

Maui Economic Development Board presents

25<sup>th</sup>

AMOS

Advanced Maui Optical  
and Space Surveillance  
Technologies Conference

2024 CONFERENCE PROGRAM



SEPTEMBER 17-20  
MAUI, HAWAII

# WELINA MAI KAKOU

## WELCOME

Aloha!

Thank you for joining us as we celebrate the **25th AMOS Conference**. Since 1999, the conference has grown from 161 attendees to a sold-out conference, with 25+ countries participating. The Conference brings to Maui a respected global scientific community to share leading research in space technology and policy, to learn, and to connect.

Help us celebrate 25 years by adding a favorite photo of you from 1999 in the conference app – where were you and what were you doing then? We look forward to sharing a bit of AMOS history with you as we take a trip down memory lane.

We have sprinkled elements throughout the week to remind us of our uniquely Hawaiian “Sense of Place.” Among them are the leis worn at the welcome reception, our traditional Native Hawaiian invocation opening the conference, and local entertainment.

Your conference name badge is required for entry to all events. One (1) guest is invited to join you for the Welcome Reception on Tuesday night. All other events are for registered conference participants only.

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 Team



# #MAUISTRONG

In August of last year, we were in the final stages of planning the 24th AMOS Conference when the devastating wildfires occurred. The outpouring of concern, sympathy, and offers of support we received from our AMOS Conference 'Ohana was overwhelming. Upon our decision to proceed with the Conference, we quickly engaged with Hawaii Community Foundation to create the "AMOS for Maui Fund" with the promise that 100% of Funds raised would go to HCF's Maui Strong Fund. A donation of **\$6,246.73** was made to the Maui Strong Fund through your direct contributions.



**Donations and  
volunteer efforts  
are still welcome.**



## OVERFLOW EXPERIENCE

Once again there is high demand to attend AMOS with many placing value on the numerous networking opportunities provided. In anticipation of numbers and limited seating, the conference will be streamed live to an overflow room, and to the virtual platform and mobile app. Once the Conference ballroom reaches capacity, attendees will be directed to the overflow room located downstairs in the **Ilima Ballroom** (Wed and Thurs 8am - 12pm).

## VIRTUAL PLATFORM AND CONFERENCE MOBILE APP

Use the online platforms to complement your live experience of AMOS. **Connect with fellow attendees and exhibitors by sharing virtual business cards; customize your agenda; view digital posters from our technical presenters; plus download sponsor collateral. The platform will feature livestreams of all sessions, as well as replays.** The virtual platform is browser based, and the App can be downloaded to your mobile device. Choose which works best for you!

### Best for Desktop Viewing

### Best for Mobile Viewing

Visit the the Conference  
Virtual Platform  
<https://bit.ly/amosconf24p>



Download the AMOS ShoApp



## TELL US WHAT YOU THINK



Please complete Feedback forms by Friday 2:00pm to be in the running to win a Bose Speaker. Winner drawn at the closing ceremony. Must be present to win! Mahalo.  
<https://bit.ly/AMOS24Feedback>

# MAHALO TO OUR

**PO'OKELA** *striving for the best*



**KOKUA** *to help and support*



**LAULIMA** *working together*



## Featured Exhibitors

a.i. solutions  
Advanced Scientific  
Concepts  
AFRL  
Astro Haven Enterprises  
BAE Systems  
CACI  
Celestron  
Charles River Analytics  
COMSPOC  
General Atomics  
Electromagnetic Systems

GEOST  
GMV  
Hart Scientific Consulting  
International  
JHU Applied Physics  
Laboratory  
Kayhan Space  
KBR  
Kratos  
LeoLabs  
Lipoa Investments, LLC  
LSAS Tec

MITRE  
Planewave Instruments  
Rocket Communications  
SAIC  
Sea West Observatories  
SEAKR  
Slingshot Aerospace  
SpaceMap  
SpaceNav  
TOPTICA Photonics  
Transastra



# AMOS SPONSORS

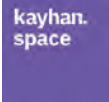
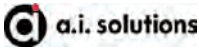
## LOKAHI *collaboration and unity*



## KUPA'A *loyal and committed*



## MALAMA *to care for*



Mali's Innovation Community



## Exhibit Hours

Load-in | Tue, 8:00AM - 5:00PM

Load-out | Fri, 3:00PM - 5:00PM

Wednesday | 9:30AM - 7:00PM

Thursday | 9:00AM - 7:00PM

Friday | 9:00AM - 3:00PM

Explore the on-site Exhibit Venue and connect with exhibitors to view their latest innovations. View the exhibit venue map in the Conference app and online platform.

# PO'AKAHI

## Monday, Sep 16



The **7th annual EMER-GEN® Program** is a joint initiative of the AMOS Conference and SGAC. The program is designed especially for young professionals and students enthusiastic about careers in space. [Learn more at www.emer-gen.com](http://www.emer-gen.com).

With the help of advisers from industry, government, academia and NGOs, the EMER-GEN experience offers:

- **Mentoring** with renowned space specialists from the public sector (military and civil), private sector, and nongovernmental organizations
- **Networking** with other young professionals
- **Technical Short Course** presented by specialists in space situational awareness
- **Professional Development** sessions to enhance effectiveness in a global environment

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## VIRTUAL TECHNICAL SHORT COURSES

*(Separate registration fee required)*

**8:00 AM - 12:00 PM**

### VIRTUAL COURSE A

**Cross-Domain Learning for Space Law: Challenging the Lessons from Maritime, AI and Cyber Domains to Enable a Circular Space Economy**

Presented by **Ralph Dinsley**, 3S Northumbria Ltd; **Christopher Newman** and **Lauren Napier**, Northumbria University

### VIRTUAL COURSE B

**Methods of Cognitive Learning for Space Traffic Management**

Presented by **Mark Abrams** and **Steve Stennett**, Cognitive Learning Systems

### VIRTUAL COURSE C

**Astrodynamics Essentials: Mastering the Math and Physics of Space Orbits Simulation**

Presented by **Richard L. Lachance**, RLL Consulting

**1:00 PM - 5:00 PM**

### VIRTUAL COURSE D

**Imaging, Tracking, and Object Detection**

Presented by **David Gerwe** and **Steven Griffin**, Boeing

### VIRTUAL COURSE E

**SSA System and Catalog Architecture Design**

Presented by **Thomas Johnson**, Exa Research, LLC

Virtual courses will be presented on Zoom. Login details will be emailed to registered participants.



# PO'ALUA

## Tuesday, Sep 17

**IN-PERSON TECHNICAL  
SHORT COURSES**  
(Separate registration fee  
required)

### 8:00 AM - 12:00 PM

**SC 01: CA Risk Assessment Technical Short Course** | *Mauna Loa Ballroom*

Presented by **Francois Laporte**, CNES; **Lauri Newman**, NASA Headquarters; and **Matthew Hejduk**, HQ NASA, The Aerospace Corporation

**SC 02: Astrodynamics for xGeo Space Domain Awareness** | *Vanda Ballroom*

Presented by **Aaron J. Rosengren**, University of California San Diego and **Shane D. Ross**, Virginia Tech

**SC 03: Panchromatic, Multi-Spectral, Spectroscopy and Polarimetry Data Collection and Image Processing for Non-Resolved Object Characterization** | *Ilima Ballroom*

Presented by **Francis Chun**, USAF Academy, Department of Physics and Meteorology; **Timothy Giblin**, i2 Strategic Services, LLC; **David Strong**, Strong EO Imaging, Inc.; **Benjamin Roth**, USAF Academy; **Anil Chaudhary** and **Phillip Fishbein**, Applied Optimization, Inc.

**SC 04: Uncertainty Quantification for Space Situational Awareness** | *Lokelani III Ballroom*

Presented by **Brandon Jones**, The University of Texas at Austin

**SC 05: Using Modular Open System Approach (MOSA) to Enhance Space Situational and Domain Awareness** | *Lokelani II Ballroom*

Presented by **Yvette Rodriguez**, Defense Acquisition University

### 1:00 PM - 5:00 PM

**SC 06: Deep Learning Methods for Space Domain Awareness** | *Mauna Loa Ballroom*

Presented by:

**Roberto Furfaro**, University of Arizona; **Richard Linares**, Massachusetts Institute of Technology and **Weston Faber**, L3Harris

**SC 08: Observing and Characterizing Space Debris** | *Lokelani III Ballroom*

Presented by **Thomas Schildknecht**, University of Bern, Astronomical Institute

**SC 09: Telescopes and Optics: An Introduction to Ground-Based Optical SDA**

*Lokelani II Ballroom*

Presented by **Peter Zimmer**, J.T. McGraw and Associates, LLC

**SC 10: The Case for Space Environmentalism** | *Ilima Ballroom*

Presented by **Moriba Jah**, The University of Texas at Austin

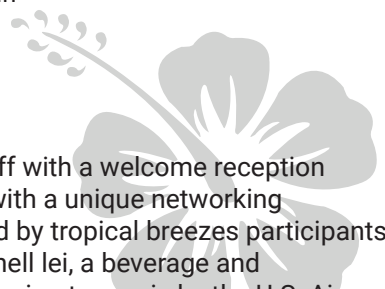
### 6:00 PM - 7:30 PM | Luau Gardens

#### WELCOME RECEPTION

Co-sponsored by



The conference kicks off with a welcome reception providing participants with a unique networking opportunity. Surrounded by tropical breezes participants will be greeted with a shell lei, a beverage and appetizers, all while listening to music by the U.S. Air Force Band of the Pacific. Conference badge required at entry.



# PO'AKOLU

## Wed, Sep 18

6:00AM -7:30 AM | Luau Gardens  
**BREAKFAST AT LEISURE**

7:30AM | Aulani Ballroom  
**CONFERENCE OPENING**

**Leslie Wilkins**, President & CEO, Maui Economic Development Board, Inc.

**CULTURAL INVOCATION**

**Kahu Kealahou Alika**

**CELEBRATING 25 YEARS**

**Paul Kervin**, AMOS Conference Technical Chair

8:15AM  
**OPENING KEYNOTE ADDRESS**

Introduction by **Ian Christensen**, Senior Director, Private Sector Programs, Secure World Foundation

**Lieutenant General Philip A. Garrant**  
Commander, Space Systems Command  
U.S. Space Force

8:45AM  
**SSA POLICY FORUM | SUSTAINABLE OPERATIONS IN THE SPACE ENVIRONMENT: THE ROLE OF ORBITAL CARRYING CAPACITY AND OTHER TOOLS**

Moderated by **Ian Christensen**, Senior Director, Private Sector Programs, Secure World Foundation

**Erick Babcock**, Director of Starlink Guidance, Navigation and Control, SpaceX

**Richard Linares**, Associate Professor, Department of Aeronautics and Astronautics, Massachusetts Institute of Technology

**Andrea Muciaccia**, PhD Student, Politecnico di Milano

**Andrew Ratcliffe**, Chief Engineer, United Kingdom Space Agency

**Audrey Schaffer**, VP, Policy and Strategy, Slingshot Aerospace



9:45AM | Exhibit Hall + Conference Platform  
**EXHIBITION AND NETWORKING BREAK** | Sponsored by **NORTHROP GRUMMAN**

Explore the Exhibit Hall on-site and online. Interact with our conference partners, view demos, access resources, schedule meetings, and more.

10:15AM | Aulani Ballroom  
**SPACE DEBRIS**

Co-chaired by **Heather Cowardin**, NASA JSC and **Zach Gazak**, SSC / SZGA

Analysis of Darkened Fragments Resulting from Laboratory Hypervelocity Experiments  
**Heather Cowardin**, NASA JSC

Resilience of LEO Constellations to Accidental and Intentional Fragmentation Events | **Mark Sturza**, Viasat

Cislunar Missions End-of-Life Disposal Strategies | **Joshua Wysack**, BAE Systems

**2023 Poster Golden Ticket Winner** | Recent Evolution of the Sub-Catalogue Space Debris Population in High-Altitude Orbital Regions  
**Thomas Schildknecht**, University of Bern, Astronomical Institute

OD-SSA Activity at NASA's Heliophysics Division | **Reinhard Friedel**, NASA

11:30AM | Lokelani Ballroom  
**LUNCH**

12:30PM | Aulani Ballroom  
**SPACE DOMAIN AWARENESS SYSTEMS & INSTRUMENTATION**

Sponsored by  **EO SOLUTIONS**

Co-chaired by **Jeff Sherk**, The Aerospace Corporation and **Stacie Williams**, HQ U.S. Space Force

A Remarkable Boost in Satellite Brightness at Optical Wavelengths During the Daytime  
**Sarah Caddy**, Macquarie University

Passive Radio Frequency Techniques & Demonstration for Space Domain Awareness | **Zachary Leffke**, Virginia Polytechnic Institute & State University



### ASK A QUESTION

In the conference app, find the **session**, "click enter Q&A tab", and enter your question using the ask button





Novel Phased Array Laser Radar Architecture for Satellite Imaging and Identification | **James Leger**, University of Minnesota

POLSA Sensor Network Capabilities under Different Operating Modes | **Tymoteusz Trocki**, Polish Space Agency (POLSA)

The GSSAC Mission System: A New Solution for Space Objects Cataloguing from DLR | **Alfredo Antón**, GMV

Ultra-Fast Real-Time Target Recognition Using a Shift, Scale, and Rotation Invariant Opto-Electronic Joint Transform Correlator | **Xi Shen**, Northwestern University

Physics Guided Machine Learning for Wavefront Sensing on a Hybrid Optical Telescope | **Fabien Baron**, Georgia State University

The Power of Persistence: Persistent Custody Through Repurposed Meteorite Trackers and Observation Processing at Real-Time Rates and Volume | **Joseph Diamond**, Peraton

Re-Entry Event Prediction Through the Analysis of Optical Sensor Data Gathered from a Worldwide Network of Telescopes | **Michal Zolnowski**, 6ROADS

**2:45PM | Exhibit Hall + Conference Platform**  
**EXHIBITION AND NETWORKING BREAK**

**3:05PM | Aulani Ballroom**  
**FEATURED PRESENTATION | SPACE LOGISTICS DRIVES SDA ARCHITECTURE**

**Colonel Jeremy A. Raley**, Director, Space Vehicles Directorate, Air Force Research Laboratory (AFRL)

**Colonel Joseph J. Roth**, Director Innovation & Prototyping Acquisition Delta and Commander, Space Systems Command Detachment 1, United States Space Force

**3:35PM**  
**MACHINE LEARNING FOR SDA APPLICATIONS** | Sponsored by  
Co-chaired by **Heather Griffith James**, Kitware, Inc. and **Nathan Toner**, Cloudstone Innovations, Inc.

Backbone Architectures for Space Domain Awareness | **Kyle Merry**, Sandia National Laboratories

Regularizing Training of Physics Informed Neural Networks (PINNs) for Cislunar Orbit Determination via Transfer Learning | **Gregory Badura**, Georgia Tech Research Institute

Action-Free Inverse Reinforcement Learning for Evaluating Satellite Similarity and Anomaly Detection | **David Witman**, Slingshot Aerospace

Resolved Hyperspectral Imaging | **Kimmy Chang**, U.S. Space Force / Space Systems Command

Rapid and Uncertainty Quantified Orbital Propagation Using Uncertainty-Aware AI | **Kevin Vanslette**, Raytheon BBN

Integrating LLMs with SatSim for Enhanced Satellite Tracking and Identification | **Enrique De Alba, Jr.**, EO Solutions

Building Trust in Human-Machine Teaming for Autonomous Space Sensing | **Garrett Fitzgerald**, U.S. Space Force / MIT AI Accelerator

**5:20PM | Exhibit Hall**  
**EXHIBITION AND POSTER SESSION**  
Sponsored by **SAIC**

Posters co-chaired by **Pat Patterson**, Space Dynamics Laboratory and **Matthew Stevenson**, LeoLabs

Hear lightning pitches highlighting this year's array of poster offerings while enjoying a cocktail and interacting with exhibitors and fellow attendees.

**8:00PM - 10:00PM**  
**Pacific Terrace Rooftop**  
**WOMEN & ALLIES IN SPACE DOMAIN AWARENESS**

Desserts, dancing, and networking under the stars. Limited to first 300 guests. Separate registration required.



# PO'AHHA

## Thu, Sep 19

6:00AM -7:30 AM | Luau Gardens  
**BREAKFAST AT LEISURE**

7:30AM | Aulani Ballroom  
**KEYNOTE ADDRESS**

Introduction by **Victoria Samson**, Chief Director, Space Security and Stability, Secure World Foundation

**Dr. Hiroshi Yamakawa**, President, Japan Aerospace Exploration Agency (JAXA)

8:00AM  
**SSA POLICY FORUM | SSA IN THE ASIA-PACIFIC: WHERE WE ARE, WHERE WE ARE GOING**

Moderated by **Victoria Samson**, Chief Director, Space Security and Stability, Secure World Foundation

**Melrose Brown**, Director, UNSW Canberra Space

**Dan Ceperley**, Founder & Chief Operating Officer, LeoLabs

**Sittiporn Channumsin**, Director of Space Technology Research Center, GISTDA

**Lexie Weikert**, Manager Business Development, National Security, Astroscale

9:00AM | Exhibit Hall + Conference Platform  
**EXHIBITION AND NETWORKING BREAK**  
Sponsored by



9:30AM | Aulani Ballroom  
**ASTRODYNAMICS** | Sponsored by

**BAE SYSTEMS**

Co-chaired by **Tom Kelecyc**, Space Enthusiast and **Geoff Lake**, BAE Systems

Minimum Observation Methods of Initial Maneuver Determination | **Sam Wishnek**, BAE Systems

Early Classification of Space Objects Based on Astrometric Time Series Data | **Giovanni Lavezzi**, Massachusetts Institute of Technology



### ASK A QUESTION

In the conference app, find the **session**, "click enter Q&A tab", and enter your question using the ask button



A Novel Stochastic Unscented Transform for Robust State Estimation Enabling Enhanced Space Domain Awareness | **Jacob Griesbach**, ARKA/Stratagem

Leveraging Corkscrew Patrol Orbits to Improve Custody of Closely Spaced Objects | **Erin Griggs**, Trusted Space, Inc.

10:30AM  
**CONJUNCTION / RPO**  
Co-chaired by **Jeff Aristoff**, Slingshot Aerospace and **Mariel Borowitz**, Office of Space Commerce / Georgia Tech

Contextual Predictive Model for Early Identification of High-Covariance Conjunctions | **Timothy Olson**, Slingshot Aerospace

A Novel Stochastic Unscented Transform for Probabilistic Drag Modeling and Conjunction Assessment | **Piyush Mehta**, West Virginia University

How to Categorize an Avoidance Maneuver: Untangling the Iridium Experience | **Ryan Shepperd**, Iridium

Real-Time Conjunction Assessment and Collision Avoidance of Satellites for Concurrent Avoidance Negotiation based on Comparative Analysis of Passive Ranging Method with Traditional Sources | **Douglas Deok Soo Kim**, Space Map

11:30AM | Lokelani Ballroom  
**LUNCH**

12:30PM | Aulani Ballroom  
**FEATURED PRESENTATION | VICTUS NOX: TACTICALLY RESPONSIVE SPACE - SPACE DOMAIN AWARENESS MISSION**

**Lieutenant Colonel Jason Altenhofen**, U.S. Space Force, Space Systems Command

**Gregory Less**, Launch Systems Integration Manager, Millennium Space Systems

12:50PM

## SATELLITE CHARACTERIZATION

Sponsored by  LEOLABS

Co-chaired by **Carolyn Frueh**, Purdue University and **Emily Gerber**, Ten One Aerospace

Multi-Layered Machine Learning for Rapid LEO Object Characterization Leveraging Global Radar Data | **Chandler Phelps**, LeoLabs

Advancing Geosynchronous Satellite Classification Utilizing Spectral Data via Fine-Tuned Pretrained Deep Learning Models | **Chad Mello**, U.S. Air Force Academy

Multi-Modal Transformers for Efficient EO/IR Signature Generation | **Nathan Highsmith**, Modern Technology Solutions, Inc.

Multi-Phenomenology Fusion for Satellite Identification | **Trevor Putman**, Johns Hopkins University Applied Physics Lab

High-Resolution Radar Imaging of Space Objects | **Simon Anger**, German Aerospace Center (DLR)

Super-Resolution Object Characterization in Low Earth Orbit (SROC LEO) | **Stacey Jones**, O Analytics, Inc.

Centroiding Caused Errors in Tracking and Adaptive Optics | **Joshua Garretson**, U.S. Space Force

2:35PM | Exhibit Hall + Conference Platform

## EXHIBITION AND NETWORKING BREAK

2:55PM | Aulani Ballroom

## SPACE DOMAIN AWARENESS

Sponsored by 

Co-chaired by **Ayla Reed**, AFRL/RDSM and **Lauchie Scott**, Defense R&D Canada

Space Debris and Nuclear Strategic Stability: Collision Risks and Attribution Potential in GEO | **Roohi Dalal**, Outer Space Institute

Automated, Collaborative Applications to Close Kill Chain Gaps | **Greg Furlich**, University of Colorado Boulder, Center for National Security Initiatives

A Technical Comparison of the Public SSA Services in the United States and the European Union | **Mariel Borowitz**, National Oceanic and Atmospheric Administration

Developing Optical Sensor Constellation Architectures for Space Domain Awareness through Model-Based Trade Studies | **Mitchell Kirshner**, University of Arizona, Steward Observatory

A Decomposition Algorithm for Optimal Selection and Placement of Heterogeneous Sensors to Holistically Satisfy Mission | **Michael Bynum**, Sandia National Laboratories

Post-Maneuver UCT Correlation Using Multi-Source Data Streams | **Gavin Hofer**, Catalyst Space Technologies

A Multi-Agent Trust Framework for Fusing Subjective Opinions with Imperfect Understanding in Space Domain Awareness Using the Scruff AI Framework | **Matthew Wilkins**, L3Harris

Extending the Quality Standards for Non-Traditional Sensors: A Pathway to Increased Data Utilization | **Steven Paligo**, a.i. solutions

Resection of Long-Range Sensor Models for Mono and Stereo Exploitation of Non-Earth Imagery | **Reuben Settergren**, BAE Systems

Integration of Air and Space Traffic Management: Establishing Criteria for Tracking of Debris Objects Prior to Uncontrolled Reentry | **Michael Kezirian**, University of Southern California

5:25PM | Exhibit Hall

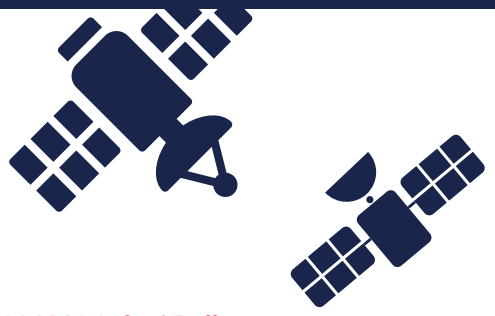
## EXHIBITION AND POSTER SESSION

Posters co-chaired by **Pat Patterson**, Space Dynamics Laboratory and **Matthew Stevenson**, LeoLabs

Hear lightning pitches highlighting this year's array of poster offerings while enjoying a cocktail and interacting with exhibitors and fellow attendees.

# PO'ALIMA

## Fri, Sep 20



6:00AM -7:30 AM | Luau Gardens  
**BREAKFAST AT LEISURE**

7:30AM | Aulani Ballroom  
**KEYNOTE ADDRESS | SUSTAINABLE SPACE: ALIGNING EFFORTS TO PRESERVE THE SOLAR SYSTEM**

Introduction by **Krystal Azelton**, Senior Director, Program Planning, Secure World Foundation

**Pam Melroy**, Deputy Administrator, NASA

8:00AM  
**SSA POLICY FORUM | SPACE WEATHER AND SSA – WHAT'S NEEDED NEXT?**

Moderated by **Krystal Azelton**, Senior Director, Program Planning, Secure World Foundation

**Marco Concha**, Flight Dynamics Lead, Amazon Kuiper

**Tzu-Wei Fang**, Space Scientist, NOAA Space Weather Prediction Center

**Piyush Mehta**, Associate Professor, West Virginia University

**Matthew Shoupe**, Senior Associate, Commercial Space Strategy, Booz Allen Hamilton

9:00AM | Exhibit Hall + Conference Platform  
**EXHIBITION AND NETWORKING BREAK**

9:00AM - 1:00PM | Ilima Ballroom + Exhibit Hall

**STUDENT SPACE EXPLORATION DAY**

The AMOS Conference welcomes 150 Maui County middle school students and their STEM educators to meet astronaut Pam Melroy and visit exhibit booths for hands-on STEM activities.

9:30AM | Aulani Ballroom  
**FEATURED PRESENTATION UPDATES ON THE TRAFFIC COORDINATION SYSTEM FOR SPACE (TRACSS)**

**Richard DalBello**, Director, Office of Space Commerce




### ASK A QUESTION

In the conference app, find the **session**, "click enter Q&A tab", and enter your question using the ask button



10:00AM  
**SPACE-BASED ASSETS** | Sponsored by

Co-chaired by **BT Cesul**,   
Umbral and **Orlando Diaz**, NASA Ames Research Center

Completion and Test of a Compact, Extremely Accurate Star Tracker | **Greg Finney**, IERUS Technologies

Event-Based Vision Sensor Noise Modeling for Space Domain Awareness | **Rachel Oliver**, Air Force Institute of Technology

The Use of Flyby Space-to-Space Non-Earth Imagery to Rapidly Identify and Characterise Unknown Objects | **James Allworth**, HEO

Concept of Operation and Initial Performance Summary of the NorthStar Space-Based Optical SSA System | **Yann Picard**, Northstar Earth & Space

Wide FOV Imagers for Co-Orbiting Object Detection | **Randa Qashoa**, York University

Experimental Results from On-Orbit Edge-Deployed AI Detection of Resident Space Objects Using Computer Vision | **Paul Day**, Booz Allen Hamilton

11:30AM | Lokelani Ballroom  
**LUNCH**

12:30PM | Aulani Ballroom  
**FEATURED PRESENTATION |  
JOINT COMMERCIAL OPERATIONS  
(JCO) INTRODUCTION AND WAY  
FORWARD**

**Barbara Golf**, U.S. Space Force, Strategic  
Advisor for SDA, Space Systems Command

12:50PM  
**ATMOSPHERICS / SPACE WEATHER**  
Sponsored by **MITRE**

Co-chaired by **Mary Ellen Craddock**,  
Northrup Grumman Corporation and  
**Shaylah Mutschler**, Space Environmental  
Technologies

Measuring the Vertical Profile of  
Atmospheric Turbulence with the Laser  
Communication Relay Demonstration  
Downlink at Table Mountain Facility  
**Francis Bennet**, Australian National  
University

Detection and Tracking of Space Objects  
with the HAARP HF Facility in Conjunction  
with Ground and Satellite-Based Sensors  
**Paul Bernhardt**, University of Alaska  
Fairbanks

Operational Space Weather Forecasts to  
Support Satellite Operations | **Sean Elvidge**,  
University of Birmingham

Harnessing Satellite Constellations as  
Signals of Opportunity for Atmospheric  
Forecasting and Enhanced Space  
Situational Awareness | **David Fitzpatrick**,  
University of Colorado Boulder

1:50PM  
**CISLUNAR SDA**

Co-chaired by **John Iannamorelli**, The  
Charles Stark Draper Laboratory and **Jaime  
Stearns**, Air Force Research Laboratory  
(AFRL) Space Vehicles Directorate

Applications of Poincare Search Maps for  
Space-Based Cislunar SDA Detection  
**Raymond Wright**, BAE Systems

Cislunar Surveillance Optimization and  
Key Region Identification | **Carolyn Frueh**,  
Purdue University

Simultaneous Observation Association  
and Maneuver Reconstruction for Non-  
Keplerian Initial Orbit Determination using  
Nonlinear Programming | **Casey Heidrich**,  
University of Colorado Boulder

2:35PM | Exhibit Hall + Conference  
Platform  
**EXHIBITION AND NETWORKING  
BREAK**

2:55PM | Aulani Ballroom  
**CISLUNAR SDA CONT.**

An Adaptive Approach to the Initial Orbit  
Determination Problem in the Cislunar  
Regime Using Machine Learning  
**Juan Ojeda Romero**, JHU / APL

Cislunar Initial Orbit Determination  
Using Sensor and Measurement-Centric  
Admissible Regions | **Queenique Dinh**,  
University of Colorado Boulder

Efficient Cislunar Multi-Target Tracking  
with Adaptive Multi-Fidelity Propagation  
**Benjamin L. Reifler**, The University of Texas  
at Austin

Reachability Analysis of Low-Thrust  
Cislunar Spacecraft Using State-Transition  
Tensors | **Aaron Rosengren**, University of  
California, San Diego

Cislunar Orbit Determination with Passive  
RF Sensors | **Francois Thevenot**, Safran  
Data Systems

4:10PM  
**FEATURED PRESENTATION  
EMER-GEN® OUTCOMES**

4:25PM  
**CONFERENCE CLOSING & AWARDS  
CEREMONY**

In collaboration with the Space  
Surveillance Committee of the American  
Astronautical Society (AAS), the AMOS  
Conference recognizes outstanding  
efforts in the field of Space Situational/  
Domain Awareness by presenting the fifth  
annual AMOS Conference Best Paper and  
Student Awards. Also awarded are Best  
Presentation for each technical session  
and a series of Poster Awards.

5:00PM - 6:30PM | Kahoolawe Lawn  
**PAU HANA RECEPTION**

Commemorate the end of the 25th AMOS  
Conference with live music, cocktails, and  
friends as we say Aloha and A Hui Hou

Co-sponsored by  **L3HARRIS™**  
FAST. FORWARD.



# POSTER PRESENTERS

POSTER SESSION | EXHIBIT VENUE  
WED, SEP 18 5:20PM - 6:50PM & THU, SEP 19 5:25PM - 6:55PM

## IN-PERSON

PITCH PERFECT! Listen to 30 second pitches from poster presenters at the start and mid points of each Poster Session and learn who will be awarded the poster prizes – Newcomer, Most Creative, Best Pitch & Golden Ticket!

Extreme Gradient Boosting and Deep Learning Models for the Classification of Synthetic Space Debris Light Curves  
**Anne Adriano**, University of Waterloo

On-chain TDM Validation using AI over a Proof of Stake (PoS) Blockchain | **Samya Bagchi**, University of Adelaide

Utilising Australian National Infrastructure To Support Cislunar Orbit Determination and Space Traffic Management | **Timothy Bateman**, UNSW Canberra Space

Error Analysis of Bulk-Density Measurements for Metal-Type Debrisat Fragments | **Matthew Biles**, University of Florida

Guiding Lunar Growth: Architectural Solutions for Space Traffic Management  
**Michael Bilka**, BAE Systems

A Benchtop Simulator for Evaluating Astronomical Observations with Object Generation and Point Spread Function Engineering | **Megan Birch**, Georgia Tech Research Institute / Georgia State University

Learned Initial Orbit Determination from Simulated Electro Optical Observations  
**Alexander Cabello**, EO Solutions

Dynamic EO/IR Satellite Signature Prediction with High-Fidelity MuSES Simulation  
**Logan Canull**, ThermoAnalytics, Inc.

Autonomous Trajectory Planning for Cislunar Space | **Fabio Chiappina**, a.i. solutions

Concept of the Korean Optical Space Surveillance Telescope System NSOS\_Beta for Monitoring the High-Altitude Orbit Region  
**Jin Choi**, Korea Astronomy and Space Science Institute

The Falcon Telescope Network: A Newly Upgraded Global Array of Optical Telescopes  
**Francis Chun**, U.S. Air Force Academy

An Australian Experimental SDA System: RED STAR | **Duncan Cook**, Defence Science and Technology Group

Adaptive Sensor Tasking Strategies for Tracking Non-Cooperative Cislunar Space Objects | **Jeremy Correa**, Katalyst Space Technologies

Robust Strategies for Incorporating Parameter Uncertainty in Constrained Admissible Regions | **Thomas Dearing**, ARKA

Neural Network Enhanced Numerical Propagation to Enhance SSA/SDA | **Duane DeSieno**, Data Fusion & Neural Networks

Machine Learning for Space Domain Awareness Sensor Scheduling | **Neil Dhingra**, Auria

Automated 6DOF Satellite Pose Estimation from Resolved Ground-Based Imagery  
**Thomas Dickinson**, Air Force Institute of Technology, Rochester Institute of Technology Center for Imaging Science

Initial Orbit Determination from Ambiguous TDOA and FDOA Measurements of Passive Radio Frequency Signals | **Benjamin Feuge-Miller**, Applied Research Laboratories, The University of Texas at Austin

Joint Commercial Operations (JCO) - Integrated Space Operations with Event Ledgers | **Joseph Gerber**, The Tech7 Company

A Common Task Framework for Testing and Evaluation at the Space Domain Awareness Tools, Applications, and Processing Lab  
**Imène Goumiri**, Lawrence Livermore National Laboratory

Exploring the Effectiveness of Maneuvering Guidelines for Space Traffic Management  
**Brian Gunter**, Georgia Institute of Technology

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Photometric Attitude Estimation Using Gaussian Process Regression | **Ryui Hara**, Kyushu University

Multi-Frame Observation-to-Orbit Association for Angles-Only Measurements  
**Cameron Harris**, EO Solutions

The TraCSS Consolidated Pathfinder: Leveraging Commercial Capability in LEO  
**Matthew Hejduk**, The Aerospace Corporation

SOM-erizing Cislunar Orbits: Classification of Cislunar Orbits Using Self-Organizing Maps (SOMs) | **Denvir Higgins**, Lawrence Livermore National Laboratory

Motion Hypothesis Satellite Detection for Cislunar Spacecraft | **Nathan Holzrichter**, MITRE

An Update on the UK Cross-Government SDA Requirements in Support of the UK's SDA Strategy | **Emma Kerr**, Defence Science and Technology Laboratory

A Comprehensive Approach to Optimized Cislunar Architecture Design Utilizing Capacity | **Justin Kim**, BAE Systems

Graph Based Analysis of Persistent Detection Corridors in Cislunar Space | **Michael Klonowski**, University of Colorado Boulder

Development of Reference Scenarios and Supporting Inputs for Space Environment Modeling | **Miles Lifson**, The Aerospace Corporation

Debris Tracking Laser Network | **Jose Miguel Lozano**, GMV

An Efficient Collision Analysis Framework Enabling Real-Time Spacecraft Self-Protect  
**Jordan Maxwell**, Scout Space LLC

Real-Time Atmospheric Turbulence Layer Determination Using Multi-Task Learning  
**Nick Murphy**, Georgia State University

ML-Driven Optimal Design of Multispectral Instruments for the Characterization of Resident Space Objects | **Kedar Naik**, BAE Systems

Enhancing Unknown Near-Earth Object Detection with Synthetic Tracking and Convolutional Neural Networks | **Kevin Phan**, EO Solutions

The Resonant Structure of xGEO and Implications for Cislunar Domain Awareness  
**Shane D. Ross**, Virginia Tech

Optimizing the Radar Network Architecture for LEO Space Domain Awareness | **Jack Schuss**, SpaceEM

Satellite Pattern-of-Life Identification Challenge: Competition Design and Results  
**Haley Solera**, Massachusetts Institute of Technology

Autonomous, Hybrid Space System Fault and Anomaly Detection, Diagnosis, Root Cause Determination, and Recovery | **Richard Stottler**, Stottler Henke Associates, Inc.

Dragster 2.0: An Operations-Ready Framework for Neutral Density Assimilation | **Rachel Stutz**, Orion Space Solutions

Feasibility Study of Spaceborne Pulsed Laser System Removing Small Debris Objects in Near-Earth Orbits | **Shigeaki Uchida**, Henan University of Science and Technology

ML-Based Photometric Fingerprinting and Event Detection at Scale for LEO Satellite Monitoring | **Brian Williams**, Slingshot Aerospace

MOCAT on Temporal Analysis and Quantification for Policies in Space Sustainability | **Di Wu**, MIT

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SDA TAP Lab Using Commercial Technology to Avoid Operational Surprise | **Sean Allen**, U.S. Space Force, Space Systems Command

Design of Wide Angle and Large Aperture Optical System of a LiDAR Sensor for Characterization of Space Debris Particles  
**Davud Asemani**, The Aerospace Corporation

Optimizing GEO Belt Observation through Analytical Methods and the Traveling Salesman Problem | **Shashanka Athigiri**, Digantara

Enhanced Heuristic Algorithm for Optimal Cislunar Space Situational Awareness Architecture | **Jacob Dahlke**, Air Force Institute of Technology

Attitude Determination and Monitoring of 3-Axes Controlled Satellites with Photometric Observations | **Adrián de Andrés Tirado**, GMV

Towards an All-Orbit Optical Data Service Provisioning Based on ArianeGroup Helix System | **Thibault de la Villegeorges**, ArianeGroup

Optimal Control-Based Track-to-Track Correlation with Optical Measurements  
**Alessia De Riz**, Politecnico di Milano

Machine Learning for E-O Data and Imagery Event Detection | **John Ebeling**, Data Fusion & Neural Networks

An Investigation of Impulsive-Maneuver Transfers from L3, L4 and L5 to Earth-Orbit  
**Evangelina Evans**, University of Colorado Boulder

Event-based Vision Sensor Physics-Based Digital Twin for Tuning SSA Use  
**Carolyn Frueh**, Purdue University

High-Fidelity Electro-Optical Space Domain Awareness Scene Simulator | **Christopher Griffith**, The Aerospace Corporation

Data-Driven Identification of Main Behavioural Classes and Characteristics of Resident Space Objects in LEO through Unsupervised Learning | **Marta Guimaraes**, Neuraspace

Architecture of a Distributed Space Traffic Coordination System | **Christopher Kebschull**, OKAPI:Orbits

Photometric Patterns as a Key for Determining the Orientation of the Rotation Axis of RSO | **Oleksandr Kozhukhov**, National Space Facilities Control and Test Center of State Space Agency of Ukraine

Detection in Deep Space from the Southern Hemisphere of Near Earth Objects Using a Combined Radar/Optical System  
**Ed Kruzins**, UNSW Canberra Space

Multi-Objective Multi-Perspective Numerical Optimization of Collision Avoidance Maneuvers Using Differential Evolution | **Naman M Ladhak**, Digantara

Metric Tensor Fields along Trajectory Solution Surfaces for Astrographic Map-Making | **Garrick Lau**, University of Colorado Boulder

Conceptual Design of Mission Scheduling Software for Small Satellite Constellation  
**Kimoon Lee**, University of Science and Technology

CubeSat Radar Cross-Section Measurement Campaign | **Matt Mayne**, Defence Science and Technology Laboratory

High-Fidelity Light Curve Simulation and Validation Using Empirical Data  
**Tristan Meyer**, German Aerospace Center

Recovery of Periodic Signals in Event Camera Data: Theory and Empirical Results  
**Mark Moretto**, University of Colorado Boulder

Preliminary Study of Hyperspectral Unmixing Analysis Associated to Resident Space Objects Using DIRSIG™ | **Aryzbe Najera**, The University of Texas at El Paso

Multi-Perspective Multi-Modal PoL Characterization of LEO Objects | **Rithwik Neelakantan**, Digantara

Deep Reinforcement Learning Applications to Space Situational Awareness Scenarios | **Benedict Oakes**, University of Liverpool

Passive Radar for Launch and Re-Entry Support | **James Palmer**, Silentium Defence

Enhancing the Pointing Accuracy Using Adaptive Terminal Sliding Mode Control for Satellite with Single Gimbal VSCMG | **Mayur Vijay Pawar**, MIT Art, Design and Technology University

Poland's Evolving Space Law: Assessing Space Debris Mitigation and Remediation in the European Context | **Malgorzata Polkowska**, Lomza Academy

Determining the Efficiency, Accuracy, and Precision between Supervised and Unsupervised Machine Learning Algorithms in Hunting for Satellite Streaks in Astronomical Survey Images | **María Romero-Colmenares**, Universidad de Atacama

Exploring Soliton Enhancement for Ground-Based Detection of Lethal Non-Trackable Space Debris | **Kristine Rosfjord**, InTrack Radar Technologies

Challenges of Deep Learning Deployment for Space-Based RSO Detection | **Shane Ryall**, Defense Research & Development Canada

Data Insights, Pedigree, and Automation for Space Domain Awareness | **Oliver Schultz**, Lockheed Martin

Catalog of US Launched Objects for Active Debris Removal | **Patrick Seitzer**, University of Michigan

Monitoring of Rendez-vous & Proximity Operations with SST and SDA Techniques Combination | **Jaime Serrano**, GMV

Challenges in Orbital Debris Modeling: A Comparative Analysis of NASA SBM and Space Fence Data | **Tory Smith**, U. S. Space Force / Massachusetts Institute of Technology

Architecting a Decision Support System for Continuing Supervision of Commercial In-Space Servicing | **Jacqueline Smith**, Massachusetts Institute of Technology

Attitude Determination Model Input Parameters Constraints for the Restitution of Tumbling Motion of Defunct Satellites from Photometric Data | **Henri Tarrieu**, Aldoria

Estimating Physical Properties of 3U CubeSat's Rotation Based on Photometric Observations and Solar Illumination Modeling | **Takuro Tsuchikawa**, Mitsubishi Corporation

Project Luciole: A Wide-Field, High-Cadence Uncued System for Comprehensive Tracking of Decimeter-Sized LEO Objects | **Denis Vida**, University of Western Ontario

Analysis of Receiver Position and Velocity Uncertainty on Passive RF Cislunar SSA Architectures | **Kullen Waggoner**, U.S. Space Force

Low Signal to Noise State Space Modeling Using Simulation Based Inference | **Ingo Waldmann**, Spaceflux

Operational Responses to LEO Satellite Orbital Decay during the 25th Solar Cycle Maximum | **Chen Yap**, Planet Labs PBC

Space Weather Effect via Periodic Photometric Observations of Geostationary Satellites | **Matej Zigo**, Comenius University - Bratislava, Slovakia



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# AMOS

**1999**

## **Inaugural AMOS Conference**

Hosted by AFRL and executed by MEDB

**2007**

## **First AMOS Exhibition**

**2012**

## **SSA Policy Forum Introduced**

International issues are explored to foster the link between policy and technical development

**2014**

## **Technical Short Courses Debut**

**2017**

## **Journal Publication**

In collaboration with AAS, select AMOS authors were peer-reviewed for inclusion in the Journal of Astronautical Sciences' AMOS Special Topic Issue

**2018**

## **Technical Paper Awards**

The AMOS Conference Best Paper and Student Awards are introduced in partnership with AAS to recognize outstanding technical advancements

**2020**

## **AMOS Goes Virtual**

Due to COVID AMOS initiated the the first all virtual conference, since then AMOS has been hybrid allowing more participation

**2022**

## **Women & Allies in SDA Event**

WASDA debuted to celebrate the growth women in the the space industry

**2006**

## **MEDB Assumes Ownership**

Sponsorships are introduced to further secure AMOS as the premiere SSA technical conference in the nation

**2010**

## **Space Exploration Day**

Over 300 Maui STEM students and educators interact with AMOS exhibitors and presenters

**2013**

## **AMOS Dialogue Launched**

**2016**

## **First International Reception**

Welcomes 18 countries to AMOS, AEOS 50th Gala

**2018**

## **EMER-GEN® Launches**

The young space professionals program welcomes 36 participants to the inaugural cohort

**2019**

## **AMOS 20th**

AMOS celebrates 20 years with record breaking attendance!

**2022**

## **Poster Pitches Debut**

Poster presenters are given the opportunity to pitch their posters and compete for - Newcomer, Most Creative, Best Pitch & Golden Ticket!

**2024**

**CELEBRATING 25 YEARS**

