



CONFERENCE PROGRAM

Wailea Marriott Resort & Spa
Maui, Hawaii
September 16-19, 2008

mahalo to our sponsors

PO'OKELA
(striving for the best)



LOKAHI
(collaboration and unity)

Raytheon

KUPA'A
(loyal and committed)



MALAMA
(to care for)

NORTHROP GRUMMAN

LAULIMA
(working together)



MONDAY 15 SEPTEMBER

12 – 6 pm **EARLY REGISTRATION | Aulani Foyer**

TUESDAY 16 SEPTEMBER

12 – 6 pm **EARLY REGISTRATION | Aulani Foyer**

EXHIBITOR LOAD-IN

6:30 – 8:30 pm **WELCOME RECEPTION | Luau Gardens**

WEDNESDAY 17 SEPTEMBER

6:00 - 7:15 am **BREAKFAST AT LEISURE | Luau Gardens**

7:30 **EXHIBITION AND POSTER ROOM | Jade-Plumeria Ballroom**

CONFERENCE OPENING | Aulani Ballroom

Jeanne Unemori Skog
President & CEO, Maui Economic Development Board

INVOCATION

Reverend Kealahou Alika, *Keawala'i Congregational Church*

WELCOME REMARKS (via video)

Daniel K. Inouye, *United States Senator*

KEYNOTE ADDRESSES

Introductions

Colonel L. Kirk Lewis, Ret.
Senior Analyst, Institute for Defense Analyses

Lieutenant General William L. "Willie" Shelton
Commander, Joint Functional Component Command for Space, U.S. Strategic Command, and the Commander, 14th Air Force (Air Forces Strategic), Air Force Space Command

Lieutenant General John T. "Tom" Sheridan
Commander, Space and Missile Systems Center, Air Force Space Command

Joshua T. Hartman
Senior Advisor, Under Secretary of Defense for Acquisition, Technology and Logistics

9:30 **BREAK**

9:50 **SESSION PRIMERS**

10:30 **SSA & SSA ARCHITECTURE**

Session Chair, John Lambert, The Boeing Company

Surveillance of Space in Australia
Garry Newsam, Defence Science and Technology Organisation, Australia

A Simulation and Modeling Framework for Space Situational Awareness
Scot Olivier, Lawrence Livermore National Laboratory

Space Situational Awareness Research Findings
David Richmond, Lockheed Martin

11:30 **LUNCHEON | Lokelani Ballroom**

12:30 pm **SSA & SSA ARCHITECTURE (continued)**

Space-Based Visible End of Life Experiment
Joseph Stuart, MIT Lincoln Laboratory

Sapphire: Canada's Answer to Space-Based Surveillance of Orbital Objects
Capt Paul Maskell, Department of National Defence, Canada

Hosting Sensors on Commercial Communication Satellites to Meet Space Surveillance Requirements
Timothy Deaver, Americom Government Systems

Site Testing for a Far-North Optical/IR Telescope
Brad Wallace, Defence Research and Development Canada

Human System Interface Research for Space Cognitive Awareness
John Ianni, AFRL/RHC

SSA Building Blocks - Transforming Your Data and Applications into Operational Capability
Shayn Hawthorne, USAF Electronic Systems Center/850 Electronic Systems Group Advanced Development Division

2:30 **BREAK**

2:50 **INSTRUMENTATION DESIGN**

Session Chair, Riki Maeda, Trex Hawaii

Iao: The New Adaptive Optics Visible Imaging and Photometric System for AEOS
John Mooney, The Boeing Company

Spectrum Tunable Quantum Dot-in-a-well Infrared Detector Arrays for Thermal Imaging
Jonathan Andrews, Naval Research Laboratory

The ISON Subsystems for GEO and HEO Surveying on the Base of Small Telescopes
Igor Molotov, Keldysh Institute of Applied Mathematics, RAS

Modeling the Imaging Performance of Ground-Based Telescopes
Richard Boucher, The Aerospace Corporation

Improved Field Corrector for Large Telescopes
Mark Ackermann, Sandia National Laboratories

ADJOURN

4:30 **EXHIBITION AND POSTER PRESENTATIONS | Jade-Plumeria Ballroom**

Posters are listed on last page of schedule

6:30 **AMOS SITE CAPABILITIES TUTORIAL | Aulani Ballroom**

Arthur Hassall, AMOS, AFRL/RDSM

7:30 **TECHNICALLY SPEAKING: BRINGING EXCITEMENT | Aulani Ballroom**

AND CLARITY TO TECHNICAL PRESENTATIONS TUTORIAL
Brad Wallace

wednesday



THURSDAY 18 SEPTEMBER

thursday



6:00 - 7:15 am **BREAKFAST AT LEISURE** | Luau Gardens

7:30 **ATMOSPHERICS/SPACE WEATHER** | Aulani Ballroom

Session Chair, L. William Bradford, PDS

Simulations of Optical Turbulence for Use in Optical Communication Studies
Randall Alliss, Northrop Grumman – TASC

Refractive Turbulence, Transient Propagation Disturbances, and Space Situational Awareness
Owen Cote, AFRL/RVBXI

The Los Alamos Dynamic Radiation Environment Assimilation Model for Space Weather Specification and Forecasting
Reiner Friedel, Los Alamos National Laboratory

ADAPTIVE OPTICS

Session Chair, Earl Spillar, AFRL, MSSS & SOR

Ground-layer Adaptive Optics with Multiple Laser Guide Stars
Michael Lloyd-Hart, University of Arizona

Solar Multi-Conjugate Adaptive Optics at the DST
Thomas Rimmele, National Solar Observatory

Measuring Tilt and Focus for Sodium Beacon Adaptive Optics on the Starfire 3.5 Meter Telescope
Robert Johnson, Starfire Optical Range, AFRL/RDSE

9:30 **BREAK**

9:50 **ADAPTIVE OPTICS (continued)**

Curvature Adaptive Optics and Low Light Imaging Goals
Christ Ftaclas, Institute for Astronomy, University of Hawaii

Snapshot Wavefront Distortion Characterization Using Compressive Spectral Imagers
David Brady, Duke University

RytovProp
David Fried

The Implementation of RytovProp in Matlab
Michael Olikier, Science Applications International Corporation

An Experimental Laser Guide Star Wavefront Sensor Simulator
Colin Bradley, University of Victoria

11:30 **LUNCHEON** | Lokelani Ballroom

12:30 pm **ADAPTIVE OPTICS (continued)**

Target-in-the-loop Wavefront Sensing and Control
Mikhail Vorontsov, Army Research Laboratory

Real Time Processing for the ATST AO System
Kit Richards, National Solar Observatory

IMAGING

Session Chair, Keith Knox, The Boeing Company

Three-Dimensional Imaging and Satellite Attitude Estimation Using Pulse Laser Illumination and a Remote Ultra-Low Light Imaging Sensor for Space Situational Awareness
Michael Roggemann, Michigan Technological University and PDS

Local Minima Analysis of Phase Diverse Phase Retrieval Using Maximum Likelihood
David Gerwe, The Boeing Company

Development of a Sparse Aperture Test-bed Utilizing Pupil-plane Imaging
David Raab, AFRL Sensors Directorate

Automatic Reconstruction of Spacecraft 3D Shape from Imagery
Conrad Poelman, Stellar Science

2:30 **BREAK**

2:50 **IMAGING (continued)**

Implementation of Estimation Theoretic Image Restoration Algorithms on OPERA: 2D FFT Benchmarking
Carlos Luna, The Boeing Company

Improving Large-telescope Speckle Imaging with Phase Masks
Brandoch Calef, The Boeing Company

The Super-resolution of Linear Structures in Image Data
Michael Egan, National Geospatial-Intelligence Agency

Imaging Geo-synchronous Satellites with the AEOS Telescope
Douglas Hope, Institute for Astronomy, University of Hawaii

Shadow Imaging Efforts at MIT Lincoln Laboratory
Jane Luu, MIT Lincoln Laboratory

Observations of a Geosynchronous Satellite with Optical Interferometry
Sergio Restaino, Naval Research Laboratory

4:50 **ADJOURN**

INDUSTRY RECEPTIONS

The Boeing Company | Puakenekeni Ballroom
Oceanit | Mauna Loa Ballroom

FRIDAY 19 SEPTEMBER

friday



6:00 - 7:15 am **BREAKFAST AT LEISURE | Luau Gardens**

7:30

NON-RESOLVED OBJECT CHARACTERIZATION

Session Chair, Matt Hejduk, SRA International (AFSPAC/A3C)

Satellite Characterization Using Small Aperture Instruments at DRDC Ottawa
Robert Lauchie Scott, Defence Research and Development Canada

Space Object Temperature Determinations from Multi-Band Infrared Measurements
Hilary Ned Snell, Atmospheric & Environmental Research

Optical CubeSat Discrimination
Doyle Hall, AMOS, Boeing LTS

Resolving Rotational Ambiguities for Spin-stabilized Satellites
Keith Knox, Boeing LTS

Unmixing the Materials and Mechanics Contributions in Non-resolved Object Signature
Anil Chaudhary, Applied Optimization, Inc.

Noise-Tolerant Hyperspectral Signature Classification in Unresolved Object Detection Using Adaptive Tabular Nearest Neighbor Encoding
Mark Schmalz, University of Florida

9:30

BREAK

9:50

ASTRONOMY

Session Chair, Tamara Payne, The Boeing Company

The Magdalena Ridge Observatory's 2.4-meter Telescope: A New Facility for Follow-up and Characterization of Near-Earth Objects
Eileen Ryan, New Mexico Institute of Mining and Technology

Reference-less Detection, Astrometry, and Photometry of Faint Companions with Adaptive Optics at 1, 2, and 5 microns
Szymon Gladysz, National University of Ireland, Galway

CRBLASTER: A Fast Parallel-Processing Program for Cosmic Ray Rejection in Space-Based Observations
Kenneth Mighell, National Optical Astronomy Observatory

AO Images of Asteroids, Inverting their Lightcurves, and SSA
Jack Drummond, RDS/AFRL

ASTRODYNAMICS

Session Chair, Kyle Alfriend, Texas A&M University

Determination and Prediction of Satellite Orbits
Byron Tapley, University of Texas at Austin

11:30

LUNCHEON | Lokelani Ballroom

12:30 pm

ASTRODYNAMICS (continued)

Orbit Determination of Space Debris
Jared Maruskin, San Jose State University

Algorithms for Calculating KAM Tori
William Wiesel, Air Force Institute of Technology

Improved Conjunction Analysis via Collaborative Space Situational Awareness
T.S. Kelso, Center for Space Standards & Innovation

Angles and Range: Initial Orbital Determination with the Air Force Space Surveillance Telescope
John McGraw, University of New Mexico

ORBITAL DEBRIS

Session Chair, Eugene Stansbery, NASA/Johnson Space Center

Space Debris - Birth to Death
David Finkleman, Center for Space Standards and Innovation

A Comparison of Catastrophic On-Orbit Collisions
Eugene Stansbery, NASA/Johnson Space Center

2:30

BREAK

2:50

ORBITAL DEBRIS (continued)

Color Photometry and Light Curve Observations of Space Debris
Thomas Schildknecht, Astronomical Institute University of Bern, Switzerland

Classification and Characterization of GEO Population Based on Results of the ISON Observations
Vladimir Agapov, Keldysh Institute of Applied Mathematics, RAS

Prediction and Tracking Analysis of a Class of High Area-to-mass Ratio Debris Objects in Geosynchronous Orbit
Thomas Kelecy, Boeing LTS

Assessment and Categorization of TLE Orbit Errors for the US SSN Catalogue
Tim Flohrer, ESA/ESOC Space Debris Office

Comparison of Re-entry Prediction Using MSISE-00 and Jacchia 1971
Chikako Hirose, Japan Aerospace Exploration Agency

4:30

CLOSING REMARKS BY TECHNICAL CHAIRS

Wes Freiwald, PDS, and Paul Kervin, AFRL

ADJOURN

EXHIBITOR LOAD-OUT

6:00

CLOSING DINNER AND SHOW | Pacific Terrace



posters

PERCS, the 10-meter Diameter Laser Imaging Calibration Sphere in Low-Earth-Orbit
Paul Bernhardt, Naval Research Laboratory

Validation of MODTRAN(TM) for Planetary Atmospheres
Alexander Berk, Spectral Sciences, Inc.

The Utility of Time-varying Spectral Similarity Analyses Using Multispectral and Hyperspectral Imagery in Diagnosing Satellite Anomalies
Joseph Coughlin, Master Solutions, LLC

Space Object Characterization with 16-Visible-Band Measurements at Magdalena Ridge Observatory
Phan Dao, AFRL/RVBYB

Space Object Modeling: Some Examples
Michael Duggin, AFRL

Simultaneous Single Site Color Photometry of LEO Satellites
James Frith, Oceanit

The Joint Milli-Arcsecond Pathfinder Survey Mission: Application for Space Situational Awareness
Ralph Gaume, U.S. Naval Observatory

MEMS Segmented Deformable Mirror for Adaptive Optics
Michael Helmbrecht, Iris AO, Inc.

Space-Based Space Situational Awareness with Guaranteed Orbit Coverage
Islam Hussein, Worcester Polytechnic Institute

The Extended Hands Characterization and Analysis of Metric Biases
Thomas Kelecy, Boeing LTS

Space Shuttle Plume Transport: Evidence that the Great Siberian Impact of 1908 was due to a Comet
Mike Kelley, Cornell University

Optimization of the PCID Multi-frame Blind Deconvolution Algorithm for Multi-core High Performance Computers
Richard Linderman, AFRL/RI

Analysis of USA-193 Breakup and Resulting Debris Characteristics with Public TLEs
Jin Liu, Chinese Academy of Science, Beijing

Plans for Tomographic Wavefront Sensing with a Hybrid Laser Guide Star System at the 6.5 m MMT
Michael Lloyd-Hart, University of Arizona

Active Optical Zoom for Tracking
Ty Martinez, Naval Research Laboratory

SiC Technology for Lightweighted Aerospace Mirrors
Lawrence Matson, AFRL/RXLN

First Proper Motions from Pan-STARRS PS1
David Monet, USNO Flagstaff Station

An Investigation of Global Albedo Values
Mark Mulrooney, NASA/JSC

Automated Image Quality Assessment for Ground Based Space Surveillance Optical Sensors
Nandini Rajan, MIT Lincoln Laboratory

Silicon Carbide Optics for Space Situational Awareness and Responsive Space Needs
Joseph Robichaud, L-3 Communications, SSG Tinsley Inc.

Precision Orbit Determination, Validation and Orbit Prediction for ICESAT
Bob Schutz, University of Texas at Austin

Optical Studies of Orbital Debris at GEO Using Two Telescopes
Patrick Seitzer, University of Michigan

High Spatial Resolution GaN and Optical Photon Counting Detectors with Sub-nanosecond Timing for Astronomical and Space Sensing Applications
Oswald Siegmund, University of California at Berkeley

A Modular Control Platform for a Diode Pumped Alkali Laser
Scott Teare, New Mexico Tech

Application of the Iterative Methods to Sparse 3D Satellite Images
Moe Tun, Adaptive Technologies Corporation

Autonomous Global Sky Surveillance with Real-Time Robotic Follow-Up
Thomas Vestrand, Los Alamos National Laboratory

Development of an Architecture of Sun-Synchronous Orbital Slots to Minimize Conjunctions
Brian Weeden, Secure World Foundation

technical tour

SATURDAY 20 SEPTEMBER

Optional Technical tour of the Maikalani, The Advanced Technology Research Center at the Institute for Astronomy, University of Hawaii and the Maui Space Surveillance Complex atop Haleakala. Participants registered for the tour, bus will depart conference hotel at 7:30 am and 9:30 am.



featured Sponsors and Exhibitors

Air Force Research Laboratory, RDSM ●

The Maui Space Surveillance System, also known as the Air Force Maui Optical & Supercomputing Site (AMOS), is operated by the Air Force Research Laboratory's Directed Energy Directorate.

Air Force Research Laboratory, Small Business Office ●

The Mission of the Air Force Research Laboratory Small Business Office is to create and deliver small business developed technology solutions and mission-ready capabilities to the warfighter.

Analytical Graphics, Inc. ●●

Analytical Graphics, Inc. develops commercial off-the-shelf analysis software used in more than 32,000 worldwide installations.

Applied Optimization, Inc. ●

Applied Optimization, Inc. (AO) operates and maintains telescope sites in Dayton, OH. We collect and analyze satellite tracking data for the purpose of health monitoring and space situational awareness.

Atmospheric and Environmental Research, Inc. ●

Atmospheric and Environmental Research, Inc. was founded in 1977 to provide a setting for basic and applied research in the atmospheric and related sciences.

The Boeing Company ●●

Boeing is the world's leading aerospace company and the largest manufacturer of commercial jetliners and military aircraft combined.

CoorsTek Technical Ceramics ●

CoorsTek is one of the largest technical ceramics providers in the world and serves the optical market with a wide variety of advanced materials including high purity silicon carbide, alumina, and zirconia.

County of Maui ●

The government of the County of Maui, encompasses the islands of Kaho`olawe, Lana`i, Maui and Moloka`i, in the State of Hawai`i, USA with a mission to promote and nurture sustainable economic development within Maui County consistent with the community's needs and priorities.

FLIR Systems ●

FLIR Systems is excited to announce the new SC-Series camera line that features high speed, high resolution, and high sensitivity detectors in all wavebands including VisGaAs (400nm – 1700nm), InGaAs (900nm – 1700nm), InSb (1500nm – 5500nm), & QWIP (8.0um – 9.2um).

Hnu-Photonics ●

At Hnu-Photonics we turn cutting edge ideas into products for our customers. We have extensive manufacturing capability for developing mechanical, opto-mechanical or electro-opto-mechanical technologies that enable customers to bring new products and technologies to market effectively and economically.

Lockheed Martin ●

Lockheed Martin, Powered by Innovation, Guided by Integrity, is a highly diversified global enterprise principally engaged in the research, design, development, manufacture and integration of advanced-technology systems, products and services.

Northrop Grumman ●

Northrop Grumman Corporation is a global defense and technology company whose 120,000 employees provide innovative systems, products, and solutions in information and services, electronics, aerospace and shipbuilding to government and commercial customers worldwide.

Oceanit ●●

Oceanit is one of Hawaii's largest, most diversified science and engineering companies with a focus on aerospace/defense, life science/biotechnology, information technology, and consulting engineering services.

Office of Aerospace Development, State of Hawaii ●

Hawaii's diverse natural resources, unique geographic terrain, mid-Pacific location, first-class technological infrastructure, and resident scientific and engineering expertise make our island state an ideal venue to support a wide variety of activities in astronomy, planetary geosciences, aviation, space-based communications, deep space surveillance, and other aerospace-related activities.

PDS ●

Pacific Defense Solutions, LLC was founded in 2006. Its headquarters is located in Kihei, Maui. The PDS team has extensive knowledge and experience in developing technology for Space Situational Awareness.

Pacific Disaster Center ●

PDC is an applied science, information and technology center, working to reduce disaster risks and impacts to peoples' lives and property.

Precision Asphere, LLC. ●

Precision Asphere, LLC. specializes in manufacturing of ultra high precision custom aspheres. From prototype to medium volume production, we offer fast (f/1 or faster) telescope mirrors and other general aspheric optics with super smooth surface and very low irregularity in the mid-frequencies range.

RC Optical Systems Inc. ●

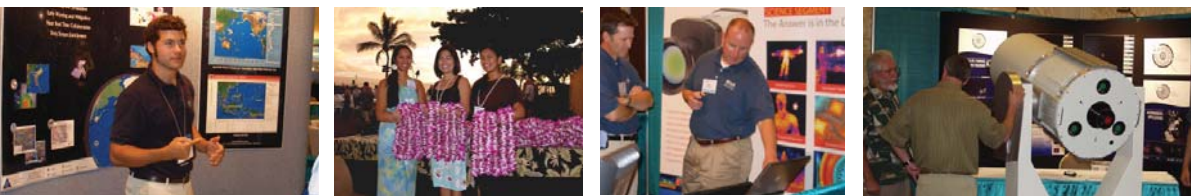
RC Optical Systems Inc. is the World's leading manufacturer of Ritchey-Chrétien Telescopes up to one meter aperture.

Raytheon ●

Raytheon Company, with 2007 sales of \$21.3 billion, is a technology leader specializing in defense, homeland security and other government markets throughout the world.

Science Applications International Corporation ●●

SAIC is a FORTUNE 500® scientific, engineering and technology applications company that uses its deep domain knowledge to solve problems of vital importance to the nation and the world, in national security, energy and the environment, critical infrastructure, and health.



Advanced Maui Optical and Space Surveillance Technologies Conference
A project of Maui Economic Development Board, Inc.

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