

AMOS

Advanced Maui Optical and Space
Surveillance Technologies Conference

e x c h a n g e

c o n n e c t



September 10-14, 2006
Wailea, Maui, Hawaii



Saturday 9 September

12:00 pm – 4:00 pm Early Registration

Sunday 10 September

6:30 am – 4:00 pm Early Registration

7:30 am & 9:30 am Optional MHPCC and MSSS Tour (departs from Wailea Marriott)

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

Monday 11 September

6:00 am BREAKFAST | Luau Gardens at leisure from 6:00 am to 7:15 am

7:30 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*

Major General Ted F. Bowlds, *Commander, Air Force Research Laboratory, Wright-Patterson Air Force Base*

Major General James B. Armor Jr., *Director, National Security Space Office, Office of the Undersecretary of the Air Force*

Lieutenant General Michael A. Hamel, *Commander, Space and Missile Systems Center, Air Force Space Command*

9:30 BREAK

10:00 SSA SYSTEMS AND PROGRAMS
Session Chair, Pat Patterson, *Space Dynamics Laboratory*

Delivering SSA Capabilities to the Warfighter
Jennifer van Weezenonk, *Space Superiority Materiel Wing Technology Division*

Integrated Multi-Sensor System for Enhanced Space Surveillance – Design, Engineering, Integration and Tests
Shiang Liu, *The Aerospace Corporation*

Proximity Operations for Space Situational Awareness
Tim Carrico and Travis Langster, *Analytical Graphics, Inc.*

Visualizing and Integrating AFSCN Utilization into a Common Operational Picture
Byron Hays, *Scitor Corporation*

Satellite Survivability Module
Patrick Buehler, *Ball Aerospace & Technologies Corporation*

Space Surveillance Network and Analysis Model Performance Improvements
Albert Butkus, *Master Solutions*

12:00 pm LUNCHEON | South Pacific Ballroom

1:00 TELESCOPES AND SENSORS
Session Chair, Anil Chaudhary, *Applied Optimization, Inc.*

The Quest for Precision Ground-Based Astronomy: The CCD/Transit Instrument with Innovative Instrumentation
John McGraw, *University of New Mexico*

Unique Baseline Optical Design of the NESSI Survey Telescope
Mark Ackermann, *Sandia National Laboratories*

Naval Prototype Optical Interferometer Upgrade with Light-Weight Telescopes and Adaptive Optics: A Status Update
Sergio Restaino, *Naval Research Laboratory*

All Spherical Catadoptric Gregorian Design for Meter Class Telescopes
Peter Ceravolo, *Ceravolo Optical Systems*

Advanced Photon Counting Imaging Detectors with 100ps Timing for Astronomical and Space Sensing Applications
Oswald Siegmund, *Space Sciences Laboratory, University of California at Berkeley*

HDVIP HgCdTe and Silicon Detectors and FPAs for Remote Sensing Applications
Arvind D'Souza, *DRS Sensors & Targeting Systems*

The Development of HWIL Testing Capabilities for Satellite Target Emulation at AEDC
Heard Lowry, *Arnold Engineering Development Center*

Lightweight, Active Optics for Space and Near Space
David Wick, *Sandia National Laboratories*

3:40 ADJOURN

4:00 – 6:00 POSTER PRESENTATIONS | Jade-Plumeria Ballroom
Posters listed on last page of schedule

6:30 – 7:30 AMOS TUTORIAL | Aulani Ballroom
Jill Tombasco, *AMOS, AFRL/Det 15*

Tuesday 12 September

TRACK 1 (dual session)

6:00 am	BREAKFAST Luau Gardens at leisure from 6:00 am to 7:15 am
7:30	ASTRONOMY Aulani Ballroom Session Chair, <i>Lewis Roberts, Boeing LTS</i> The Joint Milli-Arcsecond Pathfinder Survey: Mission Overview Bryan Dorland, <i>U.S. Naval Observatory, Astronomic Satellite Division</i> The Rice University CCD Imager for Gamma-Ray Burst Studies Ian Smith, <i>Department of Physics and Astronomy, Rice University</i> Improving the Precision and Accuracy of Near Infrared Stellar Photometry and Astrometry by Modeling the Image Formation Process within the Detector Kenneth Mighell, <i>National Optical Astronomy Observatory</i> LWIR Hyperspectral and Multispectral Scene Simulation of Mars Steven Richtsmeier, <i>Spectral Sciences, Inc.</i> IMAGING Session Chair, <i>Keith Knox, The Boeing Company</i> The AEOS Spectral Imaging System Kenneth Jerkatis, <i>Boeing – SVS</i> Reconstruction of Multi-Spectral Images from the AEOS Spectral Imaging Sensor Travis Blake, <i>Air Force Institute of Technology</i>
9:30	BREAK
10:00	IMAGING (continued) Wave Front Control and Image Reconstruction Techniques for Imaging Space Objects at Large Zenith Angles Michael Roggemann, <i>Michigan Technological University</i> Atmospheric Effects on Spatial Frequency Bounds of Polarimeter Imaging David Strong, <i>Air Force Institute of Technology</i> Wideband Hyperspectral Imaging for Space Situational Awareness Ian Robinson, <i>Raytheon Space and Airborne Systems</i> New Fourier-Based Constraints for Multi-Frame Blind Deconvolution Douglas Hope, <i>Institute for Astronomy, University of Hawaii</i> Super Drizzle: Applications of Adaptive Kernel Regression Technique in Astronomical Imaging Hiroyuki Takeda, <i>Electrical Engineering, University of California</i> Numerical Estimation of Random Image Shifts Using a Closed-Form Solution of the Pseudoinverse Keith Knox, <i>The Boeing Company</i>
12:00 pm	LUNCHEON South Pacific Ballroom
1:00	LASERS Session Chair, <i>Kelly Hammett, Air Force Research Laboratory</i> Pushing the Envelope: HI-CLASS Range and Range-Rate Paul Konkola, <i>Textron Systems, Maui Operations</i> Fiber Laser Component Testing for Space Qualification Protocol Development Suzanne Falvey, <i>Northrop Grumman Information Technology</i> Telescope Spectrophotometric and Absolute Flux Calibration, and National Security Applications, Using a Tunable Laser on a Satellite Justin Albert, <i>Department of Physics, California Institute of Technology</i> Wavefront Correction on High Repetition Rate, High Energy Laser System Zhi Liao, <i>Lawrence Livermore National Laboratory</i> Compact Fiber Laser for 589 nm Laser Guide Star Generation Deanna Pennington, <i>Lawrence Livermore National Laboratory</i> Sodium Guidestar Radiometry Results from the SOR's 50W Faser Jack Drummond, <i>Starfire Optical Range, AFRL/DES</i> Adaptive Beam Director for a Tiled Fiber Array: Concept Development, Numerical Modeling and Experimental Design Ernst Polnau, <i>Institute for Systems Research, University of Maryland</i> Recent Research at the JPL Optical Communications Telescope Laboratory Keith Wilson, <i>Jet Propulsion Laboratory, California Institute of Technology</i> Field Demonstration of an Active Laser Tracking System Vladimir Markov, <i>MetroLaser, Inc.</i>
4:00	ADJOURN
7:00	HALEAKALA: HOUSE OF THE SUN Aulani Ballroom Film Presentation

Tuesday 12 September

TRACK 2 (dual session)

6:00 am

BREAKFAST | Luau Gardens at leisure from 6:00 am to 7:15 am

7:30

TELESCOPES AND SENSORS (continued) | Pikake Ballroom
Session Chair, Anil Chaudhary, *Applied Optimization, Inc.*

Dynamic Simulation of a Multiple Beam Fourier Telescope Imaging System
E. Louis Cuellar, *Trex Enterprises Corporation*

Study of High-Performance Coronagraphic Techniques
Volker Toll, *Harvard-Smithsonian Center for Astrophysics*

PAN-STARRS

Session Chair, Mike Maberry, *Institute for Astronomy, University of Hawaii*

Pan-STARRS – A New Generation Optical Survey Telescope System
Nick Kaiser, *Institute for Astronomy, University of Hawaii*

The Pan-STARRS Telescope #1 – PS1 and the PS1 Science Mission
Kenneth Chambers, *Institute for Astronomy, University of Hawaii*

Space Situational Awareness Applications of the PS1 AP Catalog
Dave Monet, *U.S. Naval Observatory Flagstaff Station*

9:30

BREAK

10:00

PAN-STARRS (continued)

The Pan-STARRS Moving Object Processing System
Robert Jedicke, *Institute for Astronomy, University of Hawaii*

The Design of the Pan-STARRS Telescope #1
Jeffrey Morgan, *Institute for Astronomy, University of Hawaii*

Pan-STARRS PS1 Observatory, Telescope and Instrumentation Control
Ed Pier, *Institute for Astronomy, University of Hawaii*

12:00 pm

LUNCHEON | South Pacific Ballroom

1:00

PAN-STARRS (continued)

Filter Mounting and Mechanism Design for the Pan-STARRS PS1 Prototype Telescope System
Alan Ryan, *Institute for Astronomy, University of Hawaii*

The Pan-STARRS Imaging Sky Probe
Ben Granett, *Institute for Astronomy, University of Hawaii*

The Pan-STARRS u-Band Imaging Probe
Klaus Hodapp, *Institute for Astronomy, University of Hawaii*

The Pan-STARRS Gigapixel Camera
John Tonry, *Institute for Astronomy, University of Hawaii*

The Pan-STARRS PS1 Calibration System
John Tonry, *Institute for Astronomy, University of Hawaii*

Pan-STARRS PS1 GRASP Controller
Peter Onaka, *Institute for Astronomy, University of Hawaii*

The Pan-STARRS PS1 Image Processing Pipeline
Eugene Magnier, *Institute for Astronomy, University of Hawaii*

Pan-STARRS PS1 Published Science Products Subsystem
James Heasley, *Institute for Astronomy, University of Hawaii*

4:30

ADJOURN

7:00

HALEAKALA: HOUSE OF THE SUN | Aulani Ballroom
Film Presentation

Wednesday 13 September

- 6:00 am** **BREAKFAST** | Luau Gardens at leisure from 6:00 am to 7:15 am
- 7:30** **ADAPTIVE OPTICS** | Aulani Ballroom
Session Chair, Robert Fugate, *Air Force Research Laboratory*
- The Black Fringe Wavefront Sensor: Real Time Adaptive Optics with Minimum Computation**
Richard Tansey, *Advanced Technology Center, Lockheed Martin*
- Use of a Radial Shear Interferometer as a Self Reference Interferometer in Adaptive Optics**
Richard Tansey, *Advanced Technology Center, Lockheed Martin*
- Laboratory Demonstration of a Correlation-Based Adaptive-Optical System for Wavefront Sensing of Extended Objects**
Troy Rhoadarmer, *U.S. Air Force Research Laboratory*
- Packet Switching Networks for Adaptive Optics System**
Robert Eager, *Boeing LTS*
- Modular Adaptive Optics Testbed for the NPOI**
Jonathan Andrews, *Naval Research Laboratory*
- Characterization of the Variability of the Strehl Ratio of Adaptive Optics Point Spread Functions**
Julian Christou, *Center for Adaptive Optics, University of California, Santa Cruz*
- 9:30** **BREAK**
- 10:00** **ADAPTIVE OPTICS** (continued)
- Preliminary Experimental Evidence of Anisotropy of Turbulence at Maui Space Surveillance Site**
Mikhail Belen'kii, *Trex Enterprises Corporation*
- Control System Performance of a Woofer-Tweeter Adaptive Optics System**
Colin Bradley, *University of Victoria*
- Hi-Contrast Coronagraphic Imager for Adaptive Optics**
Klaus Hodapp, *Institute for Astronomy, University of Hawaii*
- "Pocket" Deformable Mirror for an Integrated On-Mirror Adaptive System**
Leonid Beresnev, *U.S. Army Research Laboratory*
- Design, Modeling, Installation of the MWIR AO System**
James Campbell, *Trex Enterprises*
- MEMS Deformable Mirrors for Adaptive Optics in Astronomical Imaging**
Steven Cornelissen, *Boston Micromachines Corporation*
- 12:00 pm** **LUNCHEON** | South Pacific Ballroom
- 1:00** **ORBITAL DEBRIS**
Session Chair, Thomas Schildknecht, *Astronomical Institute of the University of Bern*
- Recent Results from the ESA Optical Space Debris Survey**
Thomas Schildknecht, *Astronomical Institute, University of Bern*
- Orbit Processing and Analysis of a Geo Class of High Area-to-Mass Debris Objects**
Thomas Kelecy, *Boeing LTS/AMOS*
- Comparison of Orbital Parameters for GEO Debris Predicted by LEGEND and Observed by MODEST: Can Sources of Orbital Debris be Identified?**
Edwin Barker, *National Aeronautics and Space Administration, Johnson Space Center*
- Strategies for Optimizing GEO Debris Search**
Kathryn Poole, *Northrop Grumman Corporation*
- Space Debris Optical Observation System in JAXA/IAT**
Atsushi Nakajima, *Institute of Aerospace Technology, Japan Aerospace Exploration Agency*
- In-situ Observations of Space Debris at ESA**
Gerhard Drolshagen, *ESA/ESTEC/TEC-EES (Invited)*
- Reflectivity of NaK Droplets**
Carsten Wiedemann, *Institute of Aerospace Systems, Technische Universität Braunschweig*
- 3:20** **ADJOURN**
- 4:30** **AKAMAI STUDENT SYMPOSIUM** | Pikake Ballroom

Thursday 14 September

- 6:00 am** BREAKFAST | Luau Gardens at leisure from 6:00 am to 7:15 am
- 7:30** **NON-RESOLVED OBJECT CHARACTERIZATION** | Aulani Ballroom
Session Chair, Matt Hejduk, *Titan Corporation*
- The Early Development of Satellite Characterization Capabilities at the Air Force Laboratories**
John Lambert, *The Boeing Company*
- Canadian Surveillance of Space Concept Demonstrator: Photometric Variability of Deep-Space Objects, Analysis and Interpretation**
Bryce Bennett, *Department of Physics, Royal Military College of Canada*
- Harmonic Structure Function**
David Dikeman, *Lockheed Martin Hawaii*
- Statistical Properties and Analysis of Photometric Signatures of Geos**
Tamara Payne, *Boeing LTS*
- Results of Satellite Brightness Modeling Using Kriging Optimized Interpolation**
Charity Weeden, *Canadian Forces, NJ55X Policy and Doctrine*
- MSSS Satellite Categorization Laboratory**
Ray Deiotte, *The Boeing Company*
- AMOS Observations of NASA's IMAGE Satellite**
Doyle Hall, *The Boeing Company*
- 9:50** BREAK
- 10:20** **NON-RESOLVED OBJECT CHARACTERIZATION (continued)**
- Simulated Aging of Spacecraft External Materials on Orbit**
Sergei Khatipov, *Moscow State Engineering Physics Institute*
- Using Space Weathering Models to Match Observed Spectra to Predicted Spectra**
Michael Guyote, *Boeing*
- Comparisons of Ground Truth and Remote Spectral Measurements of the FORMOSAT and ANDE Spacecrafts**
Kira Abercromby, *ESCG/Jacobs Sverdrup*
- Satellite Characteristics with uvbyHbCa Photometry**
Nancy Hamilton, *National Security Agency*
- 3 - 13 μm Spectra of Geosynchronous Satellites**
David Lynch, *The Aerospace Corporation*
- 12:00 pm** LUNCHEON | South Pacific Ballroom
- 1:00** **NON-RESOLVED OBJECT CHARACTERIZATION (continued)**
- Algorithms for Hyperspectral Endmember Extraction and Signature Classification with Morphological Dendritic Networks**
Mark Schmalz, *Center for Computer Vision and Visualization, University of Florida*
- Science Applications of the RULLI Camera: Photon Thrust, General Relativity and the Crab Nebula**
Douglas Currie, *Department of Physics, University of Maryland College Park*
- Hyperspectral H V Polarization Inverse Correlation**
David Maker, *Photon Research Associates*
- SATELLITE METRICS**
Session Chair, Thomas Kelecyc, *The Boeing Company*
- Risk Reduction Activities for the Near-Earth Object Surveillance Satellite Project**
Donald Bédard, *Defence R&D Canada*
- EOS Space Debris Tracking Using High Power Lasers**
Craig Smith, *EOS Space Systems*
- Phoenix Upgrades in Support of Real-Time Space Object Capture and Handoff at AMOS**
Dennis Liang, *Boeing LTS*
- Proposal for a European Space Surveillance System-Results of an ESA Study**
Thomas Schildknecht, *Astronomical Institute, University of Bern*
- 3:20** ADJOURN
- 5:00** CLOSING NIGHT LUAU | Luau Gardens

POSTER PRESENTATIONS

Large Optical Glass Lenses for ELTs
Arnie Bazensky, *Schott North America*

Parallel Particle Swarm Optimization
Brian Birge, *Boeing LTS*

Statistics of Short Term Seeing at AEOS
L. William Bradford, *The Boeing Company*

Space Environment Simulation at Radiation Test of Satellite Nonmetallic Materials. Present Status
B.A. Briskman, *Moscow State University, Institute of Nuclear Physics*

Analysis of the Atmospheric Impact on the Analysis of Hyperspectral Imagery
Joseph Coughlin, *Master Solutions*

High Performance Computing Software Applications Institute for Space Situational Awareness – Overview
Francis Chun, *HSAI-SSA, AFRL/DE*

The Skygrid Project – A Calibration Star Catalogue for DoD Sensors
Stephen Gregory, *Boeing LTS*

Environmental Space Situation Awareness and Joint Space Effects
Kelly Hand, *Air Force Space Command*

Combining Data from Multiple Telescopes to Improve the Resolution of Imagery Degraded by Atmospheric Turbulence
Douglas Hope, *Institute for Astronomy, University of Hawaii*

Linear Mode Photon Counting LADAR Camera Development for the Ultra-Sensitive Detector Program
Michael Jack, *Raytheon Vision Systems*

Observation, Prediction, and Modeling Atmospheric Structure Effects on EO/IR Systems
Michael Kendra, *Atmospheric and Environmental Research*

Observational and Modeling Study of Mesospheric Bores
Pamela Loughmiller, *School of Electrical and Computer Engineering, Cornell University*

Space Situation Awareness Integration Office Overview and Spiral 2 Results
David Newton, *Space Systems Architect, Space Situation Awareness Integration Office*

Accelerating Scientific Computations Using FPGAs
Oliver Pell, *Imperial College London*

The Effects of Scintillation on Non-Redundant Aperture Masking Interferometry
Lewis Roberts, *The Boeing Company*

Using Light Curves to Characterize Size and Shape of Pseudo-Debris
Heather Rodriguez, *ESCG/Jacobs Sverdrup*

Hawaiian Atmospheric Forecasting Utilizing the Weather Research and Forecast Model
Kevin Roe, *Maui High Performance Computing Center*

Beam Propagation Modeling
Patrick Ryan, *Science Applications International Corporation*

Lightcurve Signatures of Multiple Object Systems in Mutual Orbits
Eileen Ryan, *Magdalena Ridge Observatory*

Training and Tactical Operationally Responsive Space Operations
Barbara Sorensen, *U.S. Air Force Research Laboratory*

Mobile Tracking Systems Using Large Reflective Telescopes
Kyle Sturzenbecher, *Photo-Sonics Inc.*

Impact of Space Weather on Flash Memory Devices
Scott Teare, *Electrical Engineering Department, New Mexico Tech*

Adaptive Optics Survey of O Stars using AEOS
Nils Turner, *The CHARA Array, c/o Mount Wilson Observatory*

Using Distributed Sensor Network Architecture to Link Heterogeneous Astronomical Assets
Robert White, *Los Alamos National Laboratory*

Neutral Density Measurements Using In-flight Accelerometer Data
Byron D. Tapley, *University of Texas at Austin, Center for Space Research*

The Developing Science and Technology List
Raymond Wick, *Institute for Defense Analyses*

Structural Analysis of the 0.4 Meter Lightweight CFRP OTA at the NRL
Christopher Wilcox, *Naval Research Laboratory*



Advanced Maui Optical
and Space Surveillance
Technologies Conference

1305 North Holocono Street, Suite One • Kihei, Hawaii 96753

Tel: 808.875.2318 • Fax: 808.879.0011

Email: info@amostech.com • <http://www.amostech.com>

