

DIRECTED ENERGY TEST & EVALUATION

August 10 – 12, 2009 ■ Albuquerque, New Mexico



PROGRAM SCHEDULE

| MONDAY, AUGUST 10

7:00 am Registration Desk Opens, Exhibits Set-up, Continental Breakfast

Morning Tutorials, 8:00 am to 12:00 noon

TUTORIAL I

Introduction to High Energy Laser (HEL) Systems

Denny Boesen, Northrop Grumman Information Technology, Program Manager

Students with a basic understanding of engineering principles should gain an appreciation for the strengths and shortfalls of HEL systems as well as some potential operational concepts for integrating HEL systems into the joint battlefield.

TUTORIAL II

Introduction to High Power Microwave (HPM) Systems

Bob Antoine and **Bob Richter-Sand**, Northrop

Grumman Mission Systems Students with a basic understanding of engineering principles should gain an appreciation for the strengths and shortfalls of HPM systems as well as some potential operational concepts for integrating HPM systems into the joint battlefield.

TUTORIAL III

Introduction to the DoD T&E Process

Bill Decker, Professor of Engineering Management, Defense Acquisition University

Students will have a greater understanding of the fundamentals of testing DoD systems with an emphasis on directed energy systems. They will learn the overview of the Defense Acquisition System; the role of the Systems Engineering Process; test planning; types of testing; test execution and reporting; and directed energy testing issues.

Afternoon Tutorials, 1:00 pm to 5:00 pm

TUTORIAL IV

The Credible Use of Modeling and Simulation in T&E

Dr. Dave Cook, The AEgis Technologies Group, Inc., Principal Member of the Technical Staff

Modeling and simulation (M&S) can productively be used to provide financially-attractive options during test and evaluation (T&E) of complex hardware and software systems. However, to make M&S work productively, it has to be used correctly and effectively. This tutorial will show how M&S should be used in T&E situations. The appropriate use of M&S and the areas where M&S makes most sense will be covered. This tutorial will also cover the proper methods to perform Verification, Validation, and Accreditation (VV&A) once M&S has been integrated into T&E.

TUTORIAL V

Test and Evaluation of High Energy Laser (HEL) Systems (Limited)

Dr. Larry McKee, Science Applications International Corporation (SAIC), Directed Energy Test and Evaluation Capability (DETEC) HEL Subject Matter Expert

This course provides an introduction to the fundamental considerations for the T&E of HEL weapon systems. Target audience is T&E engineers who may be responsible for planning, supporting, and/or executing HEL system range tests.

TUTORIAL VI

Test and Evaluation of High Power Microwave (HPM) Systems (Limited)

Jeff Schleher, Science Applications International Corporation (SAIC), DETEC Senior Analyst

This course provides an introduction to the fundamental considerations for the T&E of HPM weapon systems. Target audience is T&E engineers who may be responsible for planning, supporting, and/or executing HPM system range tests.

| TUESDAY, AUGUST 11

6:30 am Registration Desk Opens

7:00 am Exhibits Open, Continental Breakfast in the Exhibit Area

Speakers'/Panel Members' Breakfast – Speakers and panel members on this day are invited to join their session chair at a complimentary breakfast to be held in the hotel. Breakfast location will be provided at time of registration.

8:00 am **Welcome and Introductions**
Conference Co-Chairs: **Patrick M. Cannon**, ITEA and **Rick Graber**, DEPS

8:15 am **An AFRL View on Directed Energy Testing and Evaluation**
Susan J. Thornton, Director of the Directed Energy Directorate, Air Force Research Laboratory

9:00 am **Industry Perspective**
Stan Crow, Directed Energy Systems, Northrop Grumman Aerospace Systems

9:45 am Break in Exhibit Area

10:15 am **U.S. Navy Maritime Laser Demonstration**
Peter Morrison, Deputy, Naval Air Warfare and Weapons (Code 35) Department, Office of Naval Research

11:00 am **Directed Energy: Transitioning from S&T to Acquisition and the Warfighter**
John D. Corley, Director, Capabilities Integration Directorate, Air Armament Center, Eglin AFB

11:45 am Lunch

1:00 pm to 5:00 pm **Break Out Sessions** (break in exhibit area from 3:00 – 3:30 pm)

SESSION 1: Directed Energy Test Programs (Limited/Open)

Chair: James Keith, Director, 46 Test Group DE T&E Operating Location

- The Army's High Energy Solid State Laser Testbed Experiment
Travis Taylor, U.S. Army Space and Missile Defense Command (SMDC)

- ATL Prepares for Demonstration of Military Utility
Robert Lillard, **Matt D. Nixon**, The Boeing Company; **Eric Van Dorn**, 413th Flight Test Squadron
- Laser Propagation Field Exercise Preparations for MATRIX System
2dLt Kyle Dufaud, **Nicolas Tarasenko**, **Leslie Vaughn**, Air Force Research Laboratory (AFRL); **Robert Fetner**, **Mark Kozemchak**, Boeing SVS
- U.S. Navy Maritime Laser Demonstration – Detailed Discussion
Peter Morrison, Deputy, Naval Air Warfare and Weapons (Code 35) Department, Office of Naval Research
- Improved Sensors for Active Denial System Testing
Jeffrey Schleher, DETEC; **Dave Merrell**, SAIC
- White Sands Missile Range High Powered Microwave Systems (Open)
Russell Blundell, White Sands Missile Range

SESSION 2: Data Collection Analysis and Sharing – Part 1 (Open)

Chair: **James Cutler**, DETEC Army Deputy, White Sands Missile Range—System Engineering

- Combining High Power Fiber Amplifiers Using Passive Phasing
Sami Shakir, **Bill Culver**, **Yuji Starcher**, **Burke Nelson**, **George M. Bates**, **Jerry W. Hedrick, Jr.**, Northrop Grumman
- Progress Report: A High Energy Laser Target Board for Ground Target Irradiance/Fluence Measurement
David Roberts, Georgia Tech Research Institute; **Leonid Glebov**, OptiGrate Corp.
- HEL-JTO Data Collection Standards
Ralph R. Rudder, CAVALLA, Inc.; **Craig T. Walters**, CWA Associates
- Determination of the Front Surface Temperature of Metal Target Subject to HEL Irradiation
Yuwen Zhang, **Z.C. Feng**, **J.K. Chen**, University of Missouri
- Electro-optic and Magneto-Optic Sensor for High Power Microwave Test and Evaluation
Anthony Garzarella, **Dong Ho Wu**, **Terence J. Wieting**, Naval Research Laboratory

SESSION 3: Modeling and Simulation in Directed Energy Test and Evaluation

(Limited/Open)

Chair: **Robin Ritter**, Senior Analyst, Tau Technologies

- Target Surface Temperature Retrieval Using High Fidelity HEL Engagement Model
Nahum Gat, **Kyungsuk Lee**, **Gordon Scriven**, **Peter Chin**, OptoKnowledge Systems, Inc; **Jeffery King**, Teledyne Solutions Inc; **Carol Barclay**, U.S. Army SMDC

- United States Army High Energy Laser Laboratory Modeling and Simulation and Experimentation Activities and Capabilities
Amanda Black, Travis Taylor, U.S. Army SMDC
- NAVAIR HEL Fighter Crew Station
Carlos A. Falcón, M. Chapman, J. Anderson, S. O'Day, Naval Air Systems Command
- Estimating Surface Temperature Using Constrained Non-Linear Least Squares (Open)
Edward Early, George Megaloudis, William Brockmeier, Northrop Grumman
- Aero-Optic Scaling Effects in Subscale Wind Tunnel Testing (Open)
Charles Lynn Sebourn, Dynetics AEDC Group; **David Plemmons, Anthony Nelson**, Aerospace Testing Alliance

SESSION 4: "Above the Horizon" Laser Testing and Satellite Safety (Limited)

Chair: **Capt James Wolongevicz**, Directed Energy Test Engineer, U.S. Air Force 46th Test Group

- Directed Energy Issues, Practices and Solutions for Satellite Safety
- **LT Heather Lehmann**, USSTRATCOM Joint Functional Component Command for Space/J95 Unified Space Vault; **Dr. Steven Gabriel**, SERCO North America, Inc.,
- The Role of the Satellite Assessment Center and Laser Owner/Operators in Predictive Avoidance
1Lt Bryan Blasy, AFRL/RDTE
- Maui Interim Centralized Predictive Avoidance System (ICPAS)
Eric Stevenson, Boeing LTS; **Capt Virginia Wright**, AFRL/RDSMA
- PA Experience on Laser CIWS Testbed
Kurt Peterson
- Laser Weapon System (LaWS) Counter UAV Testing
Theresa Gennaro, NSWCDD
- Airborne Laser Testing: Predictive Avoidance Mission Planning
1st Lt Carlos Matos-Ramos, 771 TS/EWAI
- Airborne Laser Flight Test CONOPS
2d Lt Nathan Lehman, 417 FLTS
- The Way Forward for "Above the Horizon" Laser Testing: Open Discussion on Challenges, Solutions, and Lessons Learned Regarding Satellite Safety
All Presenters

5:30 pm to 7:30 pm Reception in the Exhibit Area with Poster Papers

| **WEDNESDAY, AUGUST 12**

6:30 am Registration Desk Opens

7:00 am Exhibits Open Continental Breakfast in the Exhibit Area

Speakers' /Panel Members' Breakfast – Speakers and panel members on this day are invited to join their session chair at a complimentary breakfast to be held in the hotel. Breakfast location will be provided at time of registration.

8:00 am **Welcome and Introductions**

Conference Co-Chairs: **Patrick M. Cannon**, ITEA, and **Rick Graber**, DEPS

8:15 am **Strategic Roadmap for Directed Energy Test and Evaluation**

Dr. John Foulkes, Director, Test Resource Management Center

9:00 am **HEL JTO Perspective on DE T&E**

Mark Neice, Joint Technology Office

9:45 am Break in Exhibit Area

10:00 am **U.S. Department of Defense and Foreign Range Capabilities**

Chair: **Theresa Gennaro**, NSWC Dahlgren

Bob Harriman, U.S. Navy, NAVAIR Ranges Department

James Keith, U.S. Air Force, Director, 46 Test Group DE T&E Operating Location

Brad King, U.S. Army, White Sands Missile Range

Carlos Rendo, Representative from Australia

11:45 am Lunch

12:45 pm **Buses Depart for Classified Session**

1:00 pm to 5:00 pm **Break Out Sessions** (break in exhibit area from 3:00 – 3:30 pm)

SESSION 2: Data Collection Analysis and Sharing—Part 2 (Limited)

Chair: **James Cutler**, DETEC Army Deputy, White Sands Missile Range System Engineering

- Airborne Target Irradiance and Imagery Measurement Test-bed
Mike Bertin, **Larry McKee**, Directed Energy Test and Evaluation Capability (DETEC)
- Tri-Service Study Update Project
Mike Bertin, DETEC

- Initial Test Results of the Narrowband Threat Systems-A (NBTS-A) Capability at White Sands Missile Range
J. Mark DelGrande, DETEC
- A Microwave Rotary Attenuator for Narrowband Threat Systems-C
Dr. Peter Duseli, Greg Dunham, Dirk Frew, Rick Johnson, Will White, Bruce Miller, Ktech Corporation
- High Energy Laser Ground Target Irradiance Measurement Capability
Mike Bertin, DETEC
- High Power Microwave Wideband Threat System
Cyndi Mora, Jeffrey Schleher, DETEC

SESSION 5: Directed Energy Test Results (SECRET/U.S. Only)

Chair: **James Keith**, Director, 46 Test Group DE T&E Operating Location

- Electric Laser on a Large Aircraft (ELLA) Ground Test Plans
- An Integrated Process for Testing and Evaluation of High Power Microwave Systems
- Lethality Analysis of the Tactical High Energy Laser Dynamic Testing
- Test Results of the Active Contours Track Field Demonstration
- Laser Propagation Field Test Results for MATRIX System

SESSION 6: Bioeffects/Safety (Limited/Open)

Chair: **Norm Barsalou**, Naval Health Research Center, Directed Energy Bioeffects Laboratory

- PHaSR Bioeffect Test Quick-Look Results
Semih Kumru, 711 HPW/RHDO; Curtis Crawford, Daniel Sharpes, AFRL/RDTA
- Directed Energy Range Safety Data Collection at PMRF (Open)
Timothy Murphy, Matthew Leigh, Jeffery Bohn, Andrew Baronavski, John Kurtz, Envisioneering, Inc.
- The U.S. Air Force Operational Test and Evaluation Center (AFOTEC) Operational Test Safety Process – Directed Energy Focus in Support of Defense Acquisition (Open)
Roderick A. Earl, Headquarters, Air Force Operational Test and Evaluation Command (1 Hour Brief)
- Development of a Skin Heating and Electric Field (SHEF) Measurement System for In-Situ HPM Testing (Open)
Jay Lewis, Ethan Klem, Andrew Dummer, Jeff Piascik, RTI International; **Kent Taylor, David Thomas**, The AEGIS Technologies Group

SESSION 7: Directed Energy Test Science and Technology (DET S&T) Investments (Open)

Chair: **Todd D Steiner**, Principal Engineer, Directed Energy Test and Evaluation Science and Technology Program, Defense Test Resource Management Center

- DET S&T Focus Area Overview
Minh Vuong, Test Resource Management Center DET S&T Focus Area Executing Agent
- Inversion-derived Resistive Temperature Sensors
David Thomas, Aegis Technologies Group
- Precision Remote Surface Temperature Sensor
Jim Daly, Bodkin Design & Engineering, LLC
- Integrated Atmospheric Characterization System
David Roberts, **Gary Gimmestad**, **John Stewart**, Georgia Tech Research Institute;
Frank D. Eaton, AFRL
- Cine Radiography Imagery Measurement
John Riordan, L3 Communications
- Scanning Target Board
Michael Zintl, SARA, Inc.
- Dual Oscillator for Microwave Generation
Doug Byrne, ITT

4:15 pm **Buses Return to Hotel from Classified Session**

5:00 pm **Conference Adjourns**

| **THURSDAY, AUGUST 13**

8:00 am Buses Leave for Tours at Kirtland Air Force Base

Live demonstrations and tours of the Active Denial System and the Advanced Tactical Laser are being offered at Kirtland AFB. Attendance is limited and participation restricted to persons who submitted their classified visit request according to the instructions for attending classified sessions. The cost of a tour is \$10 per person which covers bus transportation and attendees must select either the ADS or the ATL tour. Active Denial tour participants can chose to volunteer for the demonstration and experience the full power capabilities for themselves.

Signup for the tours is available through the online conference registration; persons who have already registered can sign up at <http://www.deps.org/DEPSpages/forms/DETEExtras.html>.

12:00 noon Buses return to the Hotel