

Technical Program 2013 Directed Energy Systems Symposium



Beam Control Conference
Counter DE Weapons Conference
DE Modeling and Simulation Conference
Employment of DE Weapons Conference
HEL Lethality Conference
RF DE Weapons Workshop

26 - 29 August 2013
Naval Postgraduate School
Monterey, California

Program Overview by Room Assignment	14 - 15
General Information	1 - 2

MONDAY ALL DAY

Short Courses	3
---------------------	---

TUESDAY MORNING

Opening Plenary Session (JOINT)	4
---------------------------------------	---

TUESDAY AFTERNOON

Beam Control Systems, Experiments, and Demonstrations & Beam Control and Optics Technology (BC)	5
Phased Arrays (BC)	6
HPM Systems / Counter HPM (CDEW & RFDEW)	7
M&S Keynote Session & Modeling DE Propagation and Target Observables (M&S)	8
DE Device and Sub-System M&S (M&S)	9
Employment Session & Round Table (EMPLOY)	10
System/Sub-System Test Results and Target Vulnerability Assessment and Bio Effects (LETH) ...	11

TUESDAY EVENING

Exhibitor Reception

WEDNESDAY MORNING

Symposium Joint Session (JOINT)	12
---------------------------------------	----

WEDNESDAY AFTERNOON

Intel Session	13
Adaptive Optics and Sensors (BC)	13
Phased Arrays (BC)	16
System Engagement and Mission Assessments & Robust Electric Laser Initiative M&S (M&S)	17
Employment Session (EMPLOY)	18
Material Interaction/High Fidelity Modeling & Test Facilities, Instrumentation, Diag and Tech (LETH)	19

THURSDAY MORNING

Lethality Session/M&S (JOINT)	20
Aero-Optics (BC)	21
SCI INTEL	21
Acquisition, Pointing and Tracking (BC)	22
Model Fidelity Assessment and V&V Techniques (M&S)	23
Counter Laser Systems and Components (CDEW)	24
Component Response (LETH)	25

THURSDAY LUNCH

Poster Sessions (JOINT)	26-27
-------------------------------	-------

THURSDAY AFTERNOON

Closing Plenary Session (JOINT)	29
---------------------------------------	----

General Information

Security

- DE Systems Symposium is SECRET/ NOFORN
- Attendees will be issued conference specific badges on site and must have valid gov't ID available at all Symposium events
- Wireless electronic devices are prohibited in classified sessions
- Classified materials must be processed through DEPS security
- Classified notes **MAY ONLY BE TAKEN IN NOTEBOOKS PROVIDED BY SECURITY STAFF** at certain conference venues (No note-taking in Opening and Closing Plenary)
- Classified discussions and sensitive unclassified discussions are restricted to designated meeting rooms only
- Cameras and photography must be authorized by the DEPS Symposium security manager
- Audio and video recording is prohibited
- Security concerns should be addressed to a DEPS Security Team member
- Failure to adhere to security standards could result in denied/revoked Symposium registration

Meals

- Breakfast is available Tuesday - Thursday at the Hyatt Regency Monterey.
- Lunch is available Tuesday and Wednesday at the Hyatt in the Oak Tree room and the outdoor patio. Box lunch is available Thursday at NPS, King Hall during the poster session.
- Refreshment services will be available throughout the week.

Reception

An exhibitor reception will take place on Tuesday evening at the Hyatt. If you would like to bring a companion to the reception, please purchase a companion ticket at the registration desk. Companion full meal tickets are also available and include breakfast and lunch each day.

General Information

Buses

NPS is a short walk from the Hyatt Hotel and attendees are encouraged to walk. For those unable to walk, buses will run approx every 20 mins during the following hours:

Tuesday - Thursday 0730 - 1730

Buses will leave from the Hyatt and drop off at various locations at NPS. Do not bring cell phones, laptops, or notebooks to NPS. DEPS staff will not be responsible for your items.

Important Phone Numbers:

Monterey Police 831-646-3914

NPS Emergency Police 831-656-2555

Community Hospital of Monterey 831-625-4900

NPS Quarterdeck 831-656-2441

General Symposium Info 505-450-1165

MONDAY

SHORT COURSES

0700 Registration at Hyatt

0800 Short Courses Begin
Hyatt Conference Center, Lower Level

- Course 1: Introduction to Wave Optics Beam Propagation

- Course 2: LEEDR and Atmospheric Effects (Limited Distribution C)

- Course 3: Introduction to Beam Control
FULL DAY COURSE

1200 Break for Lunch

1300 Short Courses Begin/Resume

- Course 4: Aero Optics

- Course 5: Predictive Avoidance (Limited Distribution C)

- Course 6: Synergistic DE/KE Analysis - Transiting the M&S Pyramid (Limited Distribution D)

TUESDAY MORNING

PLENARY SESSION

Opening Plenary

- 0630 Breakfast at Hyatt Regency
0700 Registration at Hyatt Regency
0730 Limited Buses to NPS
0800 Welcome
Mr. Mark Neice, DEPS
Security Comments
Ms. Rhonda Peyton
Call to Order
Dr. John Boness, Science Research Laboratory
Opening Remarks
Rear Admiral Jan E. Tighe,
Interim President, Naval Postgraduate School
0830 A Capitol Hill Perspective on Directed
Energy
0900 An OSD Perspective on Directed Energy
Technology and Demonstrations
0930 Break
1000 Thoughts on the Air Force's Directed
Energy Weapons Potential
1030 The Navy Plan for Shipboard SSL
Technology Demonstrations
1100 Indirect Fires Analysis of Alternatives, and
How Directed Energy Capabilities Fared
1130 Status of the Society
Mr. Mark Neice, DEPS
1200 Lunch

TUESDAY AFTERNOON

BEAM CONTROL

Beam Control Systems, Experiments, and Demonstrations (Limited Distribution D)

Hyatt, Spyglass I

Chair: *Albert Ogloza, Naval Postgraduate School*

- 1330 Beam Control Systems Study Status
Report (C)
David Loomis, DNL Consulting
1355 Beam Control System Technology
Requirements for DE (C)
Keith Bush, Schafer Corporation
1420 Atmospheric Optical Turbulence
Measurement Capability at NPS (D)
Douglas Nelson, Naval Postgraduate School
1445 Turbulence Enhanced Cooperative Optical
Communications (TECOCOM) Concept and
Analysis (A)
Mikhail Vorontsov, University of Dayton
1510 Break

Beam Control and Optics Technology (Limited Distribution D)

Chair: *Lewis DeSandre, Naval Postgraduate School*

- 1525 NPS Beam Control Testbeds (C)
Brij Agrawal, Naval Postgraduate School
1550 Recent Improvements in High Power
Deformable Mirrors and Drive
Electronics (C)
Justin Mansell, MZA Associates Corporation
1615 Wavefront Compensation using a Hotspot
Beacon (D)
Robert Praus, MZA Associates Corporation
1730 Exhibitor Reception

TUESDAY AFTERNOON

BEAM CONTROL

Phased Arrays (Limited Distribution C)

Hyatt, Spyglass II

Chair: *Dan Marker*, Air Force Research Laboratory

- 1330 **Phased Arrays: A Comprehensive Laser Weapon System Perspective (C)**
Richard Holmes, Boeing
- 1355 **Advancement in Stair-Mode Corrected Arrays (C)**
Wesley Green, Tau Technologies
- 1420 **Experimental Characterization of Radiation Distribution in A Power-Scalable Phase-Locked Fiber Laser Array (A)**
Leonid Beresnev, Army Research Laboratory
- 1445 **Break**
- 1515 **High-Resolution Sparse Imaging for Laser \ Array Phasing (C)**
Sami Shakir, Tau Technologies
- 1540 **Adaptive Fiber-Array Systems for Coherent Beam Combining and Atmospheric Compensation (A)**
Mikhail Vorontsov, University of Dayton
- 1605 **CLAWS and HBC CLAWS Development and Testing (C)**
Jeffrey Barchers, Nutronics, Inc.
- 1630 **Experimental Demo of a Phased Array Laser System Using Spatial Light Modulators (C)**
Thomas Dolash, Tau Technologies
- 1730 **Exhibitor Reception**

TUESDAY AFTERNOON

CDEW and RF DEW

HPM Systems / Counter HPM (Secret)

- 1330 **Nonlinear Metamaterials for Protection of High Gain Receivers (D)**
- 1355 **Development of a Compact, Lightweight, 30Hz Burst-Mode, L-Band HPM System (C)**
- 1420 **Break**
- 1450 **Multi-Frequency Projected Energy Gun (PEG) (D)**
- 1505 **Estimating High-Power Microwave Effects on Targets within a Structure**
- 1730 **Exhibitor Reception**

TUESDAY AFTERNOON

DE MODELING & SIMULATION

M&S Keynote Session (Limited Distribution D)

Hyatt, Cypress I & II

Chair: *Nick Morley*, Air Force Research Laboratory

1330 **Thirty Years of Directed Energy Modeling and Simulation (D)**

Robert Praus, MZA Associates Corporation

Modeling DE Propagation and Target Observables (Limited Distribution D)

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

1430 **Thermal Blooming and Distortion Number Re-Visited: Applying Realistic Atmospheres to Enhance Scaling Law Correlation with Wave Optics Solutions (C)**

Steven Fiorino, Air Force Institute of Technology

1500 **Break**

1530 **Comparison of Scaling Law Models for HEL Propagation with Thermal Blooming (D)**

Joel Davis, Ball Aerospace

1600 **Integrated Beam Train and Wave-Optics Aero-Effects Modeling (D)**

Matthew Whiteley, MZA Associates Corporation

1630 **Dynamics of Transmission Lines Coupled to Nonlinear Circuits (A)**

Ioana Triandaf, Naval Research Laboratory

1730 **Exhibitor Reception**

TUESDAY AFTERNOON

DE MODELING & SIMULATION

DE Device and Sub-System M&S (Secret)

1330 **Fiber Laser Beam Combining Comparisons (D)**

1400 **Modeling the Effect of Laser Interactions on the Strength and Failure of High Strength Aluminum Alloys (A)**

1430 **Computational Design of Combined Power Extraction with Two Relativistic Magnetrons (C)**

1500 **Break**

1530 **A Comparison of COIL and DPAL SWaP Models (C)**

1600 **Model-Based Engineering for Laser Weapons Systems - Recent Progress (A)**

1630 **Tiled-Array Incoherent Beam Combining (C)**

1730 **Exhibitor Reception**

TUESDAY AFTERNOON

EMPLOYMENT OF DE WEAPONS

Employment Session (Limited Distribution D)

Hyatt, Windjammer II - IV

Chair: *William Decker*, Defense Acquisition University

- 1300 **Modelling of Jitter and Mass Loss in COMSOL (D)**
Jay Trexler, US Military Academy
- 1320 **Experimental Investigation of Jitter and Mass Loss (D)**
Frank Arnold, US Military Academy
- 1340 **Progress on the Magnetic Colis Particle Probe Investigations on the Helicon Plasma Experiment**
Carter Schlank/Justin Sherman, US Coast Guard Academy
- 1400 **Status of the Thomson Scattering & Data Aquisition (DAQ) System on the Helicon Plasma Experiment**
Omar Duke-Tinson/Justin Sherman, US Coast Guard Academy
- 1420 **Dual-Stage Servo Control for a Mirror-Stabilized Pointing Gimbal (A)**
Eric Miller, UC San Diego
- 1440 **Break**

Round Table Discussion (Limited Distribution A)

- 1515 **Understanding the Warfighters Needs (A)**
William Decker, Defense Aquisition University
- 1730 **Exhibitor Reception**

TUESDAY AFTERNOON

HEL LETHALITY

System / Subsystem Test Results (Secret)

- 1300 **Laser Induced Material Removal Under Representative Airflow Condition (F)**
- 1325 **HEL Lethality Testing of Surrogate Missile Components at Arnold Engineering & Development Center (AEDC) (D)**
- 1350 **2012 Navy C-RAM Test Design and Execution (D)**
- 1415 **2012 Navy C-RAM Test Results and Analysis (D)**
- 1440 **UAV Counter-ISR Directed Energy Study (C)**
- 1505 **Break**

Target Vulnerability Assessment and Bio Effects (Secret)

- 1530 **High Energy Laser Vulnerability Assessment of an Unmanned Aerial System (D)**
- 1555 **Update on HEL Bioeffects (C)**
- 1620 **Understanding the Behavioral Outcomes During the Deployment of HEL Weapons (C)**
- 1730 **Exhibitor Reception**

WEDNESDAY MORNING

JOINT SESSION

Plenary Session (Secret)

- 0630 Breakfast at Hyatt Regency
0700 Registration at Hyatt Regency
0730 Limited Buses to NPS
0800 Welcome and Introduction
0820 HELLADS Laser Design, Technology and Performance
0845 HELLADS Demonstrator Laser Weapon System Field Tests
0910 HELLADS Laser Weapon System Module (LWSM) Overview
0935 HELLADS 150 kW Laser Weapon System Module
1000 Break
1020 High-Efficiency HELLADS
1045 Fiber Laser Development

1110 The LaWS System - 2012 Live Fire Exercise Results
1135 Overview of the DE Alternatives for the Indirect Fires Protection Capability (IFPC) Increment 2 Intercept Analysis of Alternatives (AoA)
1200 Lunch

WEDNESDAY AFTERNOON

BEAM CONTROL

Adaptive Optics and Sensors (Limited Distribution D)

Hyatt, Spyglass I

Chair: *Chris Washer*, Schafer Corporation

- 1330 Reconstruction-Dependent Tilts When Branch Points are Present (A)
Michael Steinbock, Air Force Institute of Technology
1355 Adaptive Tactical Laser System (ATLAS) Development and Testing (C)
Jeffrey Barchers, Nutronics, Inc.
1420 AO Testbed for Laboratory Simulation of Deep Atmospheric Turbulence (A)
Bautista Fernandez, Naval Postgraduate School
1510 Break
1525 Data Review for the Nov. 2011 On-Sky POAM Measurements (D)
Darryl Sanchez, Air Force Research Laboratory
1550 Pixel-Processing Imager Development for DE Applications (C)
Jeffrey Little, MIT Lincoln Laboratory

WEDNESDAY AFTERNOON

Intel Session (Secret)

Conference Overview by Room Assignment

	Tues AM	Tues PM	Wed AM	Wed PM	Thurs AM	Thurs Noon	Thurs PM
NPS King Hall	Opening Plenary		Plenary Session			Joint Poster Session	Closing Plenary
NPS ME Aud		COUNTER DEW & RF DEW		INTEL EMPLOYMENT	INTEL		
NPS Glasgow		LETHALITY		LETHALITY	JOINT M&S / LE LETHALITY		
NPS Ingersol		M&S		M&S			
Spyglass I		BEAM CONTROL		BEAM CONTROL	BEAM CONTROL		
Spyglass II		BEAM CONTROL		BEAM CONTROL	BEAM CONTROL		
Big Sur I & II		M&S			COUNTER DEW & RF DEW		
Windjammer II - IV		EMPLOYMENT					
Cypress I & II					M&S		

WEDNESDAY AFTERNOON

BEAM CONTROL

Phased Arrays (Limited Distribution C)

Hyatt, Spyglass II

Chair: *Dan Marker*, Air Force Research Laboratory

- 1330 **Phase Prediction and Correction with Mod n Measurements (A)**
Steve Gibson, UCLA
- 1355 **An Experimental Testbed for Phasing an Optical Array on a Remote Rough Surface (D)**
Franklin Jose, Air Force Institute of Technology
- 1420 **High Power Fiber Laser Beam Combined Aperture (HPFL-BCA) - Sim. Results (C)**
Keith Bush, Schafer Corporation
- 1445 **Demonstration of Velocity and Pupil-Plane Speckle Imaging with Doublet-Pulse Digital Holography (C)**
Tom Alley, Lockheed Martin
- 1510 **Break**
- 1525 **HiPATsim: High Fidelity Modular Phased Array Simulation Tool (C)**
Michael Steinbock, Air Force Institute of Technology
- 1550 **TBD**

WEDNESDAY AFTERNOON

DE MODELING & SIMULATION

System Engagement and Mission Assessments (Secret)

- 1330 **Gas Laser System Analysis and Military Utility Study (C)**
- 1355 **Integrated Weapons Environment for Analysis (D)**
- 1420 **IWEA Technical Evaluation Process (TEP-C) Overview (C)**
- 1445 **Laser Deconfliction Modeling and Simulation for Future Weapons and Operational Systems: Fostering Targeted Comparisons of Directed Energy Weapon Performance for DOD Missions (C)**
- 1515 **Break**

Robust Electric Laser Initiative (RELI) M&S (Secret)

- 1530 **Modeling Fiber Laser Spectral Beam Combining for HEL Applications (D)**
- 1600 **Modeling and Simulation of High Power Planar Waveguide Lasers**
- 1630 **General Atomics RELI Modeling**

WEDNESDAY AFTERNOON

EMPLOYMENT OF DE WEAPONS

Employment Session (Secret)

- 1530 Laser Deconfliction Solutions for Future Weapons and Operational Systems (C)
- 1600 Standoff Hyperspectral Imaging and Fusion Detection of Explosive Hazards (C)
- 1630 Toward Common Goals: Enhancing Research & Development and Operational Understanding (D)

WEDNESDAY AFTERNOON

HEL LETHALITY

Material Interaction / High Fidelity Modeling (Secret)

- 1300 Experimental Measurements of High Energy Laser Scattering from Painted Components (C)
- 1325 Numerical Model for Multi-Layer Laser Interaction and Penetration (D)
- 1350 Laser Effects Testing of Urban Materials (C)
- 1415 Modeling Laser Interaction with Composite Materials (A)
- 1440 Analysis of Optical and Thermophysical Properties in CW Laser Ablation (C)

Test Facilities, Instrumentation, Diagnostics and Techniques (Secret)

- 1530 Setup and Execution of the Patch Antenna Response to Irradiation by Laser Test (D)
- 1555 Capabilities on the Ground for Direct Energy Lethality Research at AEDC (C)
- 1620 Calibration of Infrared Thermal Imaging Camera (A)
- 1645 Modifications required for HEL testing in the Aerodynamic & Propulsion Test Unit (F)

THURSDAY MORNING

JOINT SESSION

Lethality and M&S Conferences Session (Secret)

- 0630 Breakfast at Hyatt Regency
0700 Registration at Hyatt Regency
0730 Limited Buses to NPS
0800 A Monte-Carlo Approach to Modeling Melt Onset of Common Semiconductor Materials (C)
0830 IWEA - Investigating M&S Approaches for Analyzing DE/KE Synergies at the Engagement and Mission Level (D)
0900 Ground Vehicle Laser Vulnerability Assessment and Vulnerability Module Generation (D)
0930 Laser-Subsystems Interactions: Effects, Mechanisms and Modeling Approaches (C)
0940 Break
1030 Lethality and Modeling and Simulation Conference Sessions continue
See pages 23 & 25

THURSDAY MORNING

BEAM CONTROL

Aero-Optics (Limited Distribution D)

Hyatt, Spyglass I

Chair: *D.J. Wittich*, Air Force Research Laboratory /RD

- 0630 Breakfast at Hyatt Regency
0700 Registration at Hyatt Regency
0925 Aero-Effects for Tactical Applications (D)
D.J. Wittich, Air Force Research Laboratory /RD
0945 Predictive AO Control for Aero-Optics Using Spatial-Temporal Correlations (D)
Jason Schmidt, MZA Associates Corporation
1010 Break
1025 Evaluation of Track Algorithms Using a Library of Synthetic Scenes (C)
Simon Knister, Air Force Research Laboratory
1045 Aero-Optics Jitter Compensation on High Speed Aircraft (D)
Matthew Whitely, MZA Associates
1115 Fast, Accurate Predictive Control for AO Compensation of Turbulent Flow (C)
Curtis Vogel, the Optical Science Company
1200 Lunch - Box Lunch at NPS King Hall

THURSDAY MORNING

JOINT SESSION

SCI INTEL

THURSDAY MORNING

BEAM CONTROL

Acquisition, Pointing and Tracking (Limited Distribution D)

Hyatt, Spyglass II

Chairs: *Jim Lasche*, Air Force Research Laboratory

- 0630 **Breakfast at Hyatt Regency**
- 0700 **Registration at Hyatt Regency**
- 0800 **Improved Beam Jitter Using Classical and Robust Control (A)**
Richard O'Brien, US Naval Academy
- 0825 **Upgrades to the AFIT AAPT for Improved Tracking in Transonic AAOL-T Flights (C)**
Matthew Krizo, Air Force Institute of Technology
- 0850 **Design of a Tracking Algorithm Development and Evaluation System (TRADES) (C)**
Brian Henderson, MZA Associates Corporation
- 0925 **Field Eval. Of a Hybrid Bayesian/Correlation Tracking Technique (C)**
Joe Lau, Air Force Research Laboratory
- 0945 **Libraryless Aimpoint Maintenance Processor (LAMP) for Use on Airborne Platforms (D)**
Jim Lasche, Air Force Research Laboratory
- 1010 **Break**
- 1025 **Practical Implementation of an Optimal Jitter Estimator for Multi-Window Tracking (D)**
Eric Magee, MZA Associates Corporation
- 1050 **Optimization of Control System Designs for Major Disturbance Inputs (D)**
Paul Merritt, Schafer Corporation
- 1200 **Lunch - Box Lunch at NPS King Hall**

THURSDAY MORNING

DE MODELING & SIMULATION

Model Fidelity Assessment and V&V Techniques (Limited Distribution D)

Hyatt, Cypress I & II

Chairs: *Jason Evanoff*, Air Force Research Laboratory

- 1030 **Status, Activities, and Issues for HELCoMES Verification and Validation**
Douglas Rigdon, Aegis Technologies
- 1100 **Application of Interval Statistics in Propagating Uncertainty through Directed Energy Engagement and Mission Level Models**
Nicholas Morley, Air Force Research Laboratory
- 1130 **A Recommendation for Quantifying Uncertainties Associated with High Energy Laser Susceptibility Models with Respect to End-to-End Modeling Analysis**
Javon Evanoff, Ball Aerospace
- 1200 **Lunch - Box Lunch at NPS King Hall**

THURSDAY MORNING

COUNTER DE WEAPONS

Counter Laser Systems and Components (Limited Distribution D)

Hyatt, Big Sur I & II

Chairs: *Sylvia Dorato*, High Energy Laser Joint
Technology Office

- 0630 **Breakfast at Hyatt Regency**
- 0700 **Registration at Hyatt Regency**
- 0800 **Optical Detection and ID for C-DEW (C)**
Leo Volfson, Torrey Pines Logic, Inc.
- 0825 **Detection and Identification of Directed
Energy Weapons and Their Targeting
Systems (C)**
Leo Volfson, Torrey Pines Logic, Inc.
- 0850 **Break**
- 0920 **Electromagnetic Wave Propagation in a
Heterogeneous Liquid Crystal Layer (C)**
Hong Zhou, Naval Postgraduate School
- 0945 **Color Name Training: Identifying Colors
Through Laser Eye Protection (A)**
Michelle Aaron, Air Force Research
Laboratory
- 1010 **Countermeasures to Improve Mortar
Resistance to a Laser Defense System**
Jay Trexler, US Military Academy
- 1200 **Lunch - Box Lunch at NPS King Hall**

THURSDAY MORNING

HEL LETHALITY

Component Response (Secret)

- 1030 **In-Band Pulsed Susceptibility Criteria for
MWIR Discrete Detectors (C)**
- 1055 **Laser Irradiation of Spacecraft Insulator
Materials - 2 (LISIM-2) (D)**
- 1120 **Patch Antenna Response to Irradiation by
Laser (PARIL) (D)**
- 1200 **Lunch - Box Lunch at NPS King Hall**

JOINT SESSION

Poster Session

NPS, King Hall

High Energy Laser Weapons for Protection of the Future Air Dominance Platform (HEL-FAD) Study (D)

Dustin Culbertson, Air Force Research Laboratory

High Energy Laser Vulnerability Assessment of an Unmanned Aerial System (S/D)

Jon Determan, Naval Surface Warfare Center

Integrated Weapons Environment for Analysis (D)

Craig Ewing, Air Force Research Laboratory

Laser Propagation Systems Engineering Meta Study (A)

Shawn Hackett, Air Force Research Laboratory

UAV Counter-ISR Directed Energy Study (C)

Eric Hamilton, AEgis Technologies

IWEA - Investigating M&S Approaches for Analyzing DE/KE Synergies at the Engagement and Mission Level (D)

Linda Lamberson, Air Force Research Laboratory

IWEA - Investigating Approaches for Characterizing Uncertainty in Effectiveness Models at the Engagement and Mission Level (D)

Linda Lamberson, Air Force Research Laboratory

JOINT SESSION

Poster Session

NPS, King Hall

An Extensive Numerical Study on Microwave Coagulation Therapy (A)

Amy Liu, Naval Postgraduate School

Numerical Model for Multi-layer Laser Interaction and Penetration (D)

Darren Luke, Air Force Research Laboratory

Cryogenically Cooled, 149kW, Q Switched, Yb:LiYF₄ Laser (A)

Daniel Miller, MIT Lincoln Laboratory

Modeling Laser Interaction with Composite Materials (A)

Alexander Rubenchik, Lawrence Livermore National Laboratory

Calibration of Infrared Thermal Imaging Camera (A)

Alexander Rubenchik, Lawrence Livermore National Laboratory

Dynamics of Transmission Lines Coupled to Nonlinear Circuits (A)

Iona Triandaf, Naval Research Laboratory

THURSDAY AFTERNOON

JOINT SESSION

Wrap Up Plenary Session (Secret)

- 1530 HEL Lethality Conference
- 1545 Counter DE Weapons Conference and
RF DE Weapons Conference
- 1600 Employment of DE Weapons Conference
- 1615 Beam Control Conference
- 1630 DE Modeling and Simulation Conference
- 1645 Symposium Adjourns

Symposium Chair:

Dr. John Boness

Conference Chairs:

Beam Control

Jim Lasche, Chris Washer

Counter DE Weapons

Sylvia Dorato

DE Modeling and Simulation

Nicholas Morley, Ross Dudley, Dwight Smith

Employment of DE Weapons

John Hartke, Kraig Sheetz

HEL Lethality

Thomas Schriempf, Chris Lloyd, Dave Loomis

RF DE Weapons

Diana Loree

Symposium Coordinator and Short Courses:

Cynnamon Spain

Security Coordinator:

Rhonda Peyton

Registration, Payments and Receipts:

Tiffany Bjelke

Directed Energy Professional Society

7770 Jefferson Street NE, Suite 440

Albuquerque, NM 87109

Tel: 505-998-4910

Fax: 505-998-4917

www.deps.org