**Monday 10 September**

2:00-6:00 PM  EARLY REGISTRATION | Aulani Foyer  
3:00-8:00 PM  EXHIBITOR MOVE-IN | Jade-Plumeria Ballroom

**Tuesday 11 September**

8:00-3:30 PM  PRE-CONFERENCE SSA FORUM | Lokelani Ballroom  
Presented in partnership with Space Foundation  
10:00-8:00 PM  EXHIBITOR MOVE-IN | Jade-Plumeria Ballroom  
2:00-6:00 PM  EARLY REGISTRATION | Aulani Foyer  
6:00-7:30 PM  WELCOME RECEPTION | Luau Gardens  
Co-sponsored by The Boeing Company

**Wednesday 12 September**

6:00-7:15 AM  BREAKFAST AT LEISURE | Luau Gardens  
9:00-6:30 PM  EXHIBIT HOURS | Jade-Plumeria Ballroom  
7:30  CONFERENCE OPENING | Aulani Ballroom  
Jeanne Unemori Skog, President & CEO, Maui Economic Development Board  
NATIONAL ANTHEM AND HAWAI'I PONO'I  
Chief Master Sergeant Laura Noel, U.S. Air Force Band of the Pacific  
INVOCATION  
Reverend Kealahou Alika, Keawala'i Congregational Church  
WELCOME REMARKS  
Daniel K. Inouye, United States Senator *(via video)*  
Jennifer Goto Sabas, Chief of Staff, U.S. Senator Daniel K. Inouye  
8:05-9:00  KEYNOTE ADDRESS  
Introduction  
Colonel L. Kirk Lewis, Ret.  
Senior Analyst, Institute for Defense Analyses  
General William L. Shelton  
Commander, Air Force Space Command, U.S. Air Force  
9:00  BREAK (20 MINUTES)  
Welcome Coffee Hour for Spouses and Guests | Mala Lounge  
Non-registered guests are invited to an informal presentation about optional island activities. This is a nice opportunity to mingle and map plans for the week.
9:20-10:00  **THE IMPACT OF SPACE TECHNOLOGY TRANSFER & COMMERCIALIZATION**  
Moderator: Kevin Cook, Director, Space Technologies Awareness, Space Foundation

**Panel Members**
- Leroy Chiao, Special Advisor–Human Spaceflight, Space Foundation
- David Deigán, President & Founder, AFM Incorporated
- Wes Freiwald, President, Pacific Defense Solutions
- Patrick Sullivan, President, Oceanit Laboratories, Inc.

10:10  **ADAPTIVE OPTICS AND IMAGING**  
Session Chair: Charles Matson, Air Force Research Laboratory

**Ka Band Objects: Observation and Monitoring (KaBOOM)**  
Invited Speaker: Barry Geldzahler, NASA Chief Scientist for Space Communication and Navigation

**Development of Robust, Light-weight, Agile Deformable Mirrors in Carbon Fiber**  
Michael Hart, The University of Arizona

**Active Optics Modernization of the AEOS Telescope**  
David Greenwald, Boeing

**Numerical Techniques for 3D-Turbulence Effects Analysis and Piston Phase Retrieval**  
Mikhail Vorontsov, University of Dayton

11:30  **LUNCHEON (60 MINUTES) | Lokelani Ballroom**  
Co-sponsored by BAE Systems

12:30 PM  **ADAPTIVE OPTICS AND IMAGING** (continued)

**Temporally Evolving Atmospheric Phase Screen Generation**  
Isaac Putnam, USAF - AFIT/ENG

**High Resolution Near Real Time Image Processing and Support for MSSS Modernization**  
Robert Bruce Duncan, Boeing Company

**Application of the ITIQUE Image Quality Modeling Metric to SSA Domain Imagery**  
David Gerwe, Boeing

1:30  **ORBITAL DEBRIS**  
Session Chair: Thomas Schildknecht, Astronomical Institute University of Bern

**Overview of Multiyear Results of GEO and HEO Region Space Debris Search, Tracking and Characterization**  
Vladimir Agapov, KIAM RAS

**Visible Light Spectroscopy of GEO Debris**  
Patrick Seitzer, University of Michigan Astronomy

**Long-Term Evolution of High Area-to-Mass Ratio Objects in Different Orbital Regions**  
Thomas Schildknecht, Astronomical Institute University of Bern

2:30  **BREAK (20 MINUTES)**  
Co-sponsored by Northrop Grumman Corporation
2:50 ORBITAL DEBRIS (continued)

Prediction of HAMR Debris Population Distribution Released from GEO Space
Aaron Rosengren, University of Colorado at Boulder

Estimating the Error in Statistical HAMR Object Populations Resulting from Simplified Radiation Pressure Modeling
Sven Flegel, Institute of Aerospace Systems, Technische Universitat Braunschweig

Comparison Between Four Detection Algorithms for GEO Objects
Toshifumi Yanagisawa, Japan Aerospace Exploration Agency

Satellite Material Type and Phase Function Determination in Support of Orbital Debris Size Estimation
Matthew Hejduk, LZ Technologies Inc.

Probable Rotation States of Rocket Bodies in Low Earth Orbit
Gregory Ojakangas, Drury University and LZ technology

Brute Force Modeling of the Orbital Debris Evolution
Sergei Nikolaev, Lawrence Livermore National Laboratory

LightForce: Photon Pressure Induced Collision Avoidance
Creon Levit, NASA Ames Research Center

5:10-6:30 EXHIBIT AND POSTER SESSION I Jade-Plumeria Ballroom

6:00-7:00 AIR FORCE MAUI OPTICAL AND SUPERCOMPUTING (AMOS) SITE I Aulani Ballroom
CAPABILITIES TUTORIAL

Thursday 13 September

6:00-7:15 AM BREAKFAST AT LEISURE I Luau Gardens

8:00-12:00 PM SPACE IN THE CLASSROOM
Co-sponsored by Space Foundation
(300 middle school students and teachers to participate in Audience with an Astronaut and hands-on STEM activities)


9:00-4:30 PM EXHIBIT HOURS I Jade-Plumeria Ballroom

7:30 ASTRONOMY
Session Chair: Michael Maberry, Institute for Astronomy, University of Hawai‘i

The Pan-STARRS Wide Field Imaging System
Nicholas Kaiser, University of Hawaii

Status and Early Science Results of the PS1 Science Mission
Kenneth Chambers, Institute for Astronomy, University of Hawai‘i
Physical Characterization Studies of Near-Earth Object Spacecraft Mission Targets
Eileen Ryan, New Mexico Institute of Mining and Technology

8:30
NON-RESOLVED OBJECT CHARACTERIZATION
Session Chair: Matthew Hejduk, LZ Technologies Inc.

The Oculus-ASR: An Orbiting Nanosatellite Testbed for Unresolved Object Characterization
Jake LaSarge, Michigan Technological University

 Imaging of Non-Resolved Objects Using the Fine Scale Optical Range
Thomas Pollock, Aerospace Engineering Department, Texas A&M University

9:10
BREAK (20 MINUTES)

9:30
NON-RESOLVED OBJECT CHARACTERIZATION (continued)

Algorithms for Automated Characterization of Three-Axis Stabilized GEOs using Non-Resolved Optical Observations
Jeremy Murray-Krezan, Air Force Research Lab - Space Vehicles

Satellite Surface Characterization from Non-resolved Multi-band Optical Observations
Doyle Hall, Boeing - LTS

Attitude Estimation for Unresolved Agile Space Objects with Shape Model Uncertainty
Marcus Holzinger, Texas A&M University

Large Phase Angle Observations of GEO Satellites
Rita Cognion, Oceanit

Noise-Robust Spectral Signature Classification in Non-resolved Object Detection using Feedback Controlled Adaptive Learning
Mark Schmalz, University of Florida

NOVEL APPROACHES TO ELECTRO-OPTICAL SSA SENSING
Session Chair: Eric Pearce, MIT Lincoln Laboratory

Subsystems of the ISON telescopes for GEO, HEO and LEO observations
Igor Molotov, Keldysh Institute of Applied Mathematics, RAS

11:30
LUNCHEON (60 MINUTES) | Lokelani Ballroom

12:30 PM
The Space Surveillance Telescope: Focus and Alignment of a Three Mirror Telescope
Deborah Woods, MIT Lincoln Laboratory

Rapid Cadence Collections with the Space Surveillance Telescope
David Monet, US Naval Observatory

An Optical Satellite Tracking System for Undergraduate Research
Shane Bruski, USAF

Early Science Instruments and Image Releases from SOFIA
Helen Hall, Universities Space Research Association

Real-Time Utilization of STSS for Improved Collision Risk Management
Matthew Duncan, SpaceNav
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<tr>
<th>Time</th>
<th>Event</th>
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<tr>
<td>2:10</td>
<td><strong>BREAK (20 MINUTES)</strong></td>
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<td></td>
<td>Co-sponsored by Universities Space Research Association (USRA)</td>
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<td>2:30</td>
<td><strong>JSpOC Mission System Application Development Environment</strong></td>
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<td>Maj Rick Luce, SMC/SY</td>
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<td>Adding the &quot;Local&quot; Layer to the SSA Picture</td>
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<td>Farakh Zaman, USAF/SMC/SY</td>
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<td>3:10-4:30</td>
<td><strong>EXHIBIT AND POSTER SESSION</strong></td>
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<td>Co-sponsored by SpaceNav</td>
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<td>4:30 PM</td>
<td><strong>CONFERENCE ADJOURN</strong></td>
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**Friday 14 September**

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<tr>
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<td><strong>SPACE IN THE CLASSROOM</strong></td>
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<td>Co-sponsored by Space Foundation</td>
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<td><em>(Teacher workshop)</em></td>
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<td>9:00-3:00 PM</td>
<td><strong>EXHIBIT HOURS</strong></td>
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<td>7:30</td>
<td><strong>INTEGRATING SSA: LINKING POLICIES, OPERATIONAL NEEDS, TECHNOLOGY AND MISSION CAPABILITIES</strong></td>
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<td></td>
<td>Moderator: Lt Gen Michael A. Hamel, USAF (Retired), Senior Vice President, Strategy and Development Orbital Sciences Corporation</td>
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<td>Panel Members</td>
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<td></td>
<td>- Paul Nielsen, Director and CEO of the Software Engineering Institute</td>
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<td>- Paul Graziani, CEO and Co-founder of Analytic Graphics, Inc.</td>
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<td>- Col Stephen Benavides, Director of Operations, Training and Exercises, Joint Functional Component Command for Space, USSTRATCOM</td>
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<td>9:10</td>
<td><strong>BREAK (20 MINUTES)</strong></td>
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<td>9:30</td>
<td><strong>SPACE WEATHER</strong></td>
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<td>Session Chair: Randall Aliss, Northrop Grumman</td>
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<td></td>
<td>Integration of Space Weather Forecasts into Space Protection</td>
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<td>Geoffrey Reeves, Los Alamos National Laboratory</td>
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<td>Forecasting of Optical Turbulence in Support of Realtime Optical Imaging and Communication Systems</td>
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<td>Randall Aliss, Northrop Grumman</td>
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<td><strong>Trans-Ionospheric High Frequency Signal Ray Tracing</strong></td>
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<td>Scott Wright, Northrop Grumman Corporation</td>
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<td>10:30</td>
<td><strong>DATA &amp; SERVICES</strong></td>
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<td>Session Chair: Lt Col Travis Blake, DARPA/TTO - Space Systems</td>
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DARPA Space Domain Awareness
Lt Col Travis Blake, DARPA/TTO - Space Systems

IBEX
Robbie Robertson, Air Force Research Laboratory

Viral Space Situational Awareness
Anthony Gleckler, GEOST, Inc.

11:30  LUNCHEON (60 MINUTES)  I Likelani Ballroom

12:30 PM  DATA & SERVICES (continued)

12:30  Space Situational Awareness using Market Based Agents
Chris Sullivan, Oceanit

12:40  Integrated Net-Centric Data for a new Space Protection Paradigm
William McShane, Lockheed Martin

1:00  A Comparison Between a Non-linear, Poisson-based Statistical Detector and a Linear, Gaussian Statistical Detector for Detecting Dim Satellites
Lt Stephen Maksim, USAF AFIT/ENG

1:20  ASTRODYNAMICS
Session Chair: Paul Cefola, University at Buffalo (SUNY)

A General Solution to the Second Order J2 Contribution in a Mean Equinoctial Element
Semianalytic Satellite Theory
Zachary Folcik, MIT Lincoln Laboratory

Improving Low-Earth Orbit Predictions Using Two-line Element Data with Bias Correction
James Bennett, The Satellite Positioning for Atmosphere, Climate and Environment (SPACE) Research Centre, School of Mathematical and Geospatial Sciences, RMIT University

Allocation of DSST in the New Implementation of Tastrodyweb Tools Web-site
Juan Felix San Juan, Universidad de La Rioja

Orbital State Uncertainty Realism
Joshua Horwood, Numerica Corporation

2:40  BREAK (20 MINUTES)

3:00  ASTRODYNAMICS (continued)

Rapid Non-Linear Uncertainty Propagation via Analytical Techniques
Kohei Fujimoto, The University of Colorado at Boulder

Covariance Based Pre-Filters and Screening Criteria for Conjunction Analysis
Eric George, The Aerospace Corporation

Precision Orbit Derived Atmospheric Density: Development and Performance
Craig McLaughlin, University of Kansas

Satellite Re-entry Modeling and Uncertainty Quantification
Matthew Horsley, Lawrence Livermore National Laboratory
New Angles-only Algorithms for Initial Orbit Determination
Gim Der, Derastrodynamics

Search and Determine Integrated Environment (SADIE)
Chris Sabol, Air Force Research Laboratory

NRC Assessment of the USAF Astrodynamical Algorithms
Paul Nielsen, Carnegie Mellon University’s Software Engineering Institute

5:20 PM
CONFERENCE ADJOURN

6:00-9:00 PM
CLOSING DINNER | Luau Gardens

Saturday 15 September

7:30 & 9:30 AM
OPTIONAL TECHNICAL TOUR
Departs from Wailea Marriott

POSTER PRESENTERS

Overview of Human-Centric Space Situational Awareness (SSA) Science and Technology (S&T)
Denise Aleva, AFRL

Implicit Runge-Kutta Methods for Uncertainty Propagation
Jeffrey Aristoff, Numerica Corporation

One Class of Nonlinear Model Solutions for Flight Vehicles and Applications to Targeting and Guidance Schemes
Dilmurat Azimov, University of Hawaii at Manoa

Laser Illuminated Imaging: Multiframe Beam Tilt Tracking and Deconvolution Algorithm
David Becker, United States Air Force

Spectrometric Characterization of Active Geosynchronous Satellites
Donald Bedard, Royal Military College of Canada

Determination of Satellite Characteristics through Visible Light Intensity Analysis
Shane Bruski, USAF

Optical Signature Analysis of Tumbling Rocket Bodies via Laboratory Measurements
Heather Cowardin, JACOBS/ESCG

Robust Global Image Registration based on a Hybrid Algorithm Combining Fourier- and Spatial-domain Techniques
Peter Crabtree, Air Force Research Laboratory

Early Science Results from SOFIA, the World’s Largest Airborne Observatory
James De Buizer, USRA

New Positions and/or Orbits for Binary Stars Observed at the SOR
Jack Drummond, AFRL/RDS

Probabilistic Observation Association in a Distributed Architecture
Matthew Duncan, SpaceNav
A Study of the Effects of Material Type and Configuration on Optical Cross Section  
Kelly Feirstine, Schafer Corporation

Modeling the Effects of Solar Cell Attitude Distribution on Optical Cross Section for Solar Panel Simulations  
Kelly Feirstine, Schafer Corporation

Ballistic Coefficient Prediction for Resident Space Objects  
Dave Gaylor, Emergent Space Technologies, Inc.

Wired Widgets: Agile Visualization for Space Situational Awareness  
Kelly Gerschefske, MITRE

Daytime Sky Brightness Modeling of Haleakala along the GEO Belt  
Brooke Gibson, Oceanit

Sapphire-like Payload for Space Situational Awareness  
John Hackett, COM DEV Ltd.

Strip Coating Metrology on Large Scale Telescope Optics: Scalable Cost Saving Preventative Maintenance with First Contact Polymer™  
James Hamilton, University of Wisconsin-Platteville

Orbital Error Analysis for Surveillance of Space  
Nick Harwood, Defence Science and Technology Laboratory

Using Cryptography to Improve Conjunction Analysis  
Brett Hemenway, RAND

GPU-based Space Situational Awareness Simulation Utilizing Parallelism for Enhanced Multi-sensor Management  
Tyler Hobson, The University of Queensland

The JSpOC Mission System (JMS) Common Data Model: Foundation for Net-Centric Interoperability for Space Situational Awareness  
Maryann Hutchison, The Aerospace Corporation

Implementation of Tomography for Raven, a Multi-Object Adaptive Optics science and technology demonstrator  
Kate Jackson, University of Victoria: Mechanical Engineering

Imaging Geostationary Satellites with a Common-Mount Interferometer: Image quality and fringe tracking  
Anders Jorgensen, New Mexico Tech

Characterizing Orbital Debris and Spacecrafts through a Multi-Analytical Approach  
Susan Lederer, NASA

Sky Brightness Analysis using a Million GEODSS Observations  
W. Jody Mandeville, MITRE Corporation

A Cramér-Rao Lower Bound Analysis of Multi-frame Blind Deconvolution  
Charles Matson, Air Force Research Laboratory

Enabling the MLSpOC (Multi-Level Space Operations Center) of the Future  
Dave Missal, Oracle - National Security Group

A Novel Approach to Environment Reconstruction in LiDAR and HSI Datasets  
Dejan Nikic, The Boeing Company
Infrasound Rocket Signatures
John Olson, Geophysical Institute, UAF

Unique search and track procedures utilizing the Ground-Based Electro-Optical Deep Space Surveillance (GEODSS) worldwide sites
Thomas Peppard, BAE Systems

A Korean Space Situational Awareness Program: OWL Network
Jang-Hyun Park, Korea Astronomy and Space Science Institute

Enhanced Collaboration for Space Situational Awareness via Proxy Agents
Paul Picciano, Aptima

Optical Measurements of Tumbling Rocket Bodies
Jon Read, Hamilton Sundstrand

Net-Centric Sensors and Data Sources (N-CSDS) GEODSS Sidecar
David Richmond, Lockheed Martin

Analysis of the Long-term Area-to-mass Ratio Variation of Space Debris
Thomas Schildknecht, Astronomical Institute, University of Bern

Analysis of Galileo Style Geostationary Satellite Imaging: Image Reconstruction
Henrique Schmitt, Computational Physics, Inc.

Scalable Track Initiation for Optical Space Surveillance
Paul Schumacher, Air Force Research Laboratory RDMS

Large Area and High Efficiency Photon Counting Imaging Detectors with High Time and Spatial Resolution for Night Time Sensing and Astronomy
Oswald Siegmund, University of California, Space Sciences Lab

Data Handling and Protection of Need-to-Know Data in a Need-to-Share Netcentric Enterprise
Jeffrey Skelton, The MITRE Corporation

Low Frequency Plasma Turbulence as a Source of Clutter in Surveillance and Communication
Vladimir Sotnikov, Air Force Research Laboratory/Sensors Directorate

NASA’s Marshall Space Flight Center Recent Studies and Technology Developments in the Area of SSA/Orbital Debris
Bruce Wiegmann, NASA - Marshall Space Flight Center (presented by Jack Mulqueen)

Cross-Organization Service Use Management for Space Situational Awareness
Jeremy Witmer, MITRE

Improving Ground Based Telescope Focus through Joint Parameter Estimation
J. Chris Zingarelli, USAF