultrashort Pulse Enhanced Low-Frequency Broadband Radiation from Material Surfaces (A)**

John Palastro, Icarus Research, Inc.

0930 Break

1000 **HEL Fires: Thermal Management and Fuel Leaks (D)**

Hartmut Legner, Physical Sciences Inc.

1030 **HEL Beam Diagnostics Results using "Thermal Plates" (D)**

Steven Baird, Space and Missile Defense Command

1100 **Sublimation and Oxidation of Fiber Laser Irradiated Graphite in Shear Flow**

Glenn Perram, Air Force Institute of Technology

1200 **Symposium Adjourns**

THURSDAY MORNING

HEL Systems (Limited)

Chair: *Ms. Michelle Kincer*, Space and Missile Defense Command

Hyatt, Grand Ballroom F

0700 **Breakfast Snacks and Registration at Hyatt**

0800 **Combat Systems Engineering of High Energy Laser Weapons (D)**

Douglas Nelson, Naval Postgraduate School

0830 **Exploring the Probability of Kill for High Energy Laser (HEL) Engagements from a Systems Engineering Perspective (D)**

Gail Erten, Raytheon SAS

0900 **High Level Conceptual Integration of HELS/ DEWS on Board Submarine Guided Nuclear Future Classes (SGNX) using a Systems Engineering Approach (D)**

James Johnson, NAVSEA

0930 Break

HEL Modeling & Simulation (Limited)

Chair: *Mr. Jeff Williams*, Sandia National Laboratories

1000 **HEL Enhancements to Brawler, A Key DoD Air-to-Air Engagement Model, used by the Acquisition Community (C)**

Bob Ackerman, NAVAIR

1030 **Performance of a High Energy Laser in Various Atmospheric Conditions (C)**

Keith Cohn, Naval Postgraduate School

1100 **WaveProp Based Simulation Framework for Detailed Target-in-the-Loop HEL System Modeling (C)**

Michael Steinbock, Air Force Institute of Technology

1130 **Improved Fidelity Subharmonic Phase Screen Generation (C)**

Jack McCrae, Air Force Institute of Technology

1200 **Symposium Adjourns**

THURSDAY MORNING

Education Workshop (Open)

Chair: *Harro Ackermann*, Joint Technology Office
Hyatt, Grand Ballroom B

- 0800 **Introduction**
Harro Ackermann, HEL JTO
- 0805 **JTO Education Initiative**
Mark Neice, DEPS
- 0815 **The 2014 AFIT DE Summer Intern Program**
Sara Kraft, Air Force Institute of Technology
- 0830 **Interferometric Determination of a Diode Pumped Alkali Laser Temperature Profile**
Noah Blach, USAF Academy
- 0850 **Potassium Vapor Density Measurement in the Closed Cycle Flowing Diode Pumped Alkali Laser**
Elliot Myers & James Stofel, USAF Academy
- 0910 **Detection and Location of Thermal Gradients in Structures Using Embedded Optical Fiber Bragg Grating Sensors**
Gavyn Gonzales, USNA
- 0930 **Thermal Damage Behind HEL Irradiated CFRP Skin**
Jorge Garcia, USNA
- 0950 **The Effect of Incidence Angle on Laser Drilling of Structural Material**
Patrick Dods, United States Naval Academy
- 1010 **Break**
- 1030 **High Energy Laser Integration on Submarines**
Clayton Petty, USNA
- 1050 **Distance Support In-Service Engineering for the HEL**
Matthew Sheehan, NAVSEA NSWC, NPS
- 1110 **High Level Conceptual Integration of HELS/ DEWS on Board Submarine Guided Nuclear Future Classes (SGNX)**
James Johnson, NAVSEA PHD NSWC CA DIV
- 1130 **Break for Lunch**

THURSDAY AFTERNOON

Education Workshop (Open)

Chair: *Harro Ackermann*, Joint Technology Office
Hyatt, Grand Ballroom B

- 1230 **Increasing Thermal Modal Instabilities Threshold through Engineered Pump Scheme**
Zeinab Sanjabi Eznaveh, University of Central Florida
- 1250 **CW Laser Damage of High Reflectivity DBR Coated Optics**
Kyle Olson, University of Minnesota
- 1310 **CW Laser Conditioning of Particle Contaminated Optics**
Andrew Brown, University of Minnesota
- 1330 **Large Mode Area, All-Solid Photonic Bandgap Fiber with Resonant Cladding Cores**
Guancheng Gu, Clemson University
- 1350 **Erbium-doped GaN Grown by Hydride Vapor Phase Epitaxy as a Gain Medium for Solid-State High Energy Lasers**
Zhenyu Sun, Texas Tech University
- 1410 **Thermo-Mechanical Properties of Rare Earth Doped AlN for Laser Gain Media**
Andrew Wieg, UCR
- 1430 **Producing RE Doped Transparent Ceramics as Gain Materials for High Energy Solid State Lasers**
Elias Penilla, UCR
- 1450 **Workshop Adjourns**

Symposium Organizing Committee

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