AMOS Advanced Maui Optical and Space Surveillance Technologies Conference September 13-16 2011
A program of Maui Economic Development Board, Inc.

Wailea Beach Marriott Resort, Maui, Hawaii
Draft Agenda (as of 8/24/2011)

Sunday 11 September 2011

2:00 – 6:00 PM **EARLY REGISTRATION | Aulani Foyer**

Monday 12 September

2:00 – 6:00 PM **EARLY REGISTRATION | Aulani Foyer**

Tuesday 13 September

8:00 – 6:00 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 14 September

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

7:30 **EXHIBITION AND POSTER ROOM | Jade-Plumeria Ballroom**
Posters listed on last page of schedule

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

General William L. Shelton
Air Force Space Command, U.S. Air Force

8:30 **BREAK (20 MINUTES)**

8:50 **BELTWAY OPTICS – THE IMPACT OF POLITICS ON SPACE POLICY | Aulani Ballroom**
Brendan Curry
Vice President-Washington Operations, Space Foundation

9:20 **SPACE SITUATIONAL AWARENESS**
Session Chair, Col Jeff Sherk, NORAD USNORTHCOM HQs J31

Space Based Space Surveillance (SBSS) System: Delivering Unprecedented Space Situational Awareness
Lt Col Stephen Behm, Space Superiority Systems Directorate

Adding the Local Layer to the SSA Picture
Kipp Johnson, Scitor Corporation

Internal JSpOC SSA processing
Col Michael Wasson, JSpOC

DREAM: An Integrated Space Radiation Nowcast System for Natural and Nuclear Radiation Belts
Geoffrey Reeves, Los Alamos National Laboratory

Space Domain Awareness
Lt Col Travis Blake, DARPA

11:00 **LUNCHEON (60 MINUTES) | Lokelani Ballroom**
Co-sponsored by BAE Systems

12:00 **SPACE SITUATIONAL AWARENESS** (continued) **| Aulani Ballroom**

BMDS SSA Integrated Sensing Demonstration (BISD)
Terje Turner, Aerospace Corp.

Unique Search and Track Procedures Utilizing the GEODSS Worldwide Sites
Eugene Burgio, BAE Systems

Space Fence PDR Phase Program Overview
Linda Haines, USAF/ESC/HSIB (Space Fence Program)

SSA Capability Improvements
Hans Thatcher, HQ AFSPC, Directorate of Requirements

Joint Space Operations Center (JSPOC) Mission System (JMS)
Maj Michael Morton, HQ AFSPC, Directorate of Requirements

1:40 **BREAK (20 MINUTES)**

2:00 **NON-RESOLVED OBJECT CHARACTERIZATION**
Session Chair, Matt Hejduk, a.i. solutions (AFSPC/A9A)

Use of Light Curve Inversion for Non-Resolved Optical Detection of Satellites Performing On Orbit Servicing in GEO
Lauchie Scott, DRDC Ottawa

Cylindrical RSO Signatures, Spin Axis Orientation and Rotation Period Determination
Phil Somers, Royal Military College of Canada

Toward Realistic Dynamics of Rotating Orbital Debris and Implications for Lightcurve Interpretation
Gregory Ojakangas, Drury University

AMOS Galaxy 15 Satellite Observations and Analysis
Doyle Hall, Boeing LTS Maui

3:20-5:20 **EXHIBITION AND POSTER PRESENTATIONS | Jade-Plumeria Ballroom**
Reception Co-sponsored by Analytical Graphics, Inc.

5:00-6:00 **AMOS SITE CAPABILITIES TUTORIAL | Aulani Ballroom**
Virginia Wright, Air Force Research Laboratory

5:30-6:30 **NEW GENERATION NETWORKING RECEPTION | Kahoʻolawe Lawn**
Sponsored by the Space Foundation (by invitation only)

8:00-10:00 PM **“AN EVENING UNDER THE STARS WITH ORBITAL” DESSERT RECEPTION | Pacific Terrace Rooftop**
Sponsored by Orbital Sciences Corporation

Thursday 15 September

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

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

7:30 **KEYNOTE | Aulani Ballroom**
MRC Greenwood
President, University of Hawai'i

SPACE IN THE CLASSROOM FOR MAUI SCHOOL STUDENTS | Mauna Loa and Ilima
An Audience with an Astronaut | Mauna Loa and Ilima 9:00 AM & 10:30 AM
Space Hands-on Activities | Mei Court/Pavilion Lanai
Exhibit Tours | Jade-Plumeria Ballroom
Co-sponsored by the Space Foundation

In association with Alaka'ina Foundation's Digital Bus Program, Analytical Graphics, Inc., Air Force Research Laboratory, The Boeing Company, Institute for Astronomy, University of Hawai'i, Lockheed Martin, Maui High Performance Computing Center, Northrop Grumman, Orbital Sciences Corporation, Pacific Defense Solutions, and United Launch Alliance.

8:00 **NON-RESOLVED OBJECT CHARACTERIZATION** (continued)

Fingerprinting of Non-resolved Three-axis Stabilized Space Objects Using a Two-Facet Analytical Model
Anil Chaudhary, Applied Optimization, Inc.

Understanding Satellite Characterization Knowledge Gained from Radiometric Data
Andrew Harms, Air Force Research Laboratory

Specular and Diffuse Components in Spherical Satellite Photometric Modeling
Matt Hejduk, a.i. solutions

Measurement of the Photometric and Spectral BRDF of Small Canadian Satellites in a Controlled Environment
Maj Donald Bedard, Royal Military College of Canada

9:20 **BREAK (20 MINUTES)**

9:40 **OPTICAL SYSTEMS**
Session Chair, Lt Col Travis Blake, DARPA/TTO – Space Systems

USAF Academy Center for Space Situational Awareness
Mike Dearborn, USAF Academy

Pointing Models & Calibration Capability for the Advanced Electro-Optical System (AEOS)
Don Brown, Textron Systems (retired)

Status of Telescope Fabra ROA Montsec Optical Observations for Space Surveillance & Tracking
Octavi Fors, Departament d'Astronomia i Meteorologia, Institut de Ciencies del Cosmos (ICC), Universitat de Barcelona (IEEC-UB)

The HANDS-IONS Daytime Camera for GEO Satellite Characterization
Kevin Jim, Oceanit Laboratories, Inc

11:00 **LUNCHEON (60 MINUTES) | Lokelani Ballroom**

12:00 PM **SPACE DEBRIS OBSERVATION STATUS AND NEEDS PANEL | Aulani Ballroom**

Moderator
David Finkleman, Center for Space Standards and Innovation, Convenor, ISO Space Operations Working Group

Panel Members
- Thomas Schildknecht, Astronomical Institute University of Bern
- Olivier Colaitis, Astrium
- Yukihito Kitazawa, Japan Aerospace Exploration Agency and IHI Corporation
- Daniel Oltrogge, Center for Space Standards and Innovation and Space Data Corporation
- Craig Smith, EOS, Australia

1:00 **ORBITAL DEBRIS | Aulani Ballroom**
Thomas Schildknecht, Astronomical Institute University of Bern (AIUB)

Pan-STARRS Status & Geo Observation Results
Mark Bolden, AFRL/RDSME

A Search for Optically Faint GEO Debris
Patrick Seitzer, University of Michigan

Results of an Optical Survey for Space Debris in MEO
Thomas Schildknecht, Astronomical Institute University of Bern (AIUB)

2:00 **BREAK (20 MINUTES)**

2:20 **ORBITAL DEBRIS** (continued)

Effective Search Strategy Applicable for Breakup Fragments in the Geostationary Region
Toshiya Hanada, Kyushu University

Identification of possible sources of HAMR objects in GEO region
Vladimir Agapov, KIAM

A New Orbital Analyst Tool for Associating Un-cataloged Analyst Debris with Historical Launches, Breakups, and Anomalous Events
Bruce Bowman, AFSPC / A9

Commercially-Hosted Payloads for Debris Monitoring and Mission Assurance in GEO
Lt Col Jim Shell, US Air Force

3:40 **SPACE-BASED ASSETS**
Session Chair, Seth Harvey, Air Force Research Laboratory

On-Orbit Teleoperation of Robotic Systems: Sensors and Real-Time Data Transmission
Markus Pietras, Technical University of Munich

Benefits of Hosted Payload Architectures for Improved GEO SSA
Jonathan Lowe, Analytical Graphics, Inc.

Implementation of a Ka-Band communication path for On-Orbit Servicing
Ralf Purschke, Institute of Astronautics

An Investigation into Using Differential Drag for Controlling A Formation of CubeSats
Matthew Horsley, Lawrence Livermore National Laboratory

5:00-6:00 **EXHIBITION AND POSTER RECEPTION | Jade-Plumeria Ballroom**
Reception Co-sponsored by SpaceNav

5:30-6:30 **THE FUTURE OF UTC AND THE LEAP SECOND | Mauna Loa Room**
Presented by David Finkleman, Center for Space Standards and Innovation

Friday 16 September

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

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

7:30 **FUTURE DIRECTIONS FOR COLLABORATIVE SSA | Aulani Ballroom**

Moderator
Lt Gen Michael A. Hamel, USAF (Retired)
Senior Vice President, Strategy and Development, Orbital Sciences Corporation

Panel Members
- Maj Gen Jay Santee, Principal Director, Office of the Deputy Assistant Secretary of Defense (Strategic Capabilities); Office of the Assistant Secretary of Defense (Special Operations/Low-Intensity Conflict and Interdependent Capabilities); Office of the Under Secretary of Defense for Policy
- Col Stephen Butler, Chief, Space Situational Awareness & C2, USAF
- Richard DalBello, Vice President Legal and Government Affairs, Intelsat General
- Paul Graziani, Chief Executive Officer, Analytical Graphics, Inc.

9:00 **BREAK (20 MINUTES)**

9:20 **ASTRODYNAMICS | Aulani Ballroom**
Session Chair, Paul Cefola, University at Buffalo (SUNY)

The All-Versus-All LEO Conjunction Problem
Arthur Lue, MIT Lincoln Laboratory

A High Performance Conjunction Analysis Technique for Cluster and Multi-Core Computers
Eric George, The Aerospace Corporation

An Application of Hadoop and Horizontal Scaling to Conjunction Assessment
Michael Prausa, The MITRE Corporation

Efficient All-vs-All Collision Risk Assessment
Miguel Molina, GMV Aerospace and Defence, S.A.

Observing and Analysing a Close Conjunction in GEO
Tim Flohrer, ESA/ESOC Space Debris Office (OPS-GR)

11:00 **LUNCHEON (60 MINUTES) | Lokelani Ballroom**

12:00 PM **ASTRODYNAMICS** (continued)

Reconciling Covariances with Reliable Orbital Uncertainty
Zachary Folcik, MIT Lincoln Laboratory

Demonstration of the DSST State Transition Matrix Time-Update Properties using the Linux GTDS Program
Paul Cefola, University at Buffalo (SUNY)

Orbit Determination and Data Fusion in GEO
Joshua Horwood, Numerica Corporation

1:00 **ADAPTIVE OPTICS/IMAGING**
Session Chairs, Capt Casey Pellizzari, Air Force Research Laboratory

Comparison of Turbulence-Induced Scintillations for Multi-Wavelength Laser Beacons Over Tactical (7 km) and Long (149 km) Atmospheric Propagation Paths
Mikhail Vorontsov, University of Dayton

Inverse Synthetic Aperture LADAR for Geosynchronous Space Objects: A Signal-to-Noise Analysis
Capt Casey Pellizzari, Air Force Research Laboratory, Det 15

Compact Multi-Channel, Multi-Frame, Blind Deconvolution
Douglas Hope, Institute for Astronomy, University of Hawaii

Multi-Frame Myopic Deconvolution for Imaging in Daylight and Strong Turbulence Conditions
Stuart Jefferies, HartSCI LLC

2:20 **BREAK (20 MINUTES)**

2:40 **ADAPTIVE OPTICS/IMAGING** (continued)

Laser Guide Star Radiometry From Several Off Axis Locations
Richard Tansey, Lockheed Martin

Implementation of Real-Time Super High Resolution Optical Image Restoration
Jinyu Zhao, Chinese Academy of Sciences

Holographic Adaptive Laser Optics System (HALOS)
Geoff Andersen, USAF Academy

Quantifying Atmospheric Impacts on Space Optical Imaging and Communication Systems
Randall Alliss, Northrop Grumman Corporation

Interferometric Imaging of Geostationary Satellites: Signal-to-Noise
Anders Jorgensen, New Mexico Tech

4:20 **CONFERENCE ADJOURN**

4:20 **POSTER AND EXHIBITOR DISMANTLE**

5:30 – 8:30 PM **CLOSING DINNER AND SHOW | Luau Gardens**

Saturday 17 September

7:30 & 9:30 AM **OPTIONAL TECHNICAL TOUR** (departs from Wailea Marriott)

POSTER PRESENTATIONS

Session Chair, Bernie Klem, Arnold Engineering Development Center

Implementing Digital Feedback Controls for the Multiple Simultaneous Ring Cavities in the FASOR-X System
Jeffrey Baker, Boeing

Using a Physics-Based Reflection Model to Study the Reddening Effect Observed in Spectrometric Observations of Artificial Space Objects
Maj Donald Bedard, Royal Military College of Canada

Broadband Spectral-Polarimetric BRDF Scan System and Data for Spacecraft Materials
David Bowers, Applied Technology Associates

Benefits of a Geosynchronous Orbit (GEO) Observation Point for Orbit Determination
Ray Byrne, Sandia National Laboratories

Satellite Cluster and Formation Orbit Determination Use Cases for Space Situational Awareness based on Real Data
Paul Cefola, University at Buffalo (SUNY)

Real Science, Real Education: The University Nanosat Program
Kelly Cole, AFRL/RVEP

Maneuver Optimization through Simulated Annealing
Willem de Vries, Lawrence Livermore National Laboratory

The Superior Lambert Algorithm
Gim Der, DerAstrodynamics

Innovative System of Very Wide Field Optical Sensors for Space Surveillance in the LEO Region.
Linda Dimare, Department of Mathematics, University of Pisa

Setting the Image Scale and other Uses for Binary Stars
Jack Drummond, AFRL/RDS

Near Real-Time Operational Collision Risk Management - Evaluating and Mitigating High Risk Conjunction Events
Matthew Duncan, SpaceNav

Small Space Launch for SSA: Origins, Challenges & Advancements
Lt Col Thomas Freeman, USAF/SMC

KAM Torus Frequency Generation from Two Line Element Sets
Capt Gregory Frey, U.S. Air Force

Short-Arc Correlation and Initial Orbit Determination for Space-Based Observations
Kohei Fujimoto, The University of Colorado at Boulder

A Technical Comparison of Satellite Conjunction Analysis Tools
Eric George, The Aerospace Corporation

Design Considerations for the Modeling and Simulation of a Large High Accuracy Catalog of Space Objects
Barry Graham, Tybrin Corporation

Numerical Calculations of the Effects of the Stratospheric Turbulence on Plane Wave Propagation
V. S. Rao Gudimetla, AFRL Maui

Effects of Air Drag and Lunar Perturbations on Orbital Motion Near a Reference KAM Torus
Capt Luke J. Hagen, U.S. Air Force

The Large Binocular Telescopes ARGOS Ground-Layer Adaptive Optics System
Michael Hart, University of Arizona

Sensor-Scheduling Simulation of Disparate Sensors for Space Situational Awareness
Tyler Hobson, University of Queensland

On-Orbit Range Set Applications
Marcus Holzinger, University of Colorado at Boulder

A High-Fidelity Model of A Satellite Collision Viewed by a Radar
Matthew Horsley, Lawrence Livermore National Laboratory

Computing and Visualizing Reachable Volumes for Maneuvering Satellites
Ming Jiang, Lawrence Livermore National Laboratory

Daytime Sky Brightness Modeling of Haleakala
Kevin Jim, Oceanit Laboratories, Inc

The Light Curves of Geostationary Satellites and its Model
Ho Jin, Kyung Hee University

Streamlined Modeling for Characterizing Spacecraft Anomalous Behavior
Bernie Klem, Arnold Engineering Development Center

Detection of Artificial Satellites in Images Acquired in Track Rate Mode.
Martin Levesque, Defence Research & Deveoplment, Canada

Radar Calibration Using a Student-Built Nanosatellite
Larry Martin, University of Hawaii

Multi-Frame Blind Deconvolution Cram←r-Rao Lower Bounds for Point Spread Function Estimates
Chuck Matson, Air Force Research Laboratory

Visible and Near-Infrared Properties of Optical Fibers Coupled to the Pathfinder High-Resolution NIR Spectrograph
Keegan McCoy, Pennsylvania State University

Toward Ground-Based Imaging of Satellites at Geosynchronous Altitude
David Mozurkewich, Seabrook Engineering

An Update on SSA in Australia
Neil Gordon, Defence Science and Technology Organisation (DSTO)

Analysis of Galaxy 15 Satellite Images from a Small-Aperture Telescope
Sergei Nikolaev, LLNL

Engineering the Ideal Gigapixel Image Viewer
Dominik Perpeet, Fraunhofer IOSB

Intuitive Space Weather Displays to Improve Space Situational Awareness (SSA)
Paul Picciano, Aptima, Inc.

The Magdalena Ridge Observatory□s 2.4-meter Fast-Tracking Telescope: Space Situational Awareness and the Near-Earth Environment
Eileen Ryan, New Mexico Institute of Mining and Technology/MRO

LAASAM - Learning Agents for Autonomous Space Asset Management
Larry Scally, Colorado Engineering, Inc.

Simulated Synthesis Imaging of Geostationary Satellites
Henrique Schmitt, CPI/NRL

Optical Photon Counting Imaging Detectors with Nanosecond Time Resolution for Astronomy and Night Time Sensing
Oswald Siegmund, University of California, Space Sciences Laboratory

Parallel-Computing Architecture for JWST Wavefront-Sensing Algorithms
Jeffrey Smith, NASA Goddard Space Flight Center

Effects of Low Activity Solar Cycle on Orbital Debris Lifetime
Eric Sutton, Space Vehicles Directorate

Forecasting the Disturbed Storm Time (Dst) Index
Charles Wetterer, PDS

Sensor Exposure, Exploitation, and Experimentation Environment
Sam Wootton, The MITRE Corporation

An Efficient Lucky Imaging System for Astronomical Image Restoration
Shixue Zhang, Chinese Academy of Sciences