

## PROGRAM

The AMOS Conference is an in-person event with virtual attendance options and kicks off with a number of virtual and in-person Technical Short Courses in various Space Situational/Domain Awareness-related disciplines. The three plenary program days open with Keynote Addresses and SSA Policy Forum discussions followed by Technical Presentations covering a range of broad topical areas relating to SSA/SDA, all streamed live to the virtual conference platform. Posters are available in digital format this year and are accompanied by on-demand presentation videos. A select number of posters are invited for in-person presentation during the evening poster sessions.

Please note all dates/times listed are Hawaii Standard Time (HST). Agenda is subject to change.

### Program at a Glance

<b>FRI Sep 13</b>	<b>Virtual Platform Open to Registered Attendees</b> <b>On-Demand Launch</b>   Digital Poster Presentations
<b>SUN Sep 15 – TUE Sep 17</b>	<b>EMER-GEN® Program</b> (separate registration fee required) On-site Registration
<b>MON Sep 16</b>	<b>Virtual Technical Short Courses</b> (separate registration fee required)
<b>TUE Sep 17</b>	<b>Exhibitor Load-in</b> <b>In-person Technical Short Courses</b> (separate registration fee required) <b>Welcome Reception</b>   Co-sponsored by Boeing
<b>WED Sep 18</b>	<b>Conference Opening &amp; Cultural Invocation</b> <b>Opening Keynote Address</b>   Lieutenant General Philip A. Garrant <b>SSA Policy Forum</b>   Sustainable Operations of Large Constellations: The Role of Orbital Carrying Capacity and Other Tools <b>Technical Session</b>   Space Debris <b>Technical Session</b>   Space Domain Awareness Systems & Instrumentation   Sponsored by EO Solutions <b>Featured Presentation</b>   Colonel Jeremy Raley & Colonel Joseph Roth <b>Technical Session</b>   Machine Learning for SDA Applications   Sponsored by Anduril <b>Poster Session + Exhibit and Networking Reception</b>   Sponsored by SAIC <b>Women &amp; Allies in SDA</b>
<b>THU Sep 19</b>	<b>Keynote Address</b>   Dr. Hiroshi Yamakawa <b>SSA Policy Forum</b>   SSA in the Asia-Pacific: Where We Are, Where We Are Going <b>Technical Session</b>   Astrodynamics   Sponsored by BAE Systems <b>Technical Session</b>   Conjunction/RPO <b>Featured Presentation</b>   Lieutenant Colonel Jason Altenhofen & Gregory Less <b>Technical Session</b>   Satellite Characterization   Sponsored by LeoLabs <b>Technical Session</b>   Space Domain Awareness   Sponsored by ExoAnalytic Solutions <b>Poster Session + Exhibit and Networking Reception</b>
<b>FRI Sep 20</b>	<b>Keynote Address</b>   Pam Melroy <b>SSA Policy Forum</b>   Space Weather and SSA – What’s Needed Next? <b>AMOS Student Space Exploration Day</b> <b>Featured Presentation</b>   Richard DalBello

## PROGRAM

**Technical Session** | *Space Based Assets* | Sponsored by LinQuest Corporation  
**Featured Presentation** | *Barbara Golf*  
**Technical Session** | *Atmospheric & Space Weather* | Sponsored by Mitre  
**Technical Session** | *Cislunar for SDA*  
**Featured Presentation** | *EMER-GEN® Outcomes*  
**Conference Closing & Awards Ceremony**  
**Pau Hana Reception** | Co-sponsored by L3 Harris

### Sunday 15 September – Tuesday 17 September



#### EMER-GEN®

The 7<sup>th</sup> annual EMER-GEN® 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. Separate registration required. Visit [www.emer-gen.com](http://www.emer-gen.com) to learn more.

02:00 PM HST      06:00 PM HST      **ON-SITE REGISTRATION** | *Aulani Ballroom Foyer*

### Monday 16 September

02:00 PM HST      06:00 PM HST      **ON-SITE REGISTRATION** | *Aulani Ballroom Foyer*

**VIRTUAL TECHNICAL SHORT COURSES:** *In-person and virtual short courses are offered this year. Separate registration fee required for each half-day course. Virtual short courses are “live” with the ability to interact with the instructor and attendees in real-time. Virtual courses will not be recorded. Access links will be provided to registrants closer to the course date.*

08:00 AM HST      12:00 PM HST      **VIRTUAL COURSE A** | Cross-Domain Learning for Space Law: Challenging the Lessons from Maritime, AI and Cyber Domains to Enable a Circular Space Economy | *Online Room-1*

**VIRTUAL COURSE B** | Methods of Cognitive Learning for space Traffic Management | *Online Room-2*

**VIRTUAL COURSE C** | Astrodynamics Essentials: Mastering the Math and Physics of Space Orbits Simulation | *Online Room-3*

12:00      01:00      **BREAK** | *Explore the AMOS Virtual Venue and Digital Poster Hall*

01:00 PM HST      05:00 PM HST      **VIRTUAL COURSE D** | Imaging, Tracking, and Object Detection | *Online Room-1*

**VIRTUAL COURSE E** | SSA System and Catalog Architecture Design | *Online Room-2*

### Tuesday 17 September

02:00 PM HST      06:00 PM HST      **ON-SITE REGISTRATION** | *Aulani Ballroom Foyer*

## PROGRAM

**IN-PERSON TECHNICAL SHORT COURSES:** *In-person and virtual short courses are offered this year. Separate registration fee required for each half-day course. In-person short courses will not be livestreamed for virtual attendance, nor will they be recorded.*

**08:00 AM HST**      **12:00 PM HST**      **IN-PERSON COURSE 01** | CA Risk Assessment Technical Short Course | *Mauna Loa Ballroom*

**IN-PERSON COURSE 02** | Astrodynamics for xGeo Space Domain Awareness | *Vanda Ballroom*

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

**IN-PERSON COURSE 04** | Uncertainty Quantification for Space Situational Awareness | *Lokelani III Ballroom*

**IN-PERSON COURSE 05** | Using Modular Open System Approach (MOSA) to Enhance Space Situational and Domain Awareness | *Lokelani II Ballroom*

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**12:00**      **01:00**      **BREAK** | *Explore the AMOS Virtual Venue and Digital Poster Hall. Pick up lunch at one of the many locations on-site or next door at the Shops at Wailea.*

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**01:00 PM HST**      **05:00 PM HST**      **IN-PERSON COURSE 06** | Deep Learning Methods for Space Domain Awareness | *Mauna Loa Ballroom*

**IN-PERSON COURSE 08** | Observing and Characterizing Space Debris | *Lokelani III Ballroom*

**IN-PERSON COURSE 09** | Telescopes and Optics: An Introduction to Ground-Based Optical SDA | *Lokelani II Ballroom*

**IN-PERSON COURSE 10** | The Case for Space Environmentalism | *Ilima Ballroom*

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**06:00 PM HST**      **07:30 PM HST**      **WELCOME RECEPTION** | *Luau Gardens*  
Join us for an oceanfront reception at sunset as we welcome the AMOS ‘ohana back to the island.

Co-sponsored by 

## PROGRAM

### Wednesday 18 September

The three-day plenary program will be livestreamed in its entirety to the virtual conference platform, with on-demand playback available in 24-48 hours. All registered attendees are encouraged to visit the virtual Exhibit Hall and Digital Poster Hall to review materials and interact with sponsors and poster presenters.

06:00 07:30 BREAKFAST AT LEISURE | *Luau Gardens*  
AM HST AM HST

07:30 08:15 **CONFERENCE OPENING** | *Aulani Ballroom*  
**Leslie Wilkins**, President & CEO, Maui Economic Development Board, Inc.

**CULTURAL INVOCATION**  
**Kahu Kealahou Alika**

**CELEBRATING 25 YEARS**  
**Paul Kervin**, AMOS Conference Technical Chair

08:15 08:45 **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

08:45 09:45 **SSA POLICY FORUM | Sustainable Operations in the Space Environment: The Role of Orbital Carrying Capacity and Other Tools**  
*Given the increasing operational complexity in the space environment, including the deployment and of operation of large satellite constellations and the increasing range of space actors, the need to improve approaches to managing and mitigating risks to safety and sustainability in operations in that environment increases in relevancy. A more holistic approach that crosses policy, operational, and SSA services aspects will have important benefits for business and service continuity, maintaining access to orbit for future users, and ensuring safety in a multi-user domain. This session will discuss the status and relevancy of various tools for approaching management of the space environment in a more comprehensive fashion, including: orbital carrying capacity modeling; efforts to assess and reduce the footprint of constellations in orbit; and approaches to improving collision avoidance screening.*

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

## PROGRAM

Panelists:

**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

09:45	10:15	<b>EXHIBITION AND NETWORKING BREAK</b>   Sponsored by <i>Exhibit Hall + Conference Platform</i> 
<p>Explore the Exhibit Hall on-site and online. Interact with our conference partners, view demos, access resources, schedule meetings, and more.</p>		
09:15 AM HST	06:50 PM HST	<b>EXHIBITION HOURS FOR THE DAY</b>
10:15	11:30	<b>SPACE DEBRIS</b>   <i>Aulani Ballroom</i> Co-chaired by <b>Heather Cowardin</b> , NASA JSC and <b>Zach Gazak</b> , SSC / SZGA
<p><i>Analysis of Darkened Fragments Resulting from Laboratory Hypervelocity Experiments</i>  <b>Heather Cowardin</b>, NASA JSC</p> <p><i>Resilience of LEO Constellations to Accidental and Intentional Fragmentation Events</i>  <b>Mark Sturza</b>, Viasat</p> <p><i>Cislunar Missions End-of-Life Disposal Strategies</i>  <b>Joshua Wysack</b>, BAE Systems</p> <p><b>2023 Poster Golden Ticket Winner</b>   <i>Recent Evolution of the Sub-Catalogue Space Debris Population in High-Altitude Orbital Regions</i>  <b>Thomas Schildknecht</b>, University of Bern, Astronomical Institute</p> <p><i>OD-SSA Activity at NASA's Heliophysics Division</i>  <b>Reinhard Friedel</b>, NASA</p>		
11:30 AM HST	12:30 PM HST	<b>LUNCH</b>   <i>Lokelani Ballroom</i>
12:30	02:45	<b>SPACE DOMAIN AWARENESS SYSTEMS &amp; INSTRUMENTATION</b>   Sponsored by <i>Aulani Ballroom</i>  Co-chaired by <b>Jeff Sherk</b> , The Aerospace Corporation and <b>Stacie Williams</b> , HQ U.S. Space Force
<p><i>A Remarkable Boost in Satellite Brightness at Optical Wavelengths During the Daytime</i>  <b>Sarah Caddy</b>, Macquarie University</p> <p><i>Passive Radio Frequency Techniques &amp; Demonstration for Space Domain Awareness</i>  <b>Zachary Leffke</b>, Virginia Polytechnic Institute &amp; State University</p> <p><i>Novel Phased Array Laser Radar Architecture for Satellite Imaging and Identification</i>  <b>James Leger</b>, University of Minnesota</p>		

## PROGRAM

*POLSA Sensor Network Capabilities under Different Operating Modes*  
**Tomasz Zubowicz**, Polish Space Agency (POLSA)

*A Benchtop Simulator for Evaluating PSF Engineering with a Fizeau Imaging Sparse Aperture Telescope*  
**Megan Birch**, Georgia Tech Research Institute / Georgia State University

*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

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02:45      03:05      EXHIBITION AND NETWORKING BREAK | *Exhibit Hall + Conference Platform*

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03:05      03:35      **FEATURED PRESENTATION | Space Logistics Drives SDA Architecture** | *Aulani Ballroom*

**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

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03:35      05:20      **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

## PROGRAM

*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

05:20 06:50 **EXHIBITION AND POSTER SESSION** | Exhibit Hall | Sponsored by   
Posters co-chaired by **Pat Patterson**, Space Dynamics Laboratory and **Matthew Stevenson**, LeoLabs  
*Meet select poster presenters while enjoying a cocktail and interacting with exhibitors and fellow attendees.*

08:00 10:00 **WOMEN & ALLIES IN SPACE DOMAIN AWARENESS** | Pacific Terrace Rooftop  
Desserts, dancing, and networking under the stars  
*Limited to first 300 guests. Separate registration required. Registration information is forthcoming.*

### Thursday 19 September

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06:00 07:30 BREAKFAST AT LEISURE | Luau Gardens  
AM HST AM HST

07:30 08:00 **KEYNOTE ADDRESS** | Aulani Ballroom  
Introduction by **Victoria Samson**, Chief Director, Space Security and Stability, Secure World Foundation



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

08:00 09:00 **SSA POLICY FORUM** | **SSA in the Asia-Pacific: Where We Are, Where We Are Going**  
*While it is agreed that a certain baseline level of SSA is needed to ensure spaceflight safety, different operators and actors have different needs for it. This panel will discuss what those needs are in the Asia-Pacific region and examine how countries and companies within it are determining what should be prioritized and how they are developing their own SSA capabilities. The possibility of regional cooperation in sharing SSA data will be discussed, as will any challenges and possible roadblocks to doing so.*



## PROGRAM

Moderated by:

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

Panelists:

**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

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09:00 09:30

EXHIBITION AND NETWORKING BREAK | Sponsored by  
Exhibit Hall + Conference Platform



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09:00 07:00  
AM HST PM HST

EXHIBITION HOURS FOR THE DAY

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09:30 10:30  
AM HST AM HST

**ASTRODYNAMICS** | Aulani Ballroom | 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

*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.

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10:30 11:30

**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



## PROGRAM

*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

11:30  
AM HST

12:30  
PM HST

LUNCH | *Lokelani Ballroom*

12:30  
PM HST


12:50  
PM HST

**FEATURED PRESENTATION | *Victus Nox: Tactically Responsive Space - Space Domain Awareness Mission*** | *Aulani Ballroom*

**Lieutenant Colonel Jason Altenhofen**, U.S. Space Force, Space Systems Command  
**Gregory Less**, Launch Systems Integration Manager, Millennium Space Systems

12:50

02:35

**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

02:35

02:55

EXHIBITION AND NETWORKING BREAK | *Exhibit Hall + Conference Platform*

02:55

05:25

**SPACE DOMAIN AWARENESS** | *Sponsored by*   
Co-chaired by **Ayla Reed**, AFRL/RDSM and  
**Lauchie Scott**, Defense R&D Canada

## PROGRAM

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*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

*On-Orbit Defensive Cyber Operations*  
**Bryan Torielli**, Deloitte

*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**, Katalyst 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

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05:25      06:55      **EXHIBITION AND POSTER SESSION** | *Exhibit Hall*  
Posters co-chaired by **Pat Patterson**, Space Dynamics Laboratory and **Matthew Stevenson**, LeoLabs

Meet select poster presenters while enjoying a cocktail and interacting with exhibitors and fellow attendees.

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### Friday 20 September

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06:00 07:30 BREAKFAST AT LEISURE | *Luau Gardens*  
AM HST AM HST

07:30 08:00 **KEYNOTE ADDRESS | Sustainable Space: Aligning Efforts to Preserve the Solar System** | *Aulani Ballroom*  
*Introduction by **Krystal Azelton**, Senior Director, Program Planning, Secure World Foundation*



**Pam Melroy**  
Deputy Administrator  
NASA

08:00 09:00 **SSA POLICY FORUM | Space Weather and SSA – What’s Needed Next?**

*Recent events such as February 2022 loss of 38 Starlink satellites due to space weather highlight the important connection between space weather and orbital trajectory predictions. Historically, the limited operational low Earth orbit (LEO) population with an altitude distribution biased towards high LEO meant operations were less sensitive to the accuracy of space weather prediction. The proliferation of LEO and very LEO with large constellations makes space weather modeling and forecasting an acute challenge. This session will examine space weather prediction capabilities, current practices for atmospheric density modeling, and the impact that these have on both the accuracy of SSA and conjunction warnings as well as the ability to share SSA data among various stakeholders. Further, it will look to US and international plans to address these issues in light of changing SSA data and service models.*

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

Panelists:  
**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

09:00 09:30 EXHIBITION AND NETWORKING BREAK | *Exhibit Hall + Conference Platform*  
Explore the Exhibit Hall on-site and online. Interact with our conference partners, view demos, access resources, schedule meetings, and more.

09:00 03:00 EXHIBITION HOURS FOR THE DAY  
AM HST PM HST

## PROGRAM

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09:00 AM HST      01:00 PM HST      **STUDENT SPACE EXPLORATION DAY** | *South Pacific Ballroom + Exhibit Hall*  
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.

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09:30 AM HST      10:00 AM HST      **FEATURED PRESENTATION** | **Updates on the Traffic Coordination System for Space (TraCSS)** | *Aulani Ballroom*  
*Introduction by **Mariel Borowitz**, Director of International SSA Engagement, Office of Space Commerce*

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

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10:00      11:30      **SPACE-BASED ASSETS** | *Sponsored by*   
Co-chaired by **BT Cesul**, Umbra 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*  
**Frederic Pelletier**, 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

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11:30 AM HST      12:30 PM HST      LUNCH | *Lokelani Ballroom*

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12:30      12:50      **FEATURED PRESENTATION** | **Joint Commercial Operations (JCO) Introduction and Way Forward** | *Aulani Ballroom*

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

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12:50      01:50      **ATMOSPHERICS / SPACE WEATHER** | *Sponsored by*   
Co-chaired by **Mary Ellen Craddock**, Northrup Grumman Corporation and **Shaylah Mutschler**, Space Environmental Technologies

## PROGRAM

*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

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01:50	02:35	<p><b>CISLUNAR SDA</b> Co-chaired by <b>John Iannamorelli</b>, The Charles Stark Draper Laboratory and <b>Jaime Stearns</b>, Air Force Research Laboratory (AFRL) Space Vehicles Directorate</p> <p><i>Applications of Poincare Search Maps for Space-Based Cislunar SDA Detection</i> <b>Raymond Wright</b>, BAE Systems</p> <p><i>Cislunar Surveillance Optimization and Key Region Identification</i> <b>Carolyn Frueh</b>, Purdue University</p> <p><i>Simultaneous Observation Association and Maneuver Reconstruction for Non-Keplerian Initial Orbit Determination using Nonlinear Programming</i> <b>Casey Heidrich</b>, University of Colorado Boulder</p>
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02:35	02:55	EXHIBITION AND NETWORKING BREAK   <i>Exhibit Hall + Conference Platform</i>
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02:55	04:10	<p><b>CISLUNAR SDA Cont.</b>   <i>Aulani Ballroom</i> Co-chaired by <b>John Iannamorelli</b>, The Charles Stark Draper Laboratory and <b>Jamie Stearns</b>, Air Force Research Laboratory (AFRL) Space Vehicles Directorate</p> <p><i>An Adaptive Approach to the Initial Orbit Determination Problem in the Cislunar Regime Using Machine Learning</i> <b>Juan Ojeda Romero</b>, JHU / APL</p> <p><i>Cislunar Initial Orbit Determination Using Sensor and Measurement-Centric Admissible Regions</i> <b>Queenique Dinh</b>, University of Colorado Boulder</p> <p><i>Efficient Cislunar Multi-Target Tracking with Adaptive Multi-Fidelity Propagation</i> <b>Benjamin L. Reifler</b>, The University of Texas at Austin</p> <p><i>Reachability Analysis of Low-Thrust Cislunar Spacecraft Using State-Transition Tensors</i> <b>Aaron Rosengren</b>, University of California, San Diego</p> <p><i>Cislunar Orbit Determination with Passive RF Sensors</i> <b>Francois Thevenot</b>, Safran Data Systems</p>
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# AMOS Conference 2024



## PROGRAM

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04:10      04:25      **FEATURED PRESENTATION | EMER-GEN® Outcomes**

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04:25      05:00      **CONFERENCE CLOSING & AWARDS CEREMONY**  
In collaboration with the Space Surveillance Technical 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.

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05:00      06:30      **PAU HANA RECEPTION | Kahoolawe Lawn**  
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

## PROGRAM

### Digital Poster Presentations | Access Starts Sep 13

All posters are available in digital format this year and are accompanied by brief presentation videos in the virtual conference platform's Poster Hall. Interact with poster presenters online. The online Poster Hall opens Sep 13.

*A select number of posters are invited for in-person presentation during the Poster Sessions, as indicated with a (\*\*) double asterisk.*

*Extreme Gradient Boosting and Deep Learning Models for the Classification of Synthetic Space Debris Light Curves*

**Anne Adriano**, University of Waterloo\*\*

*SDA TAP Lab Using Commercial Technology to Avoid Operational Surprise*

**Sean Allen**, U.S. Space Force, Space Systems Command

*The GSSAC Mission System: A New Solution for Space Objects Cataloguing from DLR*

**Alfredo Antón**, GMV\*\*

*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

*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 Debris Fragments*

**Matthew Biles**, University of Florida\*\*

*Guiding Lunar Growth: Architectural Solutions for Space Traffic Management*

**Michael Bilka**, BAE Systems\*\*

*A Technical Comparison of the Public SSA Services in the United States and the European Union*

**Mariel Borowitz**, National Oceanic and Atmospheric Administration\*\*

*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\*\*



## PROGRAM

*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\*\*

*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

*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\*\*

*An Innovative Interlaced Search, Tracking and Characterization Task Scheduling for Italian Space Surveillance and Tracking & Space Situational Awareness*

**Benedetta Di Lorenzo**, Leonardo S.p.A.\*\*

*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\*\*

*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

*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\*\*

## PROGRAM

*Dynamic-Vision Camera Physics-Based Digital Twin for Tuning SSA Use*  
**Carolin Frueh**, Purdue University

*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\*\*

*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

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

*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\*\*

*Beam-Compensated Uplink for Ground-LEO Optical Communication*  
**Michael Hart**, HartSCI LLC\*\*

*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\*\*

*Bridging Astrophysics and Space Domain Awareness: Leveraging Pandora's Innovations for Enhanced SDA Capabilities*  
**Jordan Karburn**, Lawrence Livermore National Laboratory

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

*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\*\*

## PROGRAM

*Graph Based Analysis of Persistent Detection Corridors in Cislunar Space*

**Michael Klonowski**, University of Colorado Boulder\*\*

*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 Laddh**, 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

*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\*\*

*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

*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\*\*

*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

## PROGRAM

*Deep Reinforcement Learning Applications to Space Situational Awareness Scenarios*

**Benedict Oakes**, University of Liverpool

*Spectrophotometric Studies of RSO as Part of the SSA Development Program in Kazakhstan*

**Chingis Omarov**, Fesenkov Astrophysical Institute

*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

*Enhancing Unknown Near-Earth Object Detection with Synthetic Tracking and Convolutional Neural Networks*

**Kevin Phan**, EO Solutions\*\*

*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

*The Resonant Structure of xGEO and Implications for Cislunar Domain Awareness*

**Shane D. Ross**, Virginia Tech\*\*

*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

*Optimizing the Radar Network Architecture for LEO Space Domain Awareness*

**Jack Schuss**, SpaceEM\*\*

*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

## PROGRAM

*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\*\*

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

*Comparison of Cislunar Robotic Platforms and Spacecraft Swarms for Space Situational Awareness and Traffic Management*  
**Athip Thirupathi Raj**, University of Arizona – Space TReX

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

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

*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

*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**, Massachusetts Institute of Technology\*\*

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

*Accelerating the Delivery of Space Systems: Applying Agile to Large-Scale, Safety-Critical, Cyber-Physical Systems for Enhanced Safety and Reliability*  
**Robin Yeman**, Carnegie Mellon SEI

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

# AMOS Conference 2024



## PROGRAM

*Moving AI/ML to the Ops Floor: the MIT Challenge and Beyond*

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

*Operational Heuristics Applied to the Two-Point Boundary Value Problem for Spacecraft Maneuver Reconstruction*

**Andrew Zizzi**, Millennial Software\*\*