We are pleased that you are participating in the 11th annual AMOS Conference! Although we will be sitting in a darkened ballroom, intently listening to technical briefings throughout the week, we are, indeed, in a culturally rich and beautiful setting...

It is our pleasure to share with you a few of the things that make Maui unique. We have sprinkled elements throughout the week to remind us of our Hawaiian “Sense of Place.”

Among them are the lei kukui worn to designate our conference session chairs, our traditional Native Hawaiian invocation opening the conference, and a private Polynesian luau on Wailea Beach.

If there is anything our Conference Team can do to make your week more productive and enjoyable, please let us know.

Warmest Aloha,
The AMOS Conference Organizing Committee
mahalo to our sponsors

poʻokela (striving for the best)

BOEING

laulima (working together)

Orbital

lōkahi (collaboration and unity)

agi

Raytheon

SPACE FOUNDATION

kupaʻa (loyal and committed)

LOCKHEED MARTIN

mālama (to care for)

AFRL

AO Applied Optimization

COM DEV USA

ATA Applied Technology Associates

BAE SYSTEMS

ISS

HNU-PHOTONICS LIGHT SOLUTIONS

NORTHROP GRUMMAN
Set against the backdrop of the Pacific Ocean on Wailea Beach, the conference kicks off with the welcome reception providing participants with a unique networking opportunity. Participants and their guests will be greeted with a shell lei, a beverage, and appetizers, all while listening to the Air Force Band of the Pacific’s Papana Jazz Ensemble.

**poʻalua | tue, sep 14**

6:00 - 7:30 pm  WELCOME RECEPTION | Luau Gardens
Co-sponsored by The Boeing Company

Set against the backdrop of the Pacific Ocean on Wailea Beach, the conference kicks off with the welcome reception providing participants with a unique networking opportunity. Participants and their guests will be greeted with a shell lei, a beverage, and appetizers, all while listening to the Air Force Band of the Pacific’s Papana Jazz Ensemble.

**poʻakolu | wed, sep 15**

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

7:30  CONFERENCE OPENING | Aulani Ballroom
Jeanne Unemori Skog, President & CEO, Maui Economic Development Board

INVOCAION | 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 Susan Helms, Director of Plans and Policy, U.S. Strategic Command, Offutt Air Force Base, Nebraska

Lieutenant General John T. “Tom” Sheridan, Commander, Space and Missile Systems Center, Air Force Space Command, Los Angeles Air Force Base, California

9:00  BREAK

WELCOME COFFEE HOUR FOR SPOUSES AND GUESTS | Mala Lounge

9:20  ORBITAL DEBRIS
Session Chair, Thomas Schildknecht, Astronomical Institute, University of Bern

AIUB Efforts to Survey, Track, and Characterize Small-Size Objects at High Altitudes
Thomas Schildknecht, Astronomical Institute, University of Bern

Optical Photometric Observations of GEO Debris
Patrick Seitzer, University of Michigan

Detection of Faint GEO Objects Using Population and Motion Prediction
Masahiko Uetsuhara, Kyushu University

Orbital Debris Observation via Laser Illuminated Optical Measurement Techniques
Makoto Tagawa, Kyushu University

10:40  NON-RESOLVED OBJECT CHARACTERIZATION
Session Chair, Matt Hejduk, SRA International

Satellite Attitude from Small Aperture Telescopes
Daron Nishimoto, PDS, LLC

Noise-Tolerant Spectral Signature Classification in Unresolved Object Detection Using Adaptive Lattice Neural Networks
Mark Schmalz, Center for Computer Vision and Visualization

Satellite Surface Material Characterization from Multi-band Optical Observations
Doyle Hall, Boeing LTS – AMOS
WELCOME COFFEE HOUR | Mala Lounge at 9:00 am
Non-registered participants are invited to an informal presentation about optional island activities. This is a nice opportunity to mingle and map out plans for the week.

EXHIBITION RECEPTION AND POSTER PRESENTATIONS | Jade-Plumeria Ballroom at 3:00 pm
Co-sponsored by Analytical Graphics, Inc, the poster session is an opportunity for authors to present their work and have in-depth discussions with conference participants. Poster display boards are arranged throughout a portion of the ballroom together with industry exhibits in a convivial setting with seating and light refreshments to encourage interaction with the poster authors. The exhibit venue is open throughout the week serving as a locus for side discussions and pop-up meetings.

AMOS SITE CAPABILITIES TUTORIAL | Aulani Ballroom at 5:00 pm
The Maui Space Surveillance Complex (MSSC), located at the summit of Haleakala, is a national resource providing support to various government agencies and the scientific community. The tutorial summarizes MSSC systems, capabilities, and support procedures and includes a description of the telescopes and sensors. It will also include a brief overview of the Maui High Performance Computing Center (MHPCC).
6:00-7:15 am BREAKFAST | Luau Gardens at leisure

7:30-5:30 pm EXHIBITION AND POSTER ROOM | Jade-Plumeria Ballroom

7:30 KEYNOTE | Aulani Ballroom

Introduction
Colonel L. Kirk Lewis, Ret., Senior Analyst, Institute for Defense Analyses
Lieutenant General Michael A. Hamel, USAF (Retired)
Senior Vice President, Strategy and Development, Orbital Sciences Corporation

8:20 INTEGRATING DIVERSE DATA
Session Chair, Kim Luu, Air Force Research Laboratory
Operational Impact of Improved Space Tracking and Collision Avoidance in the Future LEO Space Debris Environment
David Sibert, ExoAnalytic Solutions, Inc.
Monte Carlo Method for Collision Probability Calculations Using 3D Satellite Models
Willem de Vries, Lawrence Livermore National Laboratory

9:00 BREAK

9:00-12:30 SPACE IN THE CLASSROOM | Mauna Loa and Ilima
An Audience with an Astronaut for Maui Middle School Students
Co-sponsored by the Space Foundation and held in association with Analytical Graphics, Inc., the Air Force Research Laboratory, Lockheed Martin, and Orbital Sciences Corporation

9:20 INTEGRATING DIVERSE DATA (continued)
How the Space Data Center is Improving Safety of Space Operations
T.S. Kelso, Center for Space Standards & Innovation
Data Calibrations for the Combined Solutions Using Ranging and Telescope Data
Joseph Chan, Intelsat

Global Space Situational Awareness Sensors
Brian Weeden, Secure World Foundation
Space Data Association, International Data Sharing for SSA
Richard DalBello, Intelsat General
Sharing SSA
Duane Bird, USSTRATCOM

11:00 INTEGRATING DIVERSE DATA PANEL DISCUSSION
Moderators: T.S. Kelso, Center for Space Standards & Innovation and Emmet Fletcher, European Space Agency

Panelists: Thomas Schildknecht, Astronomical Institute, University of Bern; Vladimir Agapov, Keldysh Institute of Applied Mathematics, RAS; Duane Bird, USSTRATCOM; Andrew D’Uva, Providence Access

12:00 LUNCHEON | Lokelani Ballroom

1:00 pm ADAPTIVE OPTICS AND IMAGING
Session Chairs, Michael Hart, University of Arizona, Steward Observatory, CAAO and Glenn Tyler, The Optical Sciences Company

Multi-conjugate Adaptive Optics Testbed for Horizontal Propagation
Sergio Restaino, Naval Research Laboratory
Exploiting Spectral Correlations for Segmentation and Shape Determination from Hyperspectral Datacubes of Rotating Satellites
Sudhakar Prasad, University of New Mexico
Daytime Image Measurement and Reconstruction for Space Situational Awareness Applications
Michael Roggemann, PDS, LLC
Characterization of Deep Turbulence Over 149 km Propagation Path Using Multi-wavelength Laser Beacons
Mikhail Vorontsov, University of Dayton, LOCI
ADAPTIVE OPTICS AND IMAGING (continued)

Measurements of Tilt and Focus for Sodium Beacon Adaptive Optics on the Starfire 3.5 Meter Telescope
Robert Johnson, Starfire Optical Range

2:40 BREAK

3:00 Nonstationary EO/IR Clutter Suppression and Dim Object Tracking
Alexander Tartakovsky, Department of Mathematics, University of Southern California

Images of a Geostationary Spacecraft with the Largest Telescope on Earth
Jack Drummond, AFRL/RDSA

Recent Advances in High-resolution MEMS DM Fabrication and Integration
Thomas Bifano, Boston University

Adaptive Optics at the World’s Biggest Optical Telescope
Michael Hart, The University of Arizona

Differential Photometry in Adaptive Optics Imaging
Szymon Gladysz, European Organisation for Astronomical Research in the Southern Hemisphere

Improved Climatological Characterization of Optical Turbulence for Space Optical Imaging and Communications
Randall Alliss, Northrop Grumman Corporation

5:00 ASTRODYNAMICS
Session Chair, Terry Alfriend, Texas A&M University

Operational Maneuver Detection Using Optimal Control Performance Metrics
Marcus Holzinger, University of Colorado at Boulder

Edgeworth Filters for Space Surveillance Tracking
Joshua Horwood, Numerica Corporation

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

7:30-4:30 pm EXHIBITION AND POSTER ROOM | Jade-Plumeria Ballroom

7:30-8:40 KEYNOTES | Aulani Ballroom

Introductions
Valerie Skarupa, Operationally Responsive Space Office
Peter Marquez, Director of Space Policy, White House National Security Council
Elliot Holokauahi Pulham, Chief Executive Officer, Space Foundation

8:30-1:30 SPACE IN THE CLASSROOM | Ilima
Workshop for Maui School Teachers

8:40 ASTRODYNAMICS (continued)
Large-Scale Simulation of a Process for Cataloguing Small Orbital Debris
Alex Pertica, Lawrence Livermore National Laboratory
Almost-Optimal Sensor Tasking Using Auction Methods
Richard Hujsak, Analytical Graphics Inc

9:20 BREAK

9:40 Dynamic Tasking of Networked Sensors Using Covariance Information
Kim Luu, AFRL
Correlation and Initial Orbit Determination for Short-Arc Optical Observations
Kohei Fujimoto, The University of Colorado-Boulder

10:20 MODELING
Session Chair, Keric Hill, Pacific Defense Solutions
Integration of Space Weather into Space Situational Awareness
Geoff Reeves, Los Alamos National Laboratory

A Parallel, High-Fidelity Radar Model
Benjamin Fasenfest, Lawrence Livermore National Laboratory

The Application of Parallel Discrete Event Simulation to the Space Surveillance Network
David Jefferson, Lawrence Livermore National Laboratory

A Bayesian Approach to Multi-Sensor Track Correlation
Matthew Horsley, Lawrence Livermore National Laboratory

Numerical and Probabilistic Analysis of Asteroid and Comet Impact Hazard Mitigation
Catherine Plesko, Los Alamos National Laboratory

12:00 LUNCHEON | Lokelani Ballroom

1:00 pm MODELING (continued)

H. Keo Springer, Lawrence Livermore National Laboratory

Forecasting Kp Using Unscented Kalman Filter-based Model
Charles Wetterer, Colorado Professional Resources

Real Time Polarization Light Curves for Space Debris and Satellites
John Stryjewski, CSC

SYSTEMS
Session Chair, Riki Maeda, Pacific Defense Solutions
Performances of Telescopes of New Series, ISON Annual Development and Observation Planning
Vladimir Agapov, Keldysh Institute of Applied Mathematics, RAS

Space Debris Characterization Using Thermal Imaging Systems
James Dawson, Dynetics, Inc.
Set against the backdrop of the Pacific Ocean, the conference wraps with a private luau on Wailea Beach. Say “Aloha” to friends as you experience the local flavors of Hawaii and entertainment by one of Hawaii’s largest and longest running Polynesian production show, Tihati; as they present Te Au Moana, the ocean tide.

**ho‘ike po‘alima (highlight of the day)**

**CLOSING DINNER LUAU | Luau Gardens at 5:30 pm**

Set against the backdrop of the Pacific Ocean, the conference wraps with a private luau on Wailea Beach. Say “Aloha” to friends as you experience the local flavors of Hawaii and entertainment by one of Hawaii’s largest and longest running Polynesian production show, Tihati; as they present Te Au Moana, the ocean tide.

**pō‘aono | sat, sep 18**

**OPTIONAL AMOS TECHNICAL TOUR**

Depart from Wailea Marriott at 7:30 & 10:00 am

Beginning at sea level, the tour will proceed to the 10,000 ft. summit of Haleakala for a visit to the Maui Space Surveillance Site where participants will visit the DoD’s 3.6m AEOS telescope and Pan-STARRS at the UH Institute for Astronomy. Transportation and lunch will be provided for the approximately seven hour trip.
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 Safety Center
The mission of Air Force Safety is to prevent mishaps and preserve combat capability. In enabling that mission, Air Force Safety provides an array of capabilities that commanders and Airmen employ to identify, assess and mitigate strategic, operational, and tactical risks to mission accomplishment.

Analytical Graphics, Inc./Scalable Display Technologies
Analytical Graphics, Inc. develops commercial off-the-shelf analysis software used in more than 32,000 worldwide installations. Scalable Display Technologies produces groundbreaking software that automatically calibrates and edge-blends multiple projectors into seamless digital displays.

Applied Optimization Inc.
Applied Optimization Inc. develops mathematical algorithms and software for SSA and operates two telescope sites for verification of the data collection, reduction and analysis methods.

Applied Technology Associates
Applied Technology Associates (ATA) is a precision measurement, sensing and controls company that offers engineering services, custom hardware solutions, and integration and test services / facilities to government, aerospace and commercial customers.

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

Boston Micromachines Corporation
Founded in 1999, Boston Micromachines Corporation (BMC) is the leading provider of advanced microelectromechanical systems (MEMS)-based mirror products for use in commercial adaptive optics systems.

FLIR Infrared Camera
Come see the latest from FLIR Systems, the global leader in infrared cameras. FLIR will feature its SC Series infrared cameras which boast high speed, high resolution, and high sensitivity.

HNu Photonics
HNu Photonics is a science and technology company creating cutting-edge technologies and transforming innovative ideas into state-of-the-art products with commercial, scientific and military applications.

Lockheed Martin, Santa Barbara Focalplane
Santa Barbara Focalplane, a Lockheed Martin Missiles & Fire Control Business, is a world leader in the design, custom development and manufacture of multi-spectral infrared focalplane array detectors, camera cores and complete camera imaging systems.

Oceanit
Oceanit’s HANDS program is an Air Force program that successfully built and deployed a worldwide network of optical ground stations to provide timely information about space objects.
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