

Technical Program 2012 Directed Energy Systems Symposium



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

2 - 5 April 2012
Gaithersburg, Maryland

Co-Sponsored by
High Energy Laser Joint Technology Office

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General Information

Security

- DE Systems Symposium is SECRET/ NOFORN
- Attendees will be issued NIST ID 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** (No note-taking in Opening and Closing Plenary)
- Classified and sensitive but unclassified conversations and 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 Hilton Gaithersburg Hotel.
- Lunch is available Tuesday - Thursday at NIST Cafeteria.
- Refreshment services will be available throughout the week.

Reception

A strolling reception in Olde Towne Gaithersburg will be held on Tuesday evening. Buses will depart Hilton at 1615 and last bus will return at 1900. Conference ID will be required to enter food locations. See additional flyer for map and details.

General Information

Buses

Parking is limited at the NIST facility and all are encouraged to take the provided shuttle bus. Buses will run from the Hilton Gaithersburg Hotel to NIST during the following hours:

Mon 0730 - 1715 (approx every 30 mins)

Tues - Thurs 0700 - 1730 (approx every 15 min)

Do not bring cell phones, laptops, or notebooks to NIST. DEPS staff will not be responsible for your items.

NIST Facility Tours

Two tours of the NIST facility are scheduled for Thursday lunch time, 1200 and 1245. The tours are 45 min in length and limited to 25 people per tour. For tour sign up please visit the registration desk once you arrive and add your name to your selected tour time.

Symposium Phone Number

Cynnamon Spain 505-450-1165

MONDAY

SHORT COURSES

0700 **Registration at Hiton**
Buses begin to NIST

0800 **Short Courses Begin**

- **Course 1: The Road to Fielding DE Systems**
Hilton, Salon A

- **Course 3: Modeling and Simulation Verification, Validation & Accreditation**
Hilton, Salon B

- **Course 4: Joint RF Effects Model (Limited)**
Hilton, Salon D

- **Course 5: Understanding Laser Effects from a Systems Engineering Perspective (Secret)**
NIST, LR B

- **Course 6: Introduction to the Physics of DE (Limited) (FULL DAY)**
Hilton, Salon E

1200 **Break for Lunch**

1300 **Short Courses Begin/Resume**

- **Course 2: Laser Propagation**
Hilton, Salon A

- **Course 7: Predictive Avoidance (Limited)**
Hilton, Salon B

- **Course 8: HPM Effects and Data Collection (Limited)**
Hilton, Salon D

- **Course 9: HEL Warfighter Familiarization (Secret)**
NIST, LR B

1715 **Last bus returns from NIST**

MONDAY

MODELING AND SIMULATION

HELSEEM Showcase (Secret Distribution D)

NIST, Green Room, 1500-1600

Chairs: *Chris McCracken*, Air Force Research
Laboratory/ RDTA and
Robin Ritter, TAU Technologies

HPM Simulation Management Software (Limited Distribution C)

NIST, Green Room, 1600-1700

Chair: *Nathaniel Lockwood*, Air Force Research
Laboratory/RDHEC

The M&S Conference is hosting two mature software “Showcases” for Symposium attendees. The showcases are designed as an interactive demonstration, incorporating step-by-step instruction and simulation runs with existing Government-owned software packages, addressing operationally relevant scenarios. The two showcases we are highlighting are the High Energy Laser System End-to-End Model (HELSEEM) tool and the HPM Simulation Management Software (HSMS) tool.

TUESDAY MORNING

PLENARY SESSION

Opening Plenary

NIST, Red Room

0630 **Breakfast at Hilton Gaithersburg**

0700 **Buses begin to NIST
Registration at NIST**

0800 **Call to Order and Security Comments**
Mr. William Decker, Defense Acquisition
University and *Dr. Malcolm O'Neill*, Lt. Gen
US Army (ret.)

0815 **Keynote Speaker**
Lieutenant General James A. Abrahamson,
USA Air Force (ret.), former Director,
Strategic Defense Initiative Organization

0900 **Better Buying Power Efficiencies**
Ms. Katharina McFarland, Defense Acquisition
University

0930 **Bleed Us Not Into Temptation - Surviving
with your “DE S&Tination Unknown”**
Major General Curtis Bedke, VP for S&T,
High Performance Technologies Group,
Dynamics Research Corporation

1000 **Break**

1030 **Directed Energy Innovation in “Interesting
Times”**
Dr. Larry Schuette, Office of Naval Research,
Director of Innovation

1100 **Electric Fires**
Mr. Kirby Brown, Deputy to the Commanding
General, FIRES Center of Excellence

1130 **The Promise of Directed Energy Weapons**
Mr. Mark Gunzinger, Center for Strategic and
Budgetary Assessment (CSBA)

1200 **Lunch at NIST**

TUESDAY AFTERNOON

COUNTER DE WEAPONS

CDEW Session (Secret)

NIST, LR B

Chair: *David Schafer*, Air Force Research Laboratory/RDH

- 1300 **Issues Affecting Solar Panel Survivability to High Energy Lasers**
- 1325 **AFRL Efforts to Protect Satellites from Electromagnetic Energy Weapons**
- 1345 **Switchable Electromagnetic Windows**
- 1405 **Design and Testing of HPM Immune UAS Systems**
- 1630 **Strolling Reception in Olde Towne Gaithersburg (DEPS ID Required)**

TUESDAY AFTERNOON

MODELING & SIMULATION

System, Engagement, and Mission Assessment (Limited Distribution D)

NIST, LR C

Chair: *Bryan Knott*, Naval Surface Warfare Center

- 1300 **IWEA**
Christopher McCracken, Air Force Research Laboratory/RDTA
- 1330 **Addressing the Challenges in High-Fidelity Physics-Based Multidisciplinary HEL Modeling**
Robert Praus, MZA Associates Corporation
- 1400 **An Integrated Software Environment for Model-Based Engineering of Laser Weapons Systems - Recent Progress**
Steve Coy, Timelike Systems LLC
- 1430 **System Engineering Trades for HELs on Remotely-Piloted Aircraft**
Marc Hallada, Schafer Corporation
- 1500 **Break**

Propagation Modeling (Limited Distribution D)

NIST, LR C

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

- 1530 **Simulated Active and Passive Tactical Imaging from an Airborne Platform**
Robin Ritter, Tau Technologies
- 1600 **Turbulence Measurement in the Atmospheric Boundary Layer Using Cellular Telephone Signals**
Lee Burchett, Air Force Institute of Technology
- 1630 **LADAR Performance Simulations with a High Spectral Resolution Atmospheric Transmittance and Radiance Model- LEEDR**
Benjamin Roth, Air Force Institute of Technology
- 1630 **Strolling Reception in Olde Towne Gaithersburg (Conference ID Required)**

TUESDAY AFTERNOON

EMPLOYMENT OF DE WEAPONS

DE Acquisition Challenges / Solutions Round Table (Open)

NIST, LR A

Chair: *Kraig Sheetz*, US Military Academy

1300 - 1430

1430 Break

HEL Sub Systems (Limited Distribution D)

NIST, LR A

Chair: *Kraig Sheetz*, US Military Academy

1500 **Laser Close-In Weapon System**
Gerald Uyeno, Raytheon Missile Systems

1530 **Advanced Energy Storage for Directed
Energy Weapons**
Mike Marcel, A123 Systems

1600 **Large Stable Aluminum Optics for
Aerospace Applications**
Daniel Vukobratovich, Ratheon Missile
Systems

1630 **Strolling Reception in Olde Towne
Gaithersburg (Conference ID Required)**

TUESDAY AFTERNOON

HEL LETHALITY

System / Sub-System Test Results (Secret)

NIST, Red Room

Chair: *Mike Libeau*, Naval Surface Warfare Center/
DD

1300 **Multi-kW Fiber Laser Lethality Testing
Against Missiles**

1330 **Satellite Vulnerability to Lasers**

1400 **Engagement Angle Dependency Test**

1430 Break

Target Vulnerability Assessment (Secret)

NIST, Red Room

Chair: *Darren Luke*, Air Force Research Laboratory/
RDLE

1500 **Examination of Roll Rate on RAM Failure
Time**

1530 **Counter-Communications System JUONS
Target Lethality Assess**

1600 **Defeat Speed of Light Initiative (DSOLWI)
Smart Bomb Laser Effects**

1630 **Strolling Reception in Olde Towne
Gaithersburg (Conference ID Required)**

TUESDAY AFTERNOON

RF DE WEAPONS

RF Sources and Antennas (Limited Distribution D and C)

NIST, Green Room

Chair: *Michael Haworth*, Air Force Research
Laboratory/RDHE

Session is Limited Distribution D

1300 **Beam Profiler for High Power, High
Frequency Sources (D)**
David Thomas, Aegis Technologies

Session is now Limited Distribution C

1330 **20-Hz Burst-Mode Operation of a
Relativistic Magnetron Having No RF
Pulse Shortening**
Michael Haworth, Air Force Research
Laboratory/RDHE

1400 **Relativistic Magnetron Experiments
Utilizing a Compact Permanent Magnet
Solenoid**
Brad Hoff, Air Force Research
Laboratory/RDHP

1430 **Break**

1500 **Innovative Solid State Agile Radio
Frequency Source**
Andrew Yuenger, Naval Air Warfare Center,
Weapons Division

1530 **Metal Plate Lenses for High Power
Microwave Applications**
Julie Lawrance, Air Force Research
Laboratory/RDHP

1600 **Emerging High Dielectric Materials and
Their Impact on Directed Energy Systems**
Randy Curry, University of Missouri

1630 **Strolling Reception in Olde Towne
Gaithersburg (Conference ID Required)**

WEDNESDAY MORNING

JOINT SESSION

Symposium Joint Session (Secret)

NIST, Red Room

Chair: *Chuck LaMar*, Space and Missile Defense
Command

0630 **Breakfast at Hilton Gaithersburg**

0700 **Buses begin to NIST
Registration at NIST**

0800 **Introduction and Security Comments**

0815 **The Airborne Laser Testbed's High Power
Test Campaign to System Demonstration**

0845 **The Airborne Laser Testbed's Directed
Energy Performance**

0915 **The Airborne Laser Testbed's Science
and Technology Test Campaign**

0945 **The Airborne Laser Testbed's Science
and Technology Test Results: Aero-Optical
and Aero-Mechanical Wavefronts**

1015 **Break**

1030 **Recent Developments and Near Term
Directions for Navy Laser Weapons System
(LaWS) Testbed**

1050 **HELLADS Demonstrator Laser Weapon
System**

1120 **Results from High Energy Laser Technology
Demonstrator (HELTD) Low Power Testing**

1140 **Solid State Laser Testbed Status and
Capabilities for Use in High Energy Laser
Vulnerability and Propagation Tests**

1200 **Lunch at NIST**

MODELING AND SIMULATION

HPM Simulation Management Software Showcase (Limited Distribution C)

NIST, Green Room, 1030 - 1200

Chair: *Nathaniel Lockwood*, Air Force Research
Laboratory/RDHEC

Conference Overview by Room Assignment

	Tues AM	Tues PM	Wed AM	Wed PM	Thurs AM	Thurs Noon	Thurs PM
Red Room	Opening Plenary	LETHALITY	Joint Symposium Session	JOINT M&S / LE	LETHALITY	Joint Secret Posters	Closing Plenary
				Lethality			
Green Room		RF DE Weapons	M&S Showcase	RF DE Weapons	M&S Showcase		
LRA		EMPLOYMENT		Lethality	Counter DE Weapons	Joint Unclass Posters	
LRB		Counter DE Weapons		INTEL	EMPLOYMENT		
LRC		M&S			JOINT M&S / RFDEW		
				M&S			
LRD				Joint Student Session			

WEDNESDAY AFTERNOON

JOINT SESSION

Student Session (Limited Distribution D)

NIST, LR D

Chair: *Don Seeley*, HEL Joint Technology Office

- 1300 **Helicon Mode Development on a Small Helicon Plasma Experiment (HPX)**
Stephen Nolan, CGAPL (Physics) U.S. Coast Guard Academy
- 1325 **Pre-Stage Magnetic Coil to Enhance Helicon Mode Excitation on a Small Helicon Plasma Experiment (HPX)**
Carter Schlank, CGAPL (Physics) U.S. Coast Guard Academy
- 1350 **A Numerical Model of Laser Damage Effects on Quasi-Isotropic Sandwich Structures Including Material Ablation**
Andrew Tresansky, United States Naval Academy
- 1415 **HEL Used for C-RAM and Counter UAV Missions**
Jeffrey Gorn, United States Military Academy
- 1440 **Break**
- 1500 **Modeling the Vulnerability of Unmanned Aerial Systems Targeted by High Energy Lasers**
John Paulson, United States Military Academy
- 1525 **Modeling the Destruction of a Mortar Targeted by a Laser Defense System**
Zachary Brownlee, U.S Military Academy
- 1550 **Control of Platform Induced Jitter for the Multiple Beam Directed Energy System**
Zachary Patrick, United States Naval Academy
- 1615 **Isolation of Thermal and Strain Responses in Composites using Embedded Fiber Bragg Grating Temperature Sensors**
Kyle Elam, United States Naval Academy
- 1640 **An Adaptive Infinity Control Algorithm for Jitter Control and Target Tracking**
Shane Moran, United States Naval Academy

WEDNESDAY AFTERNOON

JOINT SESSION

Joint Session Lethality Conference and Modeling & Simulation Conference (Secret)

NIST, Red Room

Chair: *Benjamin Hurst*, Air Force Research Laboratory/RDLE

- 1300 **A Numerical Model of Laser Damage Effects on Quasi-Isotropic Sandwich Structures Including Material Ablation**
- 1330 **Vulnerability Assessment of an Anti-Ship Cruise Missile**
- 1400 **Vulnerability Module Integration with the Dynamic Aimpoint Laser Engagement Tool**
- 1430 **Break**
- 1500 **Progress in High-Fidelity Physics-Based Multidisciplinary HEL Modeling**
- 1530 **Weather Climatology and Effects on High Energy Laser Propagation and Lethality**

HEL LETHALITY

Material Interaction / High Fidelity Modeling (Secret)

NIST, Red Room

Chair: *Chris Lloyd*, Naval Surface Warfare Center/DD

- 1600 **Outdoor High Energy Laser Testing on Static UAS Wings and Fuel Systems**
- 1630 **HEL Lethality of Carbon Based Materials**

WEDNESDAY AFTERNOON

HEL LETHALITY

Test Facilities, Instrumentation, Diagnostics and Techniques (Limited Distribution D)

NIST, LR A

Chair: *Craig Walters*, Craig Walters Associates

1300 **Facility Modifications at the Aerodynamic and Propulsion Test Unit in Support of Directed Energy Laser Lethality Ground Testing**

Alexander Hausman, Air Force / AEDC

1330 **High Energy Laser Tests in a Flight-Representative Environment**

Adam Goss, 46 TG/OL-AC

1400 **Adjunct Tracker Scoring System Development, Data Collection, and Data Analysis**

Richard Lee, Science Applications International Corporation

1430 **Break**

MODELING & SIMULATION

Verification, Validation, and Accreditation (Limited Distribution C)

NIST, LR C

Chair: *Javon Evanoff*, Ball Aerospace Corporation

1600 **Experimental Validation of the Photostress Recovery Model (PREMO)**

Peter Smith, TASC Inc.

1630 **JREM VV&A**

Walter Clover, TechFlow Scientific

1700 **The Verification and Validation of a Component-Based Laser Weapon System SWAP Model**

Daniel Sharpes, Air Force Research Laboratory/RDTA

WEDNESDAY AFTERNOON

RF DE WEAPONS

RF Systems and Effects (Secret Distribution D)

NIST, Green Room

Chair: *Diana Loree*, Air Force Research Laboratory/RD

1300 **The Army Research Laboratory Electronic Warfare/Electronic Attack Program**

1330 **The Army Research Laboratory REDLINE Program**

1400 **Modeling and Measurements of Inductive Coupling to Detonators**

1430 **Break**

1500 **A New Technology for Identification of Electronics**

1530 **Effects Testing with a High Power BWO**

1600 **Results from Recent High Power Microwave (HPM) "Back Door" Effects Testing**

1630 **Results from Recent High Power Microwave (HPM) "Front Door" Effects Testing**

1700 **Performance of a High Gain Fixed Angle Antenna for a Ground Based Application**

WEDNESDAY AFTERNOON

INTEL

INTEL Session (Secret)

NIST, LR B

- 1300 Collateral Hazards of Foreign Electro-Optic Countermeasures
- 1320 Foreign Ground Combat Laser Threat
- 1350 Worldwide Laser Weapons Development
- 1430 Break
- 1500 A New Class of Laser Weapon: The DPAL - Diode Pumped Alkali Laser
- 1520 Worldwide Emerging RFW Capabilities

THURSDAY MORNING

JOINT SESSION

Joint Session Modeling & Simulation Conference and RF DE Weapons Workshop (Limited Distribution C)

NIST, LR C

Chair: *Timothy Clarke*, Air Force Research Laboratory/RDHEE

- 0630 Breakfast at Hilton Gaithersburg
- 0700 Buses begin to NIST Registration at NIST
- 0800 X-Ray Safety Calculations Near HPM Sources Using ICEPIC and GEANT4/ParRT
Nathaniel Lockwood, Air Force Research Laboratory/RDHE
- 0830 Design and Simulation of a Megawatt Class Conventional Magnetron
Timothy Fleming, Air Force Research Laboratory/RDHE
- 0900 A New Method for Calculating Adsorption Probabilities Using Direct Simulation Monte Carlo Techniques
Brook Bentley, Air Force Institute of Technology
- 0930 High Power Microwave High Performance Computing Software Applications Institute
Nathaniel Lockwood, Air Force Research Laboratory/RDHEC
- 1000 Break
- 1030 Novel Solid Pulse Forming Lines for Compact Pulsed Power
Susan Heidger, Air Force Research Laboratory/RDHP
- 1100 Application of the Nested High Voltage Generator to HPM
Richard Adler, Applied Energetics
- 1200 Lunch at NIST
NIST Facility Tours (see page 2)

THURSDAY MORNING

COUNTER DE WEAPONS

CDEW Sessions 1 & 2 (Limited Distribution D)

NIST, LR A

Chair: *David Schafer*, Air Force Research
Laboratory/RDH

- 0630 **Breakfast at Hilton Gaithersburg**
- 0700 **Buses begin to NIST
Registration at NIST**
- 0800 **Design of a C-DEW-Enabled Fire Control
Vision System Testbed: Focal Plane Shift
and Revised Eye Protection Threshold
Requirements**
Timothy Pritchett, U.S. Army Research
Laboratory
- 0830 **Material Coatings and Structures to
Counter the Effects of HEL Weapons**
Keith Caruso, Johns Hopkins University
- 0900 **Thermal Barrier Materials for Counter HEL**
Collin Bright, Naval Research Laboratory
- 0930 **Detection and Identification of Directed
Energy Weapons and Their Targeting
Systems**
Leo Volfson, Torrey Pines Logic
- 1000 **Break**
- 1030 **Counter Radio Frequency Directed
Energy Methodology**
John Tatum, SURVICE Engineering Company
- 1100 **Green Production of Low Cost, Lightweight
Nanostructured Shielding Materials**
Jennifer Lalli, NanoSonic, Inc.
- 1130 **Hyperspectral Imaging as a Tool for Material
Damage Assessment Under Laser-Material
Interactions**
Cameron Keenan, Air Force Institute of
Technology
- 1200 **Lunch at NIST
NIST Facility Tours (see page 2)**

THURSDAY MORNING

EMPLOYMENT OF DE WEAPONS

HEL Employment Considerations (Secret Distribution D)

NIST, LR B

Chair: *John Hartke*, US Military Academy

- 0630 **Breakfast at Hilton Gaithersburg**
- 0700 **Buses begin to NIST
Registration at NIST**
- 0800 **Strike Aircraft: Synergistic Weapons and a
Smarter Way to Survive**
- 0830 **Aeroeffects Performance and Prediction -
A Summary of the Aeroeffects Workshop
- 2011**
- 0900 **Developing a Climatology for Laser-Relevant
Parameters Using Archived Synoptic
Weather Data**
- 0930 **On the Probability of Hitting a Spacecraft
During a Laser Counter-Artillery
Engagement**
- 1000 **Break**

Employment of RF Systems (Secret Distribution C)

NIST, LR B

Chair: *John Hartke*, US Military Academy

- 1030 **MAX POWER v1.5 Testing Results**
- 1100 **All-Dielectric Frequency Selective Surfaces
for High Power Microwave Systems**
- 1130 **COTS Network Centric Equipment Effects
from the Advanced Fast Electromagnetic
Pulse Simulator (AFEMPS)**
- 1200 **Lunch at NIST
NIST Facility Tours (see page 2)**

MODELING AND SIMULATION

HELSEEM Showcase (Secret Distribution D)

NIST, Green Room, 1030-1200

Chairs: *Chris McCracken*, Air Force Research
Laboratory/ RDTA and
Robin Ritter, TAU Technologies

THURSDAY MORNING

HEL LETHALITY

Material Interaction / High Fidelity Modeling (Secret)

NIST, Red Room

Chairs: *Chris Lloyd*, Naval Surface Warfare Center and *Steve Baird*, Space and Missile Defense Command

- 0630 Breakfast at Hilton Gaithersburg
- 0700 Buses begin to NIST
Registration at NIST
- 0800 Sustained Burning of Cotton Fabric:
HEL Testing and Analysis
- 0830 Laser Beam Penetration of Generic
Composite Wing Components
- 0900 Laser Beam Penetration and Hole Growth
of Painted and Unpainted Aluminum
Coupons
- 0930 Overview of the Artimus II Test Series
- 1000 Break
- 1030 Study of Transient Evaporation During High
Energy Laser Interaction
- 1100 Prediction of Laser Damage Using a Coupled
Thermo-Mechanical Finite-Element
Approach
- 1130 Multiple Surface Laser Penetration Modeling
- 1200 Lunch
NIST Facility Tours (see page 2)

THURSDAY NOON

JOINT SESSION

Limited Distribution D Session

NIST, LR A, 1200-1430

An Integrated Software Environment for Model-
Based Engineering of Laser Weapons Systems
Steve Coy, Timelike Systems LLC

HEL Lethality of Carbon Based Materials
Robert Cozzens, NRL

High Energy Laser Tests in a Flight-Representative
Environment
Adam Goss, 46 TG/OL-AC

Weather Climatology and Effects on High Energy
Laser Propagation and Lethality
Wilford Gebhart, Radiance Technologies

System Engineering Trades for HELs on Remotely-
Piloted Aircraft
Marc Hallada, Schafer Corporation

Engagement Angle Dependency Test
Justin Harms, AFRL/RDLE

Facility Modifications at the Aerodynamic and
Propulsion Test Unit in Support of Directed Energy
Laser Lethality Ground Testing
Alexander Hausman, Air Force / AEDC

Laser Effects Testing in Relevant Environments
Braden Childers, LHMEI / UES, Inc.

Solid State Laser Testbed Status and Capabilities
for use in High-Energy Laser Vulnerability and
Propagation Tests
Chuck LaMar, SMDC

Adjunct Tracker Scoring System Development, Data
Collection, and Data Analysis
Richard Lee, SAIC

Outdoor High Energy Laser Testing on Static UAS
Wings and Fuel Systems
Chris Lloyd, NSWC Dahlgren

Multiple Surface Laser Penetration Modeling
Darren Luke, AFRL/RDLE

A Graduate-Developed Framework for Evaluating
the Effectiveness of Counter-Directed Energy
Weapons
Jessica Marshall, ASDL, GTRI

THURSDAY NOON

JOINT SESSION

Limited Distribution D Session (continued)

NIST, LR A, 1200-1430

Prediction of Laser Damage Using a Coupled Thermo-Mechanical Finite-Element Approach

David Medina, AFRL/RDLEA

Development of a Laboratory Experimental Platform to Validate Laser Engagement Models

Jordan Smith, United States Military Academy

Chaos in a Transmission Line Connected to Nonlinear Circuits

Ioana Triandaf, Naval Research Laboratory

Laser Beam Penetration of Generic Composite Wing Components

Craig Walters, Craig Walters Associates

Laser Beam Penetration and Hole Growth of Painted and Unpainted Aluminum Coupons

Craig Walters, Craig Walters Associates

Secret Poster Session

NIST, Red Room 1200-1430

Satellite Vulnerability to Lasers

Defeat Speed of Light Initiative (DSOLWI) Smart Bomb Laser Effects

Counter-Communications System JUONS Target Lethality Assess

Examination of Roll Rate on RAM Failure Time

THURSDAY AFTERNOON

JOINT SESSION

Symposium Closing Plenary (Secret)

NIST, Red Room

1400 **Introduction**

Mr. William Decker, Defense Acquisition University and Dr. Malcolm O'Neill, Lt. Gen US Army (ret.)

1420 **HEL Lethality Conference**

Mr. Robert Roybal, Co-Conference Chair

1440 **DE Modeling & Simulation Conference**

Dr. Nicholas Morley, Co-Conference Chair

1500 **RF DE Weapons Workshop**

Dr. Diana Loree, Co-Conference Chair

1520 **Counter DEW Conference**

Mr. David Schafer, Conference Chair

1540 **Employment of DE Weapons Conference**

Lt Col John Hartke, Co-Conference Chair

1600 **Symposium Adjourns**

Symposium Co-Chairmen:

William Decker and Malcolm O'Neill

Symposium Program Coordinator:

David Loomis

Conference Chairs:

Counter DE Weapons

David Schafer

DE Modeling and Simulation

Nicholas Morley, Benjamin Call & Dwight Smith

Employment of DE Weapons

John Hartke and Kraig Sheetz

HEL Lethality

Robert Roybal and Robert Ulibarri

RF DE Weapons

Diana Loree and Mike Haworth

Symposium Coordinator and Short Courses:

Cynnamon Spain

Security Coordinator:

Rhonda Peyton

Registration, Payments and Receipts:

Tiffany Bjelke

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